No. 878,478. PATENTED FEB. 4, 1908.

A. M. ENGLISH.

ROUGH ROUNDING MACHINE.

APPLICATION FILED AUG. 9, 1906.

30 SHEETS—SHEET 1.

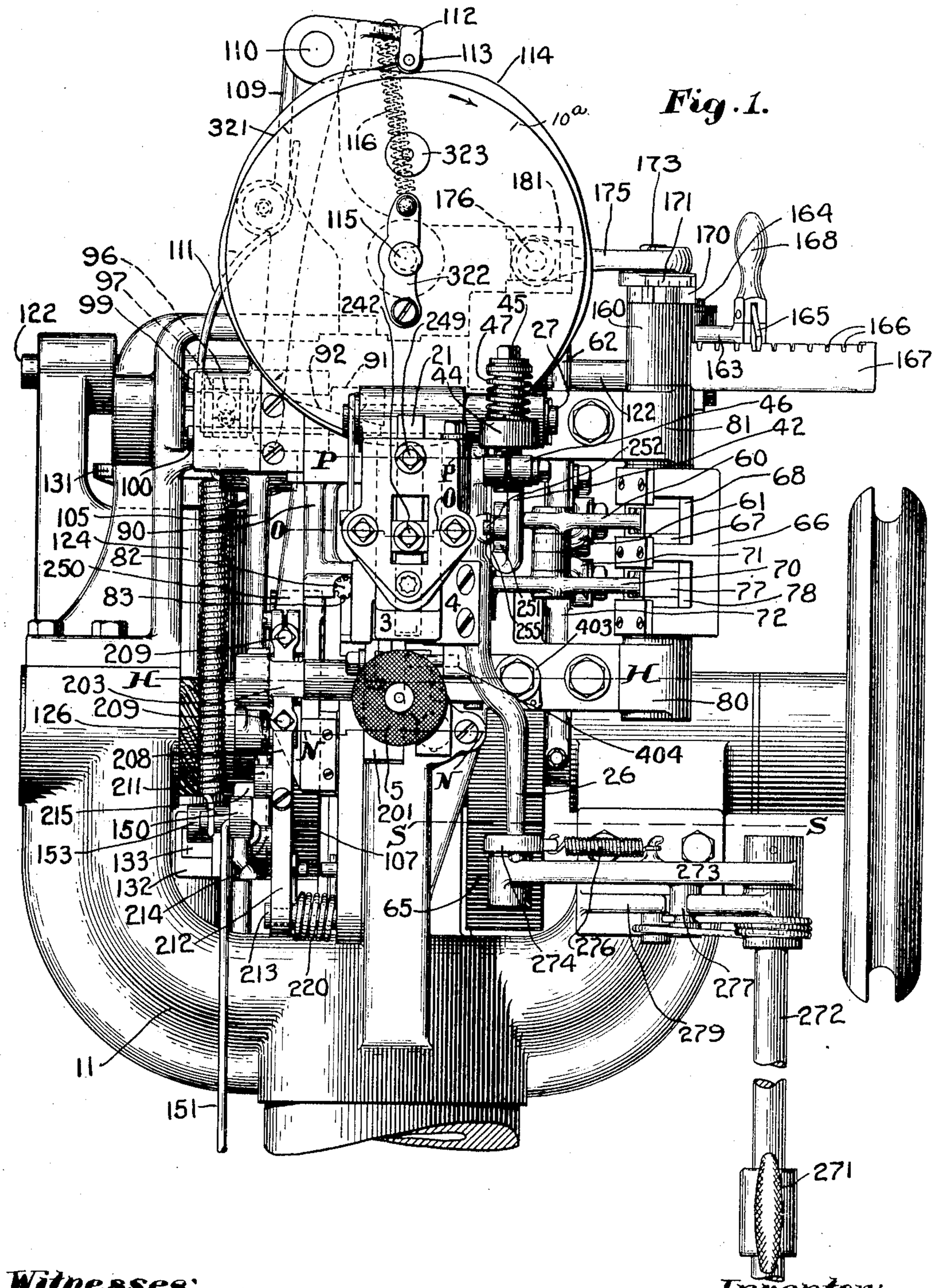


Fig. 1.

Witnesses:
Edwin J. Lucas
Robert H. Kammler.

Inventor:
Analdo M. English,
by Cleary & Hagney
Atty's.

No. 878,478. PATENTED FEB. 4, 1908.

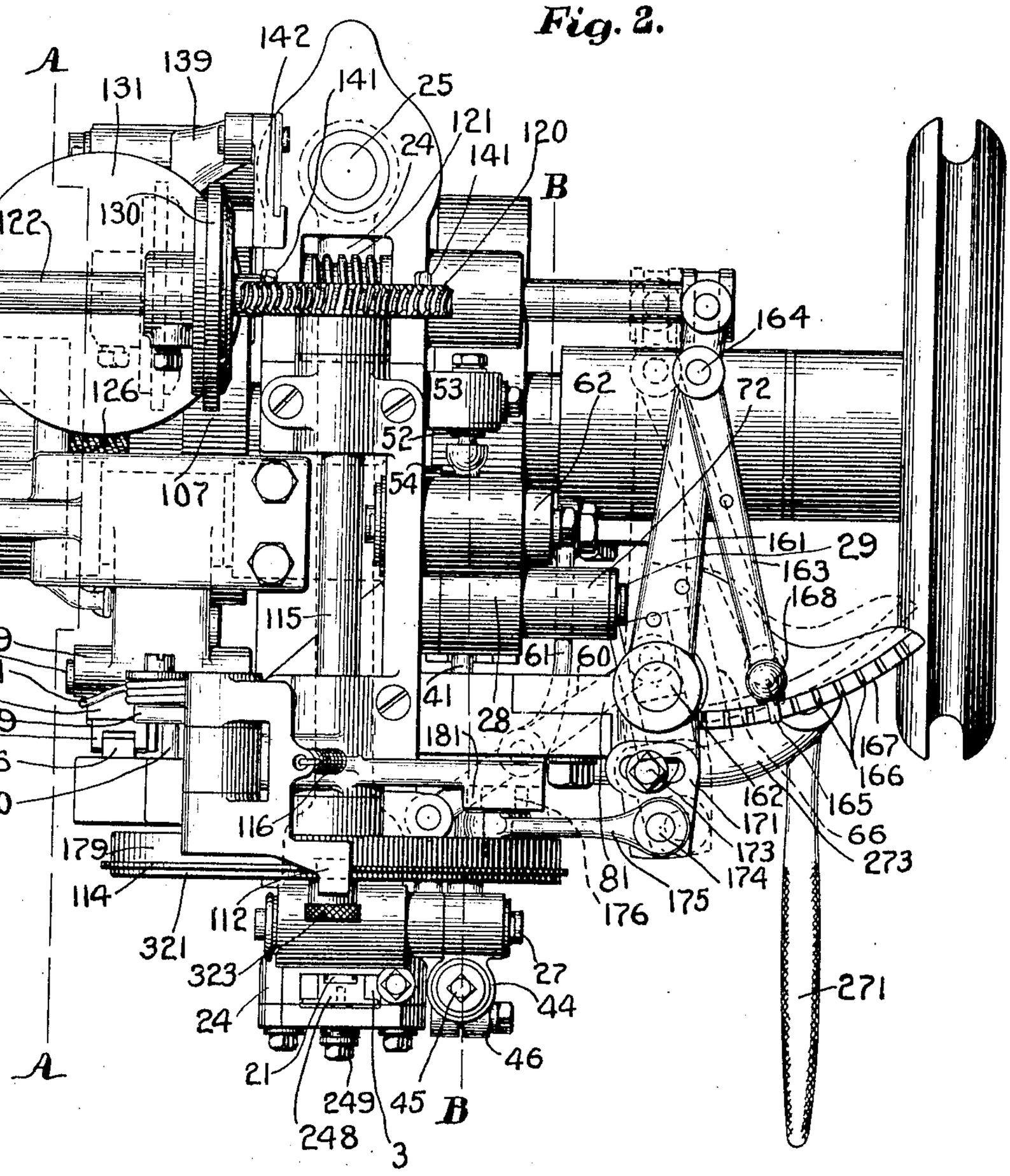
A. M. ENGLISH.

ROUGH ROUNDING MACHINE.

APPLICATION FILED AUG. 9, 1906.

30 SHEETS—SHEET 2.

Fig. 2.



Witnesses:
Edwin T. Luce
Robert H. Kammich.

Inventor:
Analdo M. English,
by Lesarly & Fugony
Atty's.

No. 878,478. PATENTED FEB. 4, 1908.

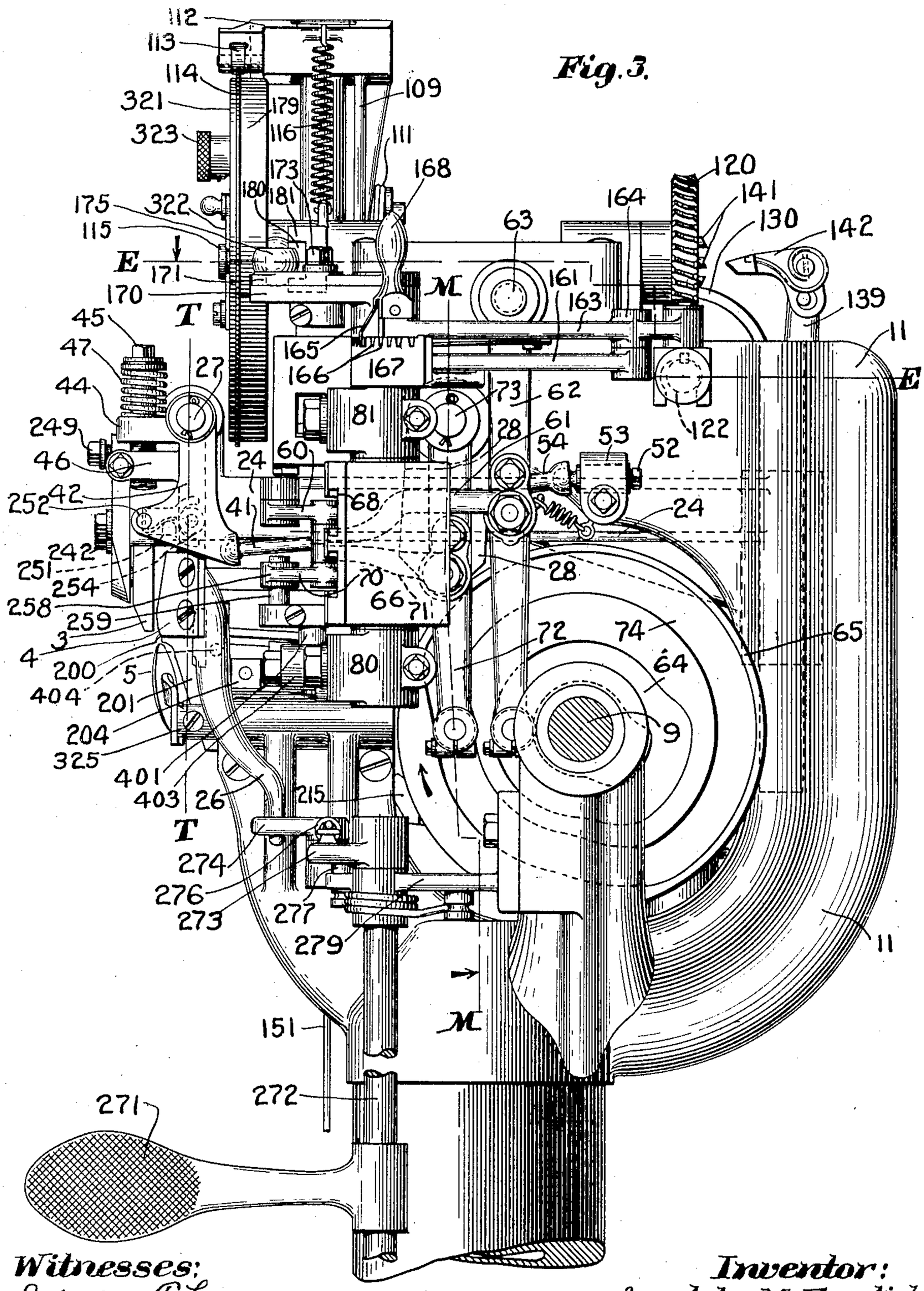
A. M. ENGLISH.

ROUGH ROUNDING MACHINE.

APPLICATION FILED AUG. 9, 1906.

30 SHEETS—SHEET 3.

Fig. 3.



Witnesses:
Edwin T. Luce
Robert H. Kammler.

Inventor:
Arnaldo M. English,
by Lemley & Gregory
Atty's.

No. 878,478. PATENTED FEB. 4, 1908.

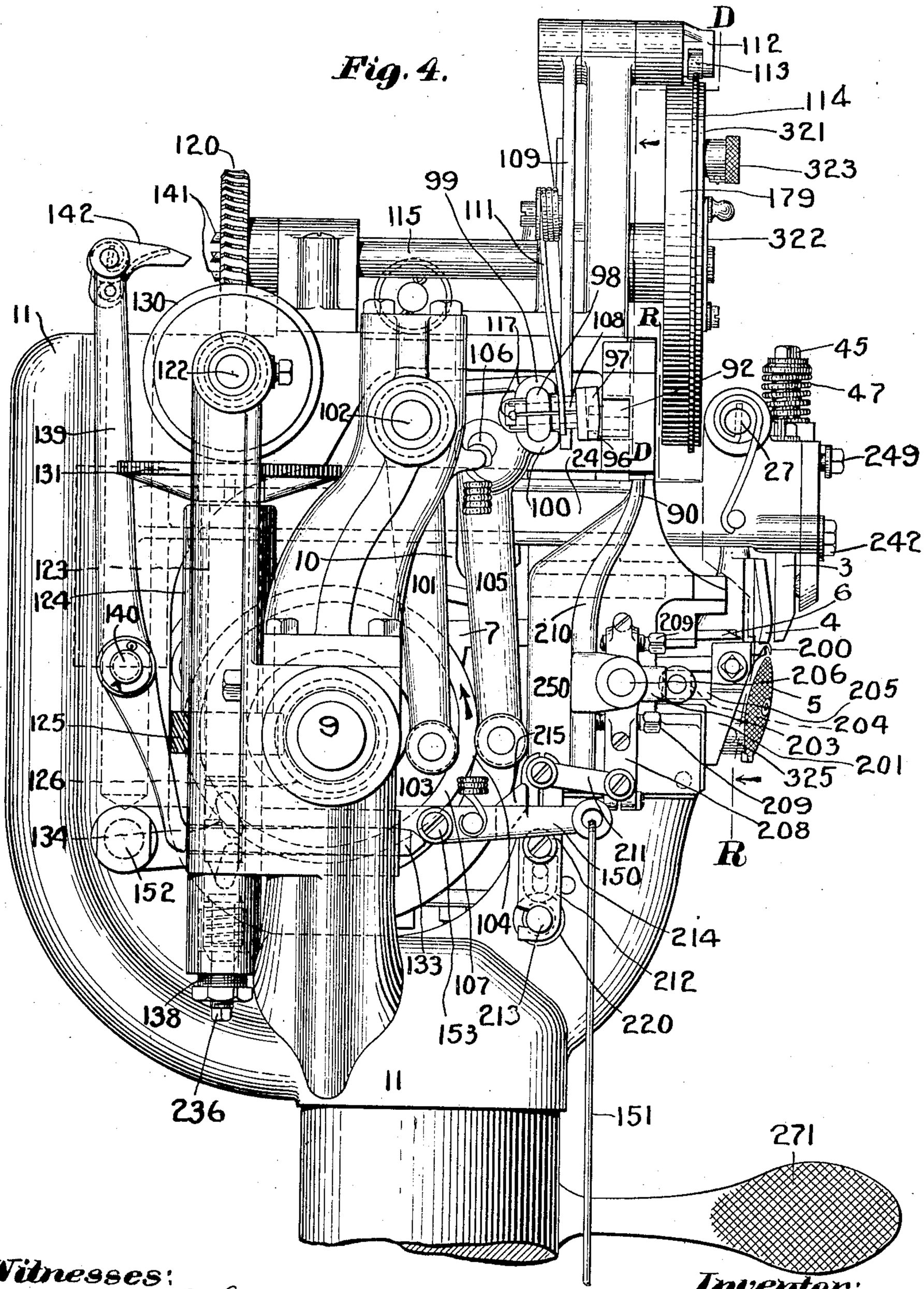
A. M. ENGLISH.

ROUGH ROUNDING MACHINE.

APPLICATION FILED AUG. 9, 1906.

30 SHEETS—SHEET 4.

Fig. 4.



Witnesses:
Edwin T. Luce
Robert H. Kammler.

Inventor:
Arnaldo M. English
by Lemby & Gregory
Atty's.

No. 878,478. PATENTED FEB. 4, 1908.

A. M. ENGLISH.

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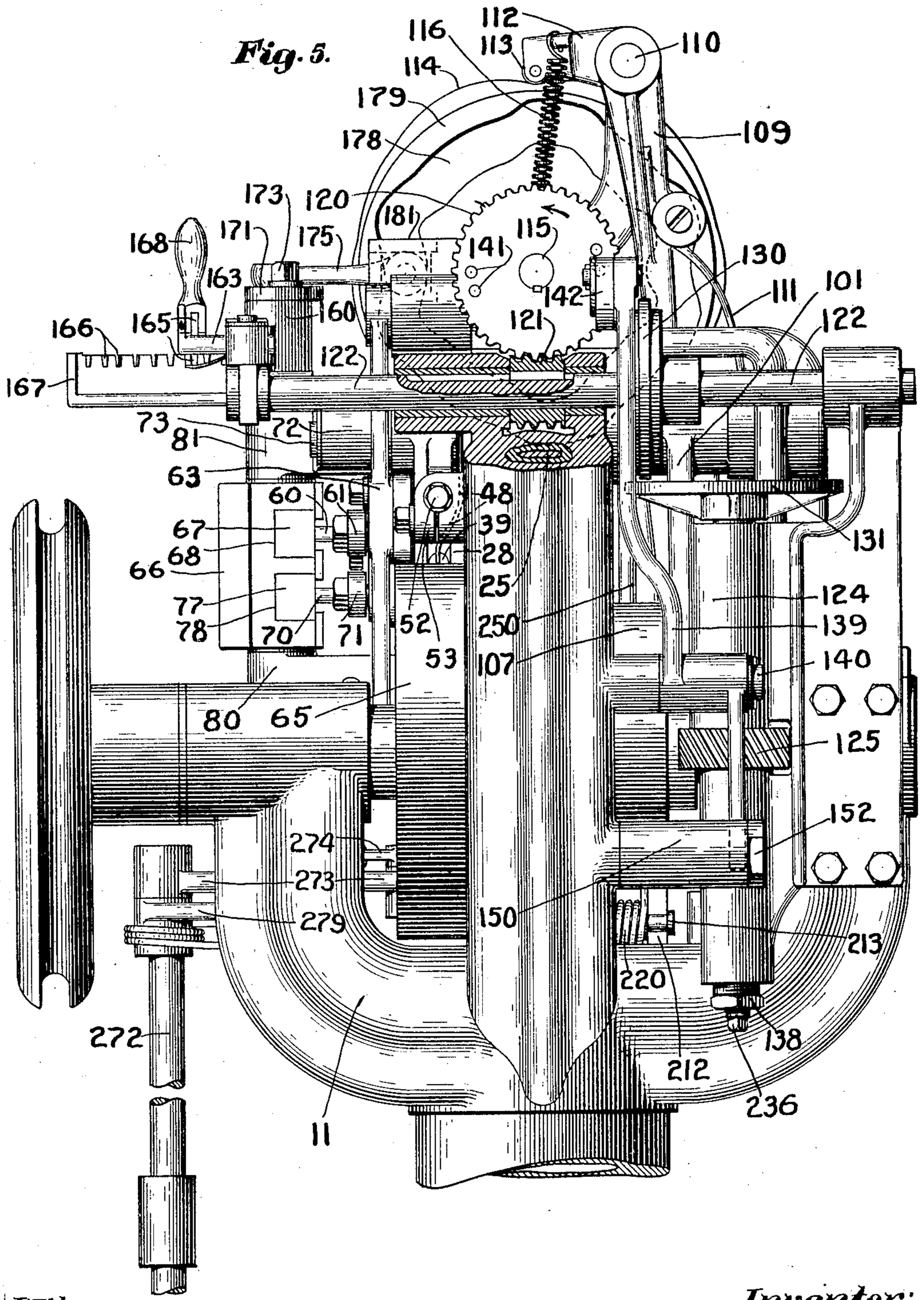
APPLICATION FILED AUG. 9, 1906.

30 SHEETS—SHEET 5.

Fig. 5.



Witnesses:
Edwin T. Luce
Robert H. Kammler.

Inventor:
Arnaldo M. English,
by Lemley & Gregory Atty's.

No. 878,478. PATENTED FEB. 4, 1908.

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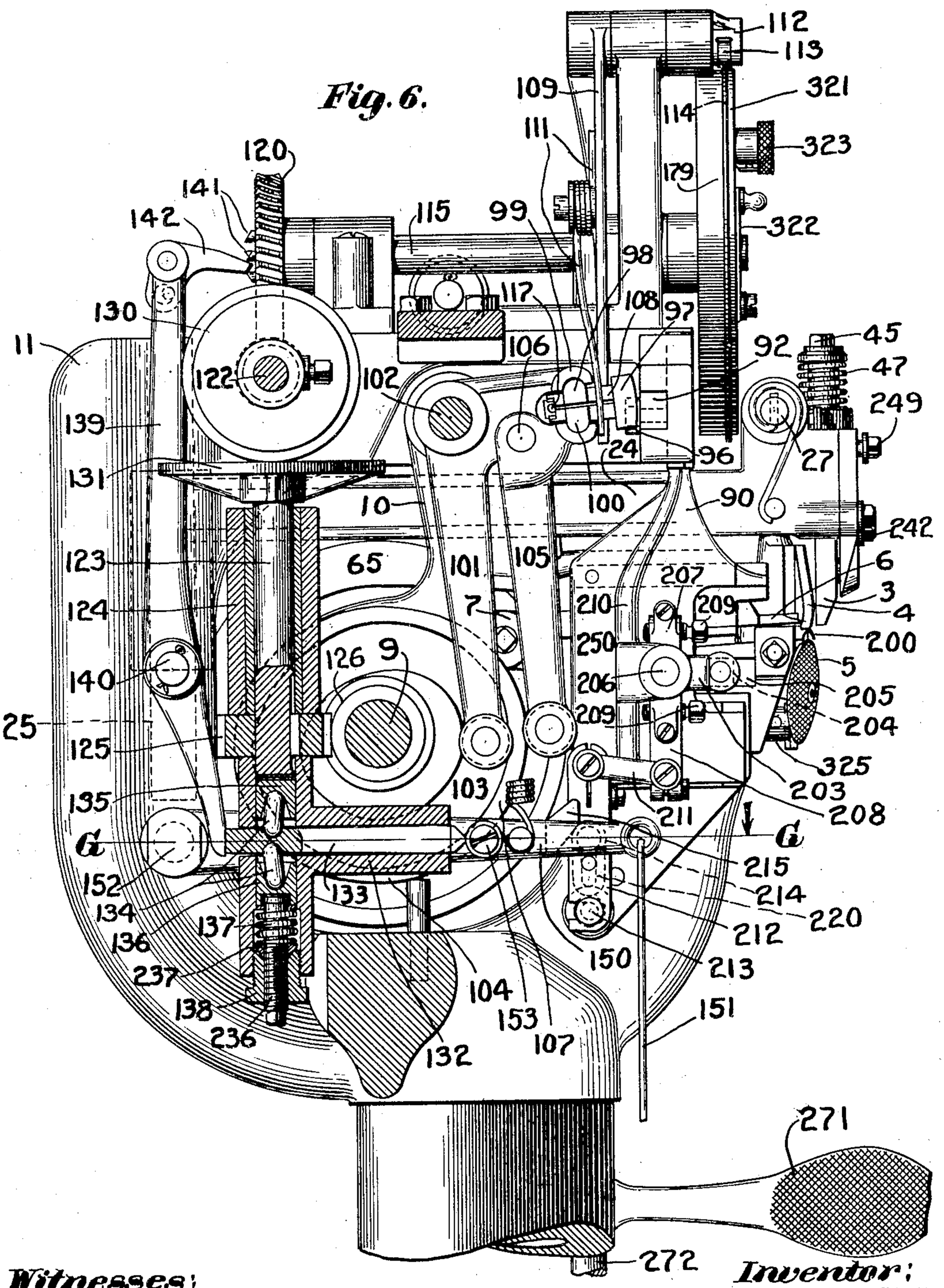
APPLICATION FILED AUG. 9, 1906.

30 SHEETS—SHEET 6.

Fig. 6.



Witnesses:
Edwin T. Luce
Robert H. Kammler.

Inventor:
Arnaldo M. English,
by Lemley & Gregory
Atty's.

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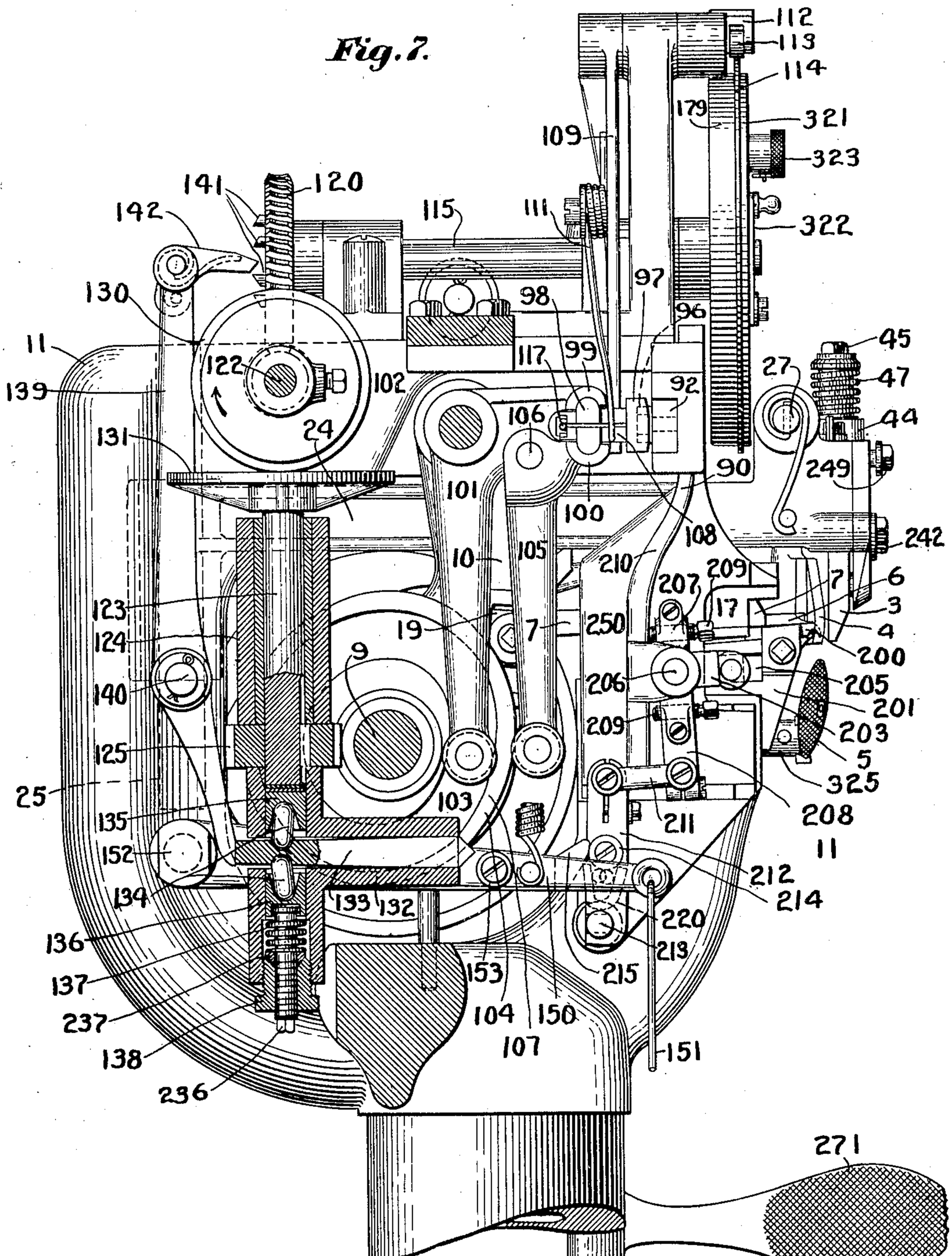
30 SHEETS—SHEET 7.

Fig. 7.



Witnesses:
Edwin T. Luce
Robert H. Hammler.

Inventor:
Arnaldo M. English,
by Lemly & Fugroy Atty's.

No. 878,478. PATENTED FEB. 4, 1908.

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APPLICATION FILED AUG. 9, 1906.

30 SHEETS—SHEET 8.

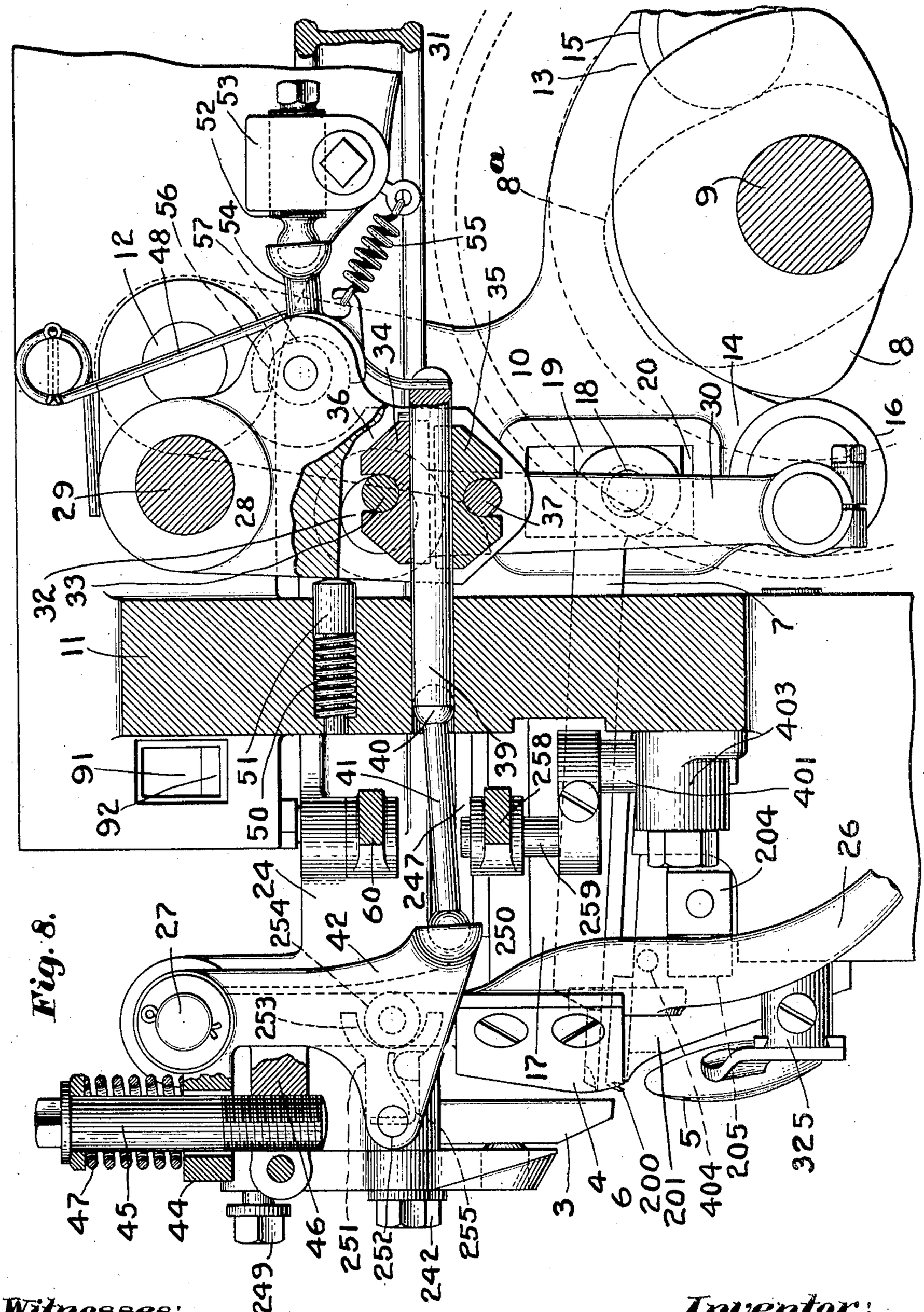

Fig. 8.

Witnesses:
Edwin F. Lucas
Robert H. Kammler.

Inventor:
Arnaldo M. English,
by Lemley & Gregory
Atty's.

No. 878,478. PATENTED FEB. 4, 1908.

A. M. ENGLISH.

ROUGH ROUNDING MACHINE.

APPLICATION FILED AUG. 9, 1906.

30 SHEETS—SHEET 9.

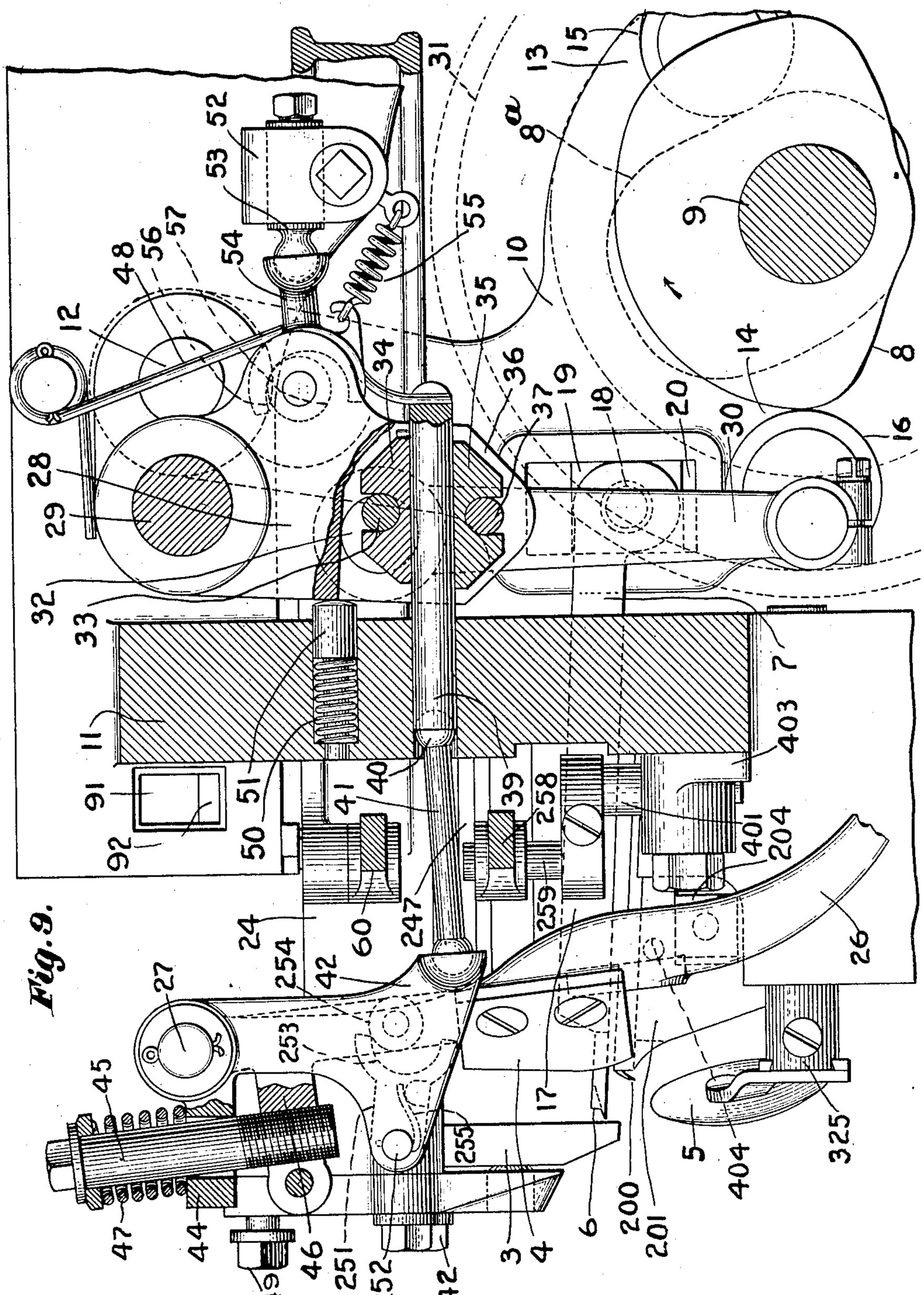

Fig. 9.

Witnesses:
Edwin T. Luce
Robert H. Kammler.

Inventor:
Arnaldo M. English,
by Lemley & Gregg Atty's.

No. 878,478. PATENTED FEB. 4, 1908.

A. M. ENGLISH.

ROUGH ROUNDING MACHINE.

APPLICATION FILED AUG. 9, 1906.

30 SHEETS—SHEET 10.

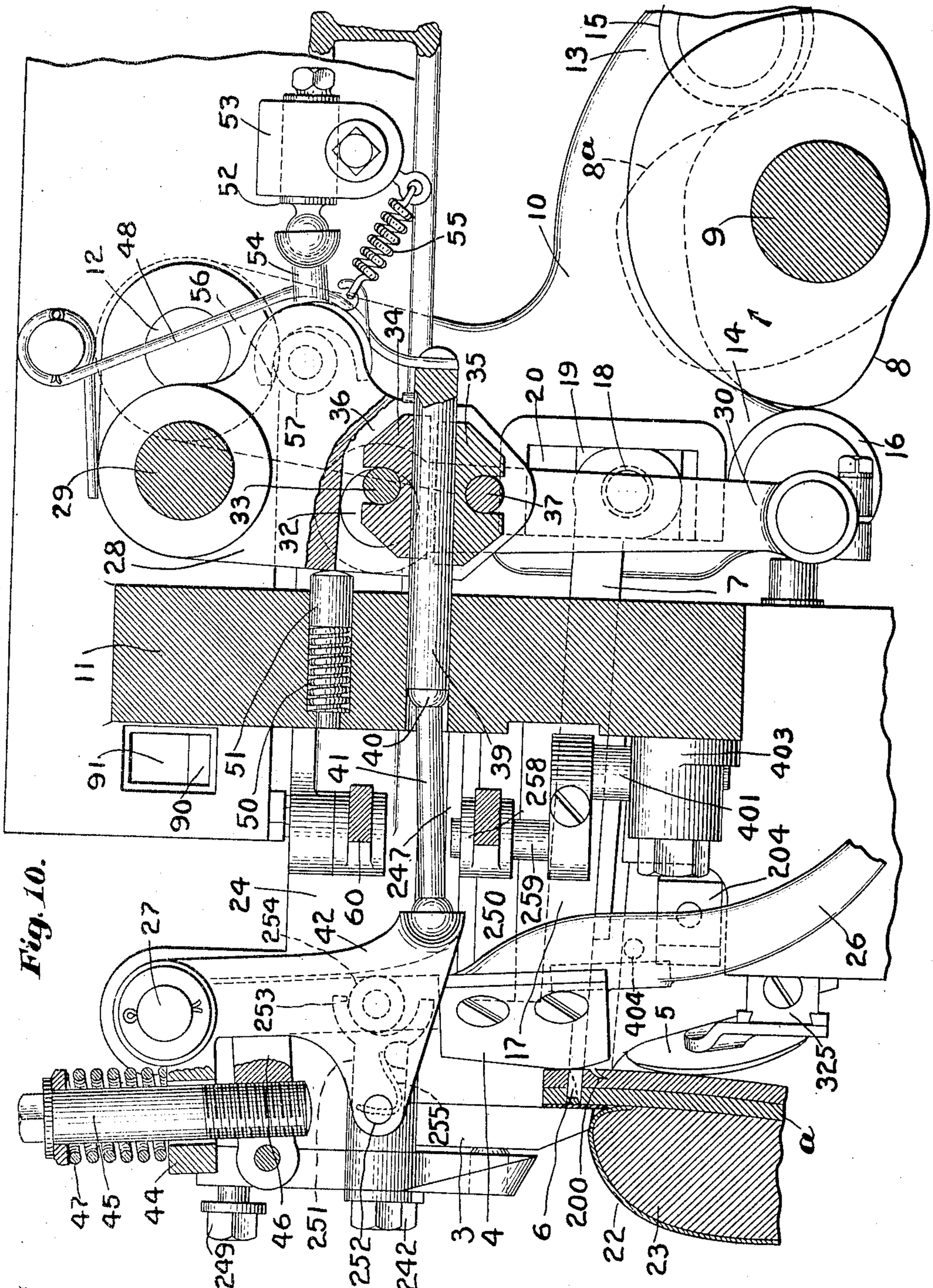

Fig. 10.

Witnesses:
Edwin F. Lance
Robert H. Kammler.

Inventor:
Analdo M. English,
by Lemley & Gregory
Atty's.

No. 878,478. PATENTED FEB. 4, 1908.

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ROUGH ROUNDING MACHINE.

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30 SHEETS—SHEET 11.

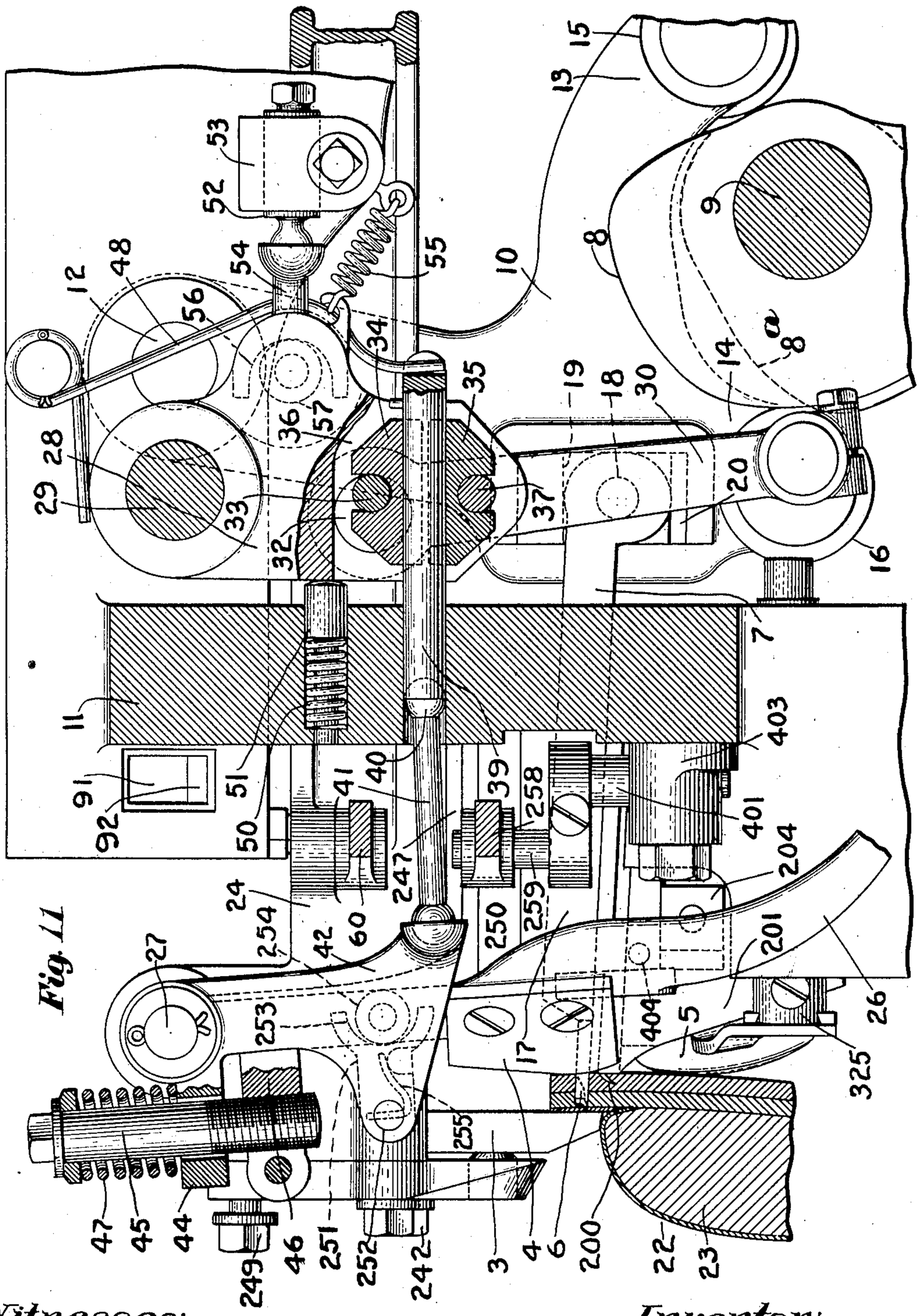

Fig. 11

Witnesses;
Edwin T. Lucas
Robert H. Kamma.

Inventor;
Arnaldo M. English,
by Cressy & Gregory Atty's.

No. 878,478. PATENTED FEB. 4, 1908.

A. M. ENGLISH.

ROUGH ROUNDING MACHINE.

APPLICATION FILED AUG. 9, 1906.

30 SHEETS—SHEET 12.

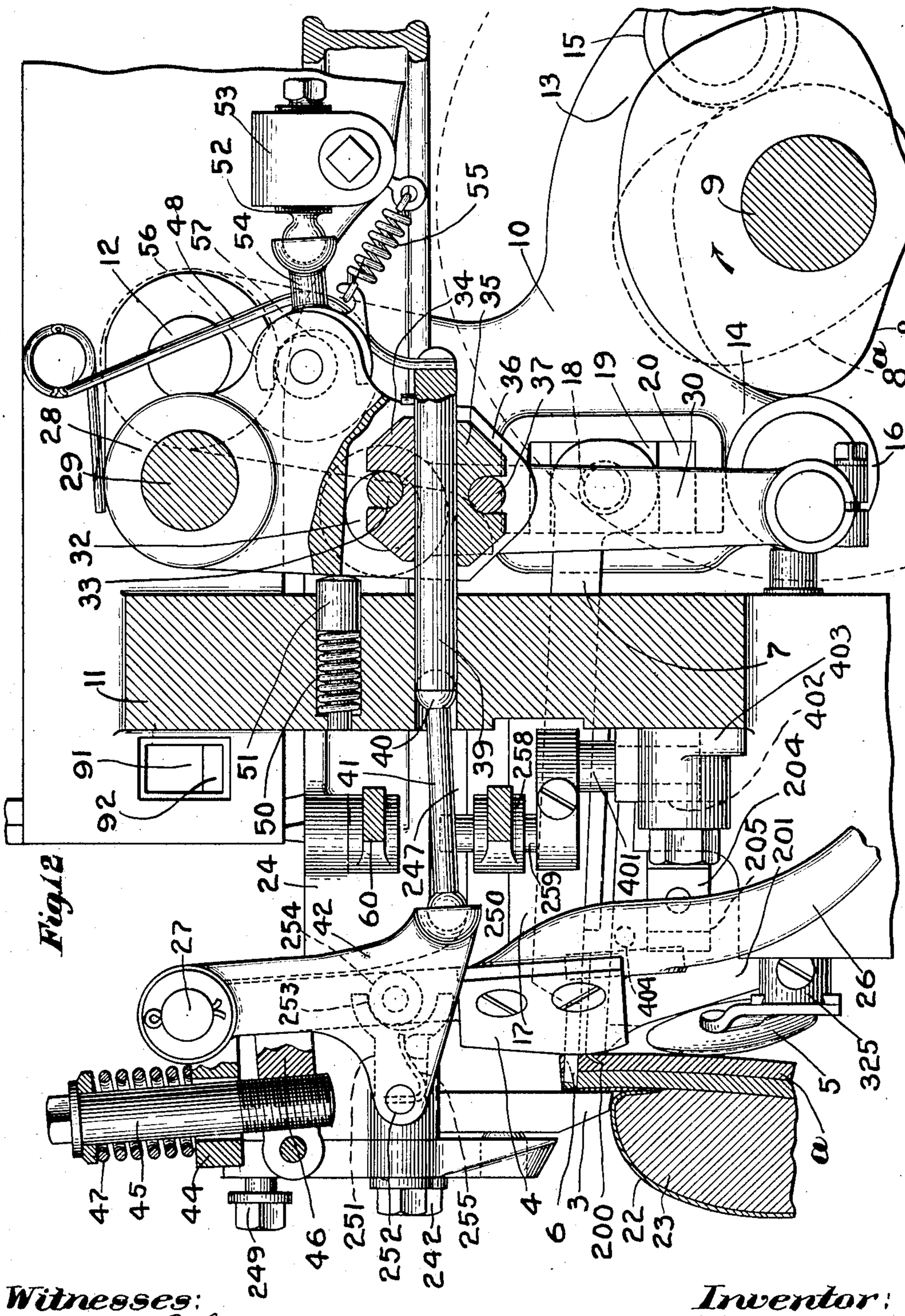

Fig. 12

Witnesses:
Edwin P. Lyon
Robert H. Kammler

Inventor:
Analdo M. English
by Cleveland & Gregory Atty's

No. 878,478. PATENTED FEB. 4, 1908.

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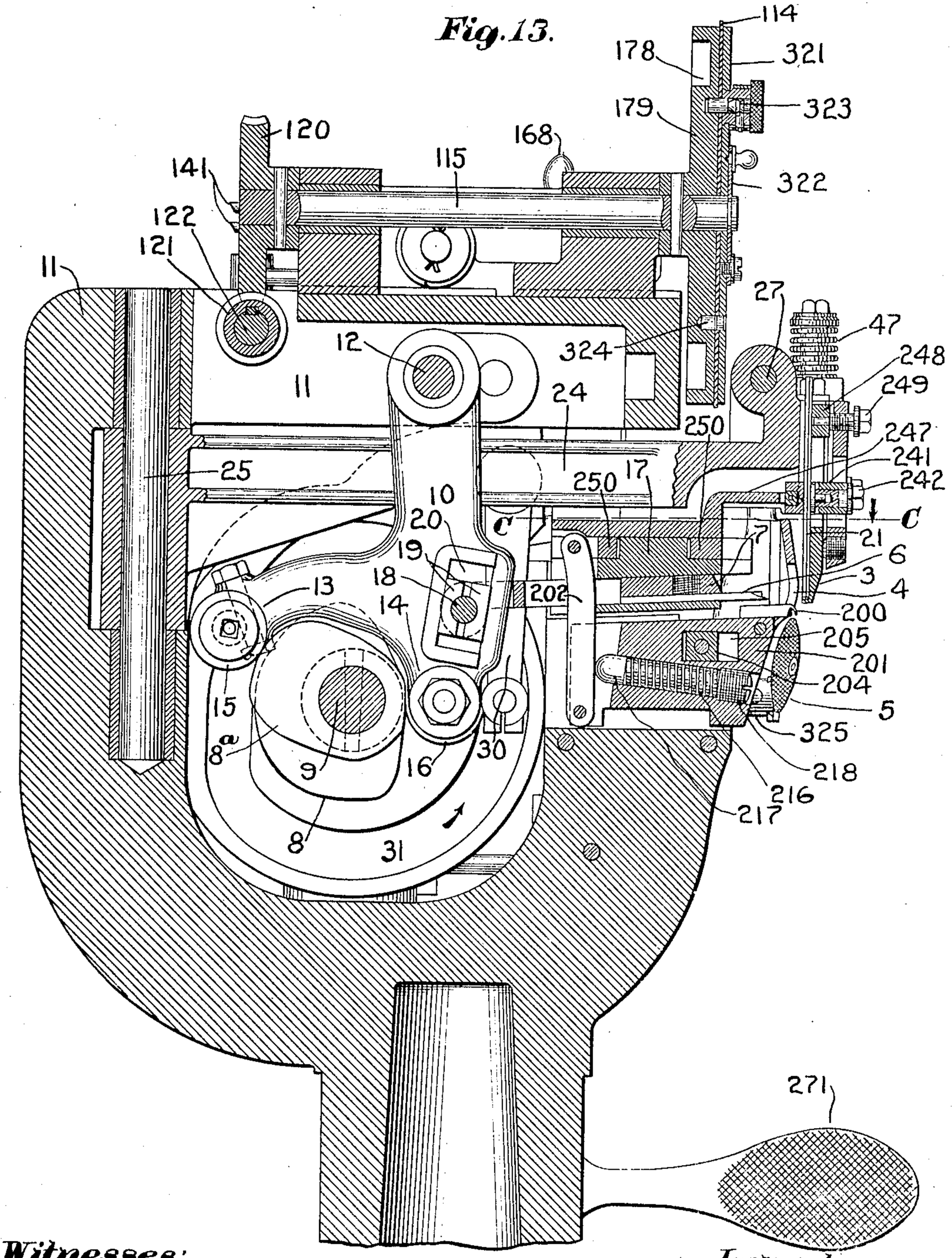
ROUGH ROUNDING MACHINE.

APPLICATION FILED AUG. 9, 1906.

30 SHEETS—SHEET 13.

Fig. 13.



Witnesses:
Edwin P. Lyon
Robert H. Kammler.

Inventor:
Arnaldo M. English.
by Cleary & Gregory
Atty's.

No. 878,478. PATENTED FEB. 4, 1908.

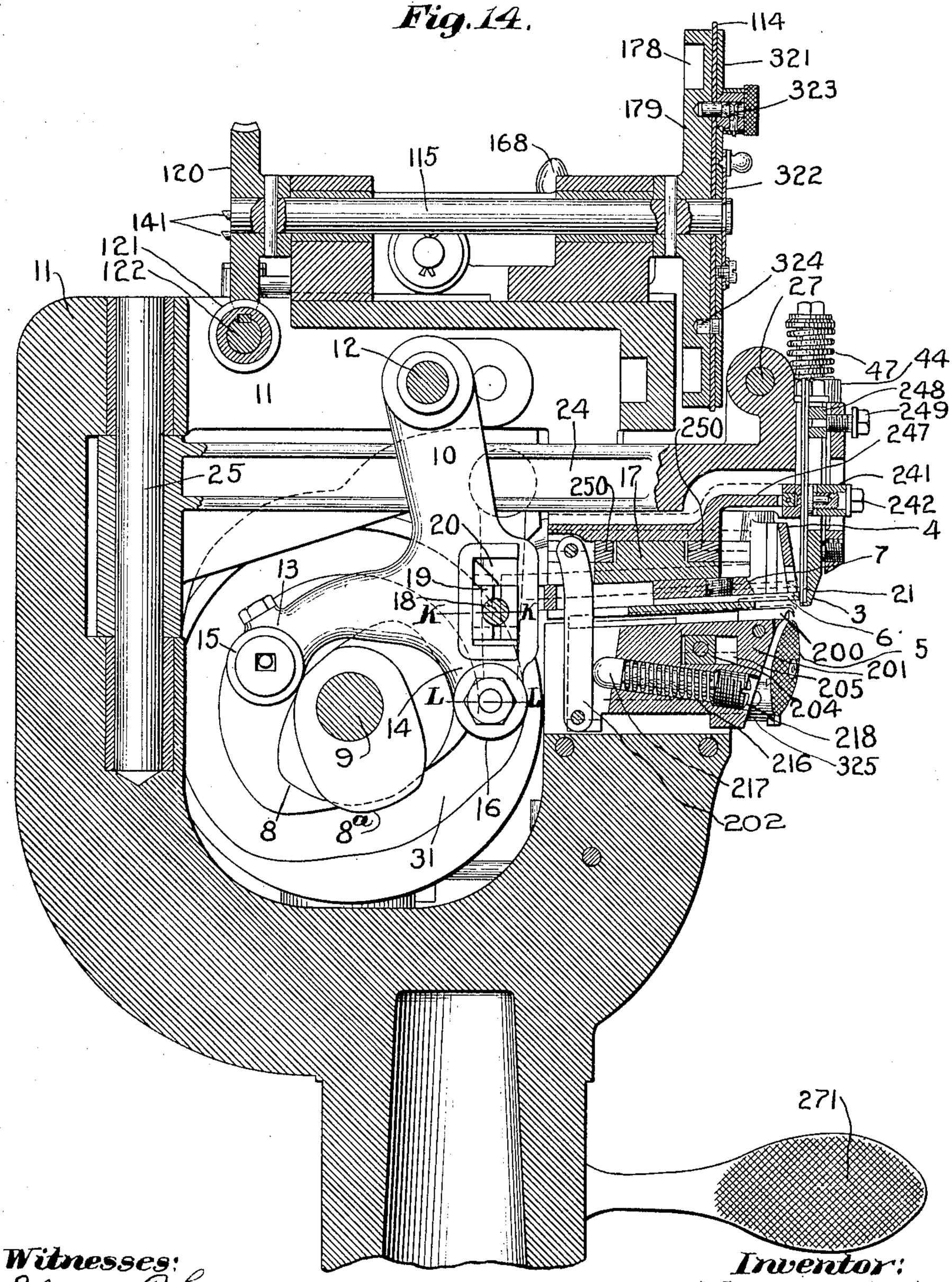
A. M. ENGLISH.

ROUGH ROUNDING MACHINE.

APPLICATION FILED AUG. 9, 1906.

30 SHEETS—SHEET 14.

Fig. 14.



Witnesses:
Edwin T. Luce
Robert H. Kammler.

Inventor:
Analdo M. English,
by Lemley & Gregory
Atty's.

No. 878,478. PATENTED FEB. 4, 1908.

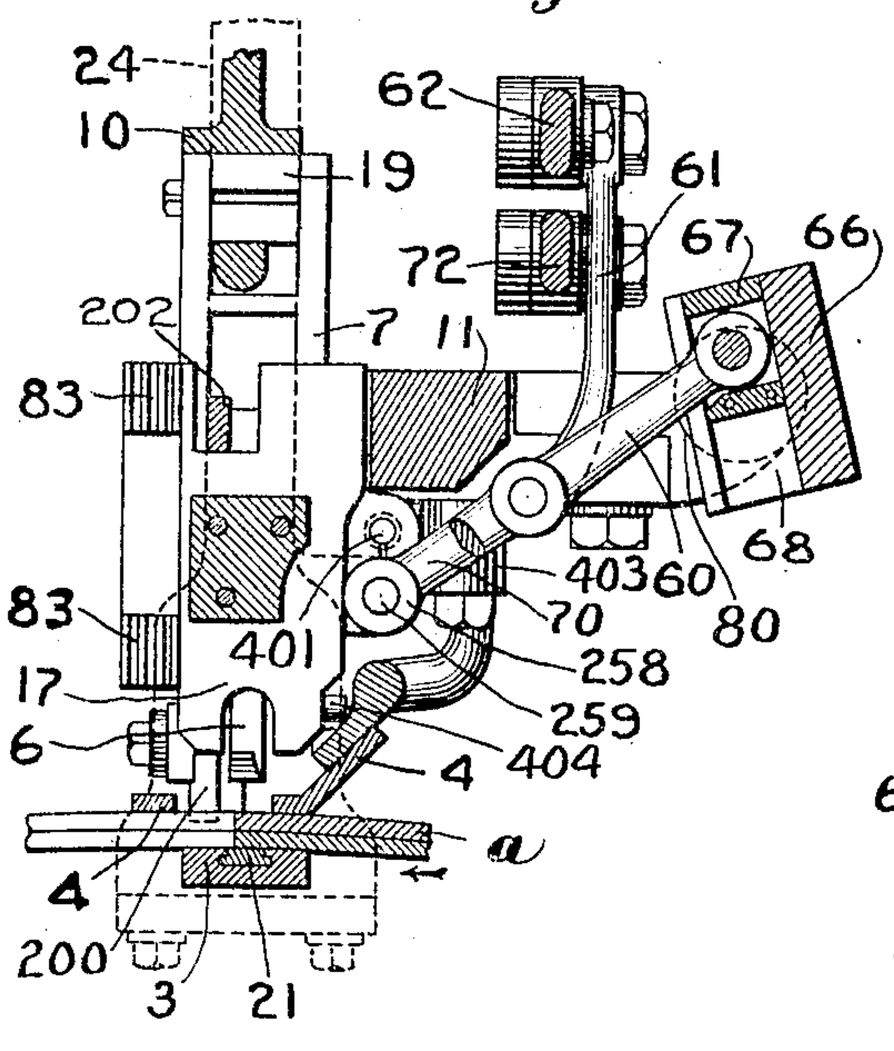
A. M. ENGLISH.

ROUGH ROUNDING MACHINE.

APPLICATION FILED AUG. 9, 1906.

30 SHEETS—SHEET 15.

Fig. 15



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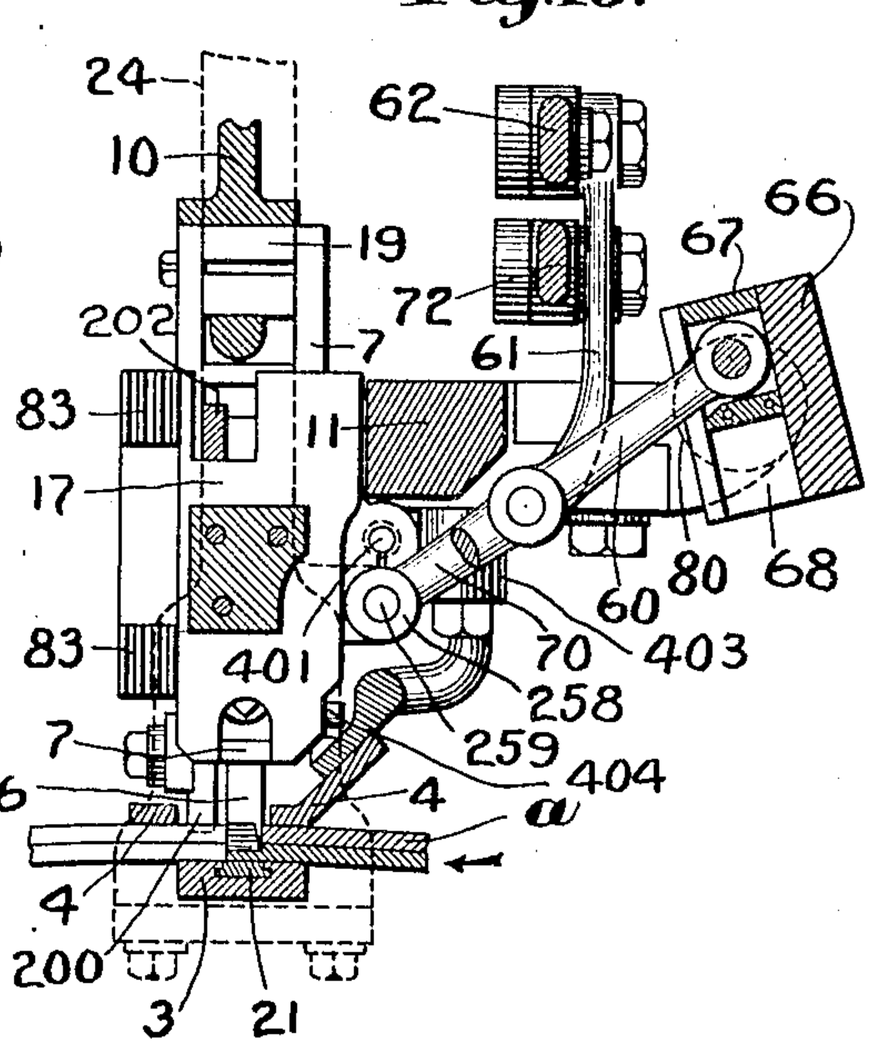

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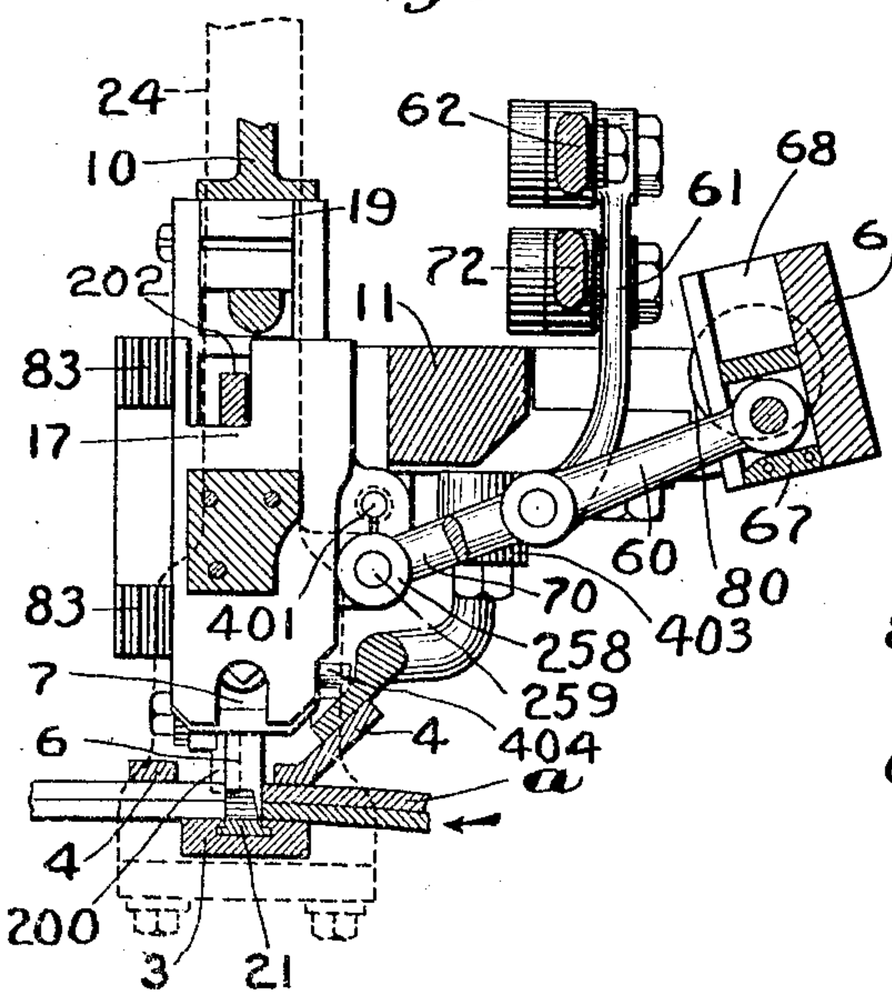

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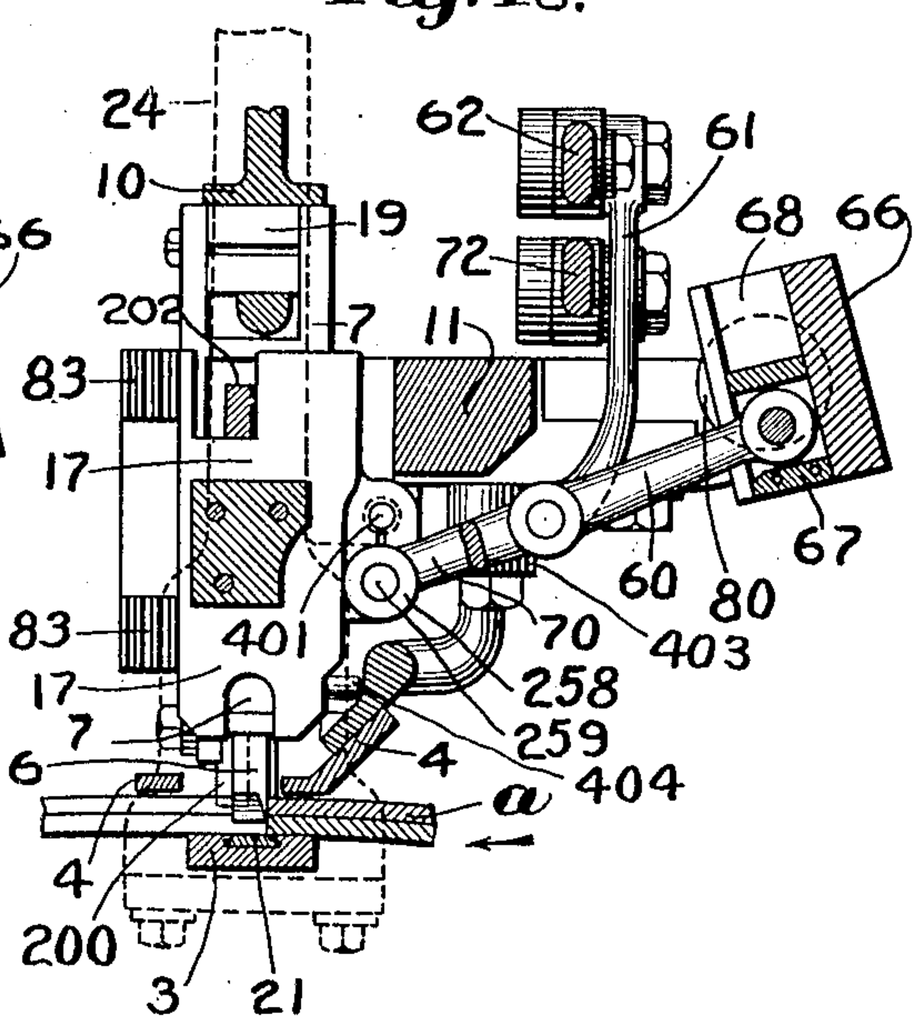


Witnesses;
Edwin T Luce
Robert H Kammler.

Inventor;
Arnaldo M. English,
by Levinsky & Gregory **Atty's.**

No. 878,478. PATENTED FEB. 4, 1908.

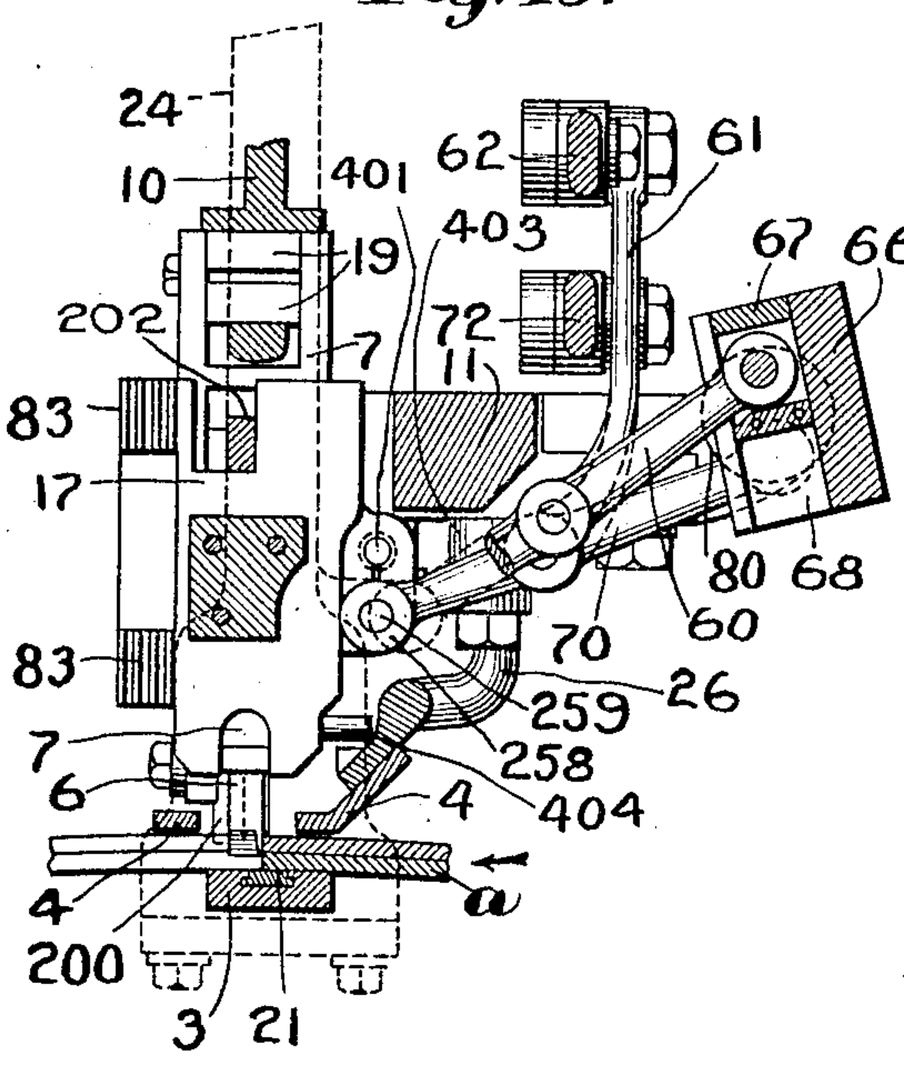
A. M. ENGLISH.

ROUGH ROUNDING MACHINE.

APPLICATION FILED AUG. 9, 1906.

30 SHEETS—SHEET 16.

Fig. 19.



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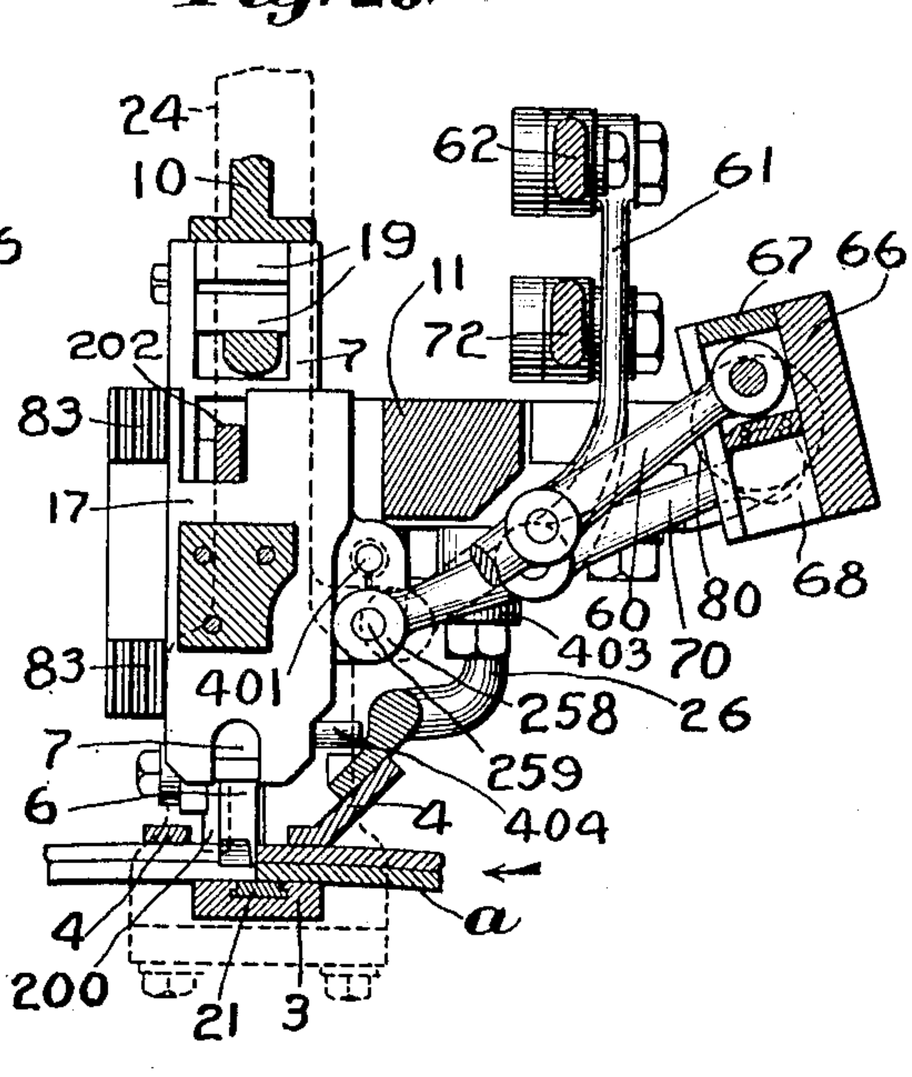

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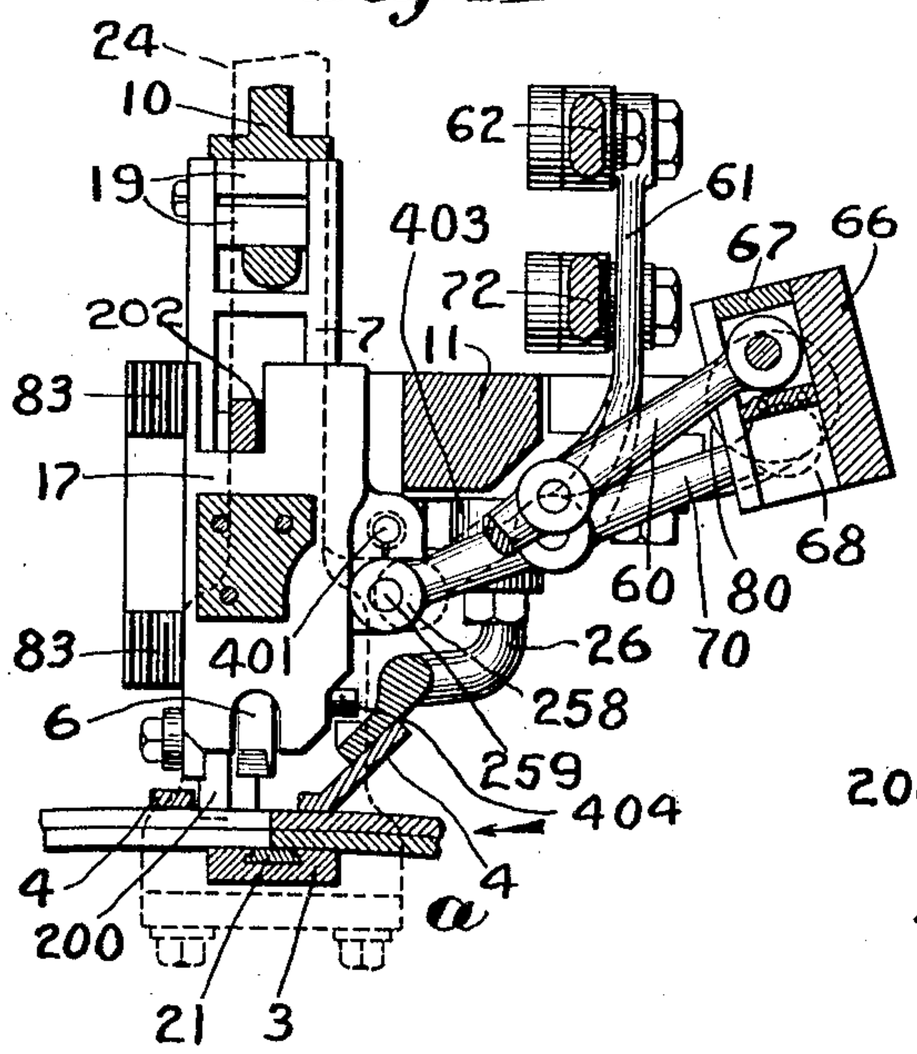

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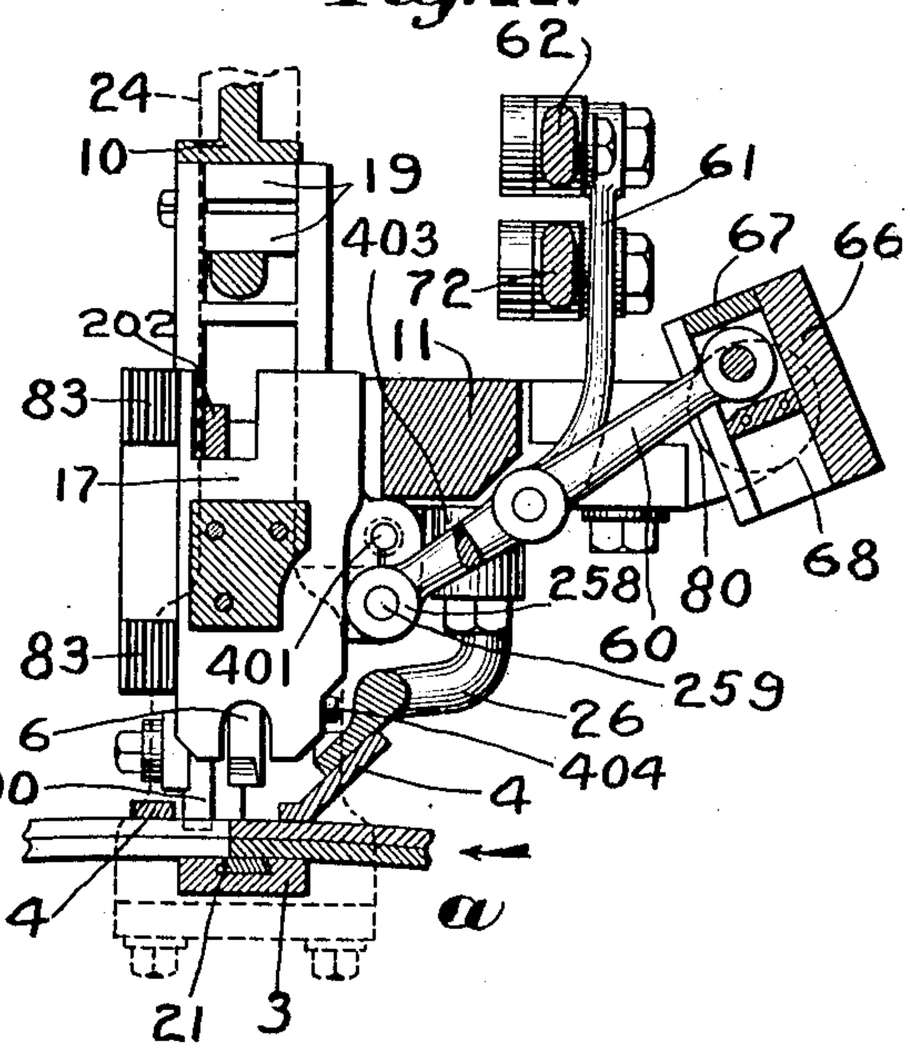


Witnesses:
Edwin T. Luce
Robert H. Kammler.

Inventor:
Arnaldo M. English,
by Lemley & Gregory
Atty's.

No. 878,478. PATENTED FEB. 4, 1908.

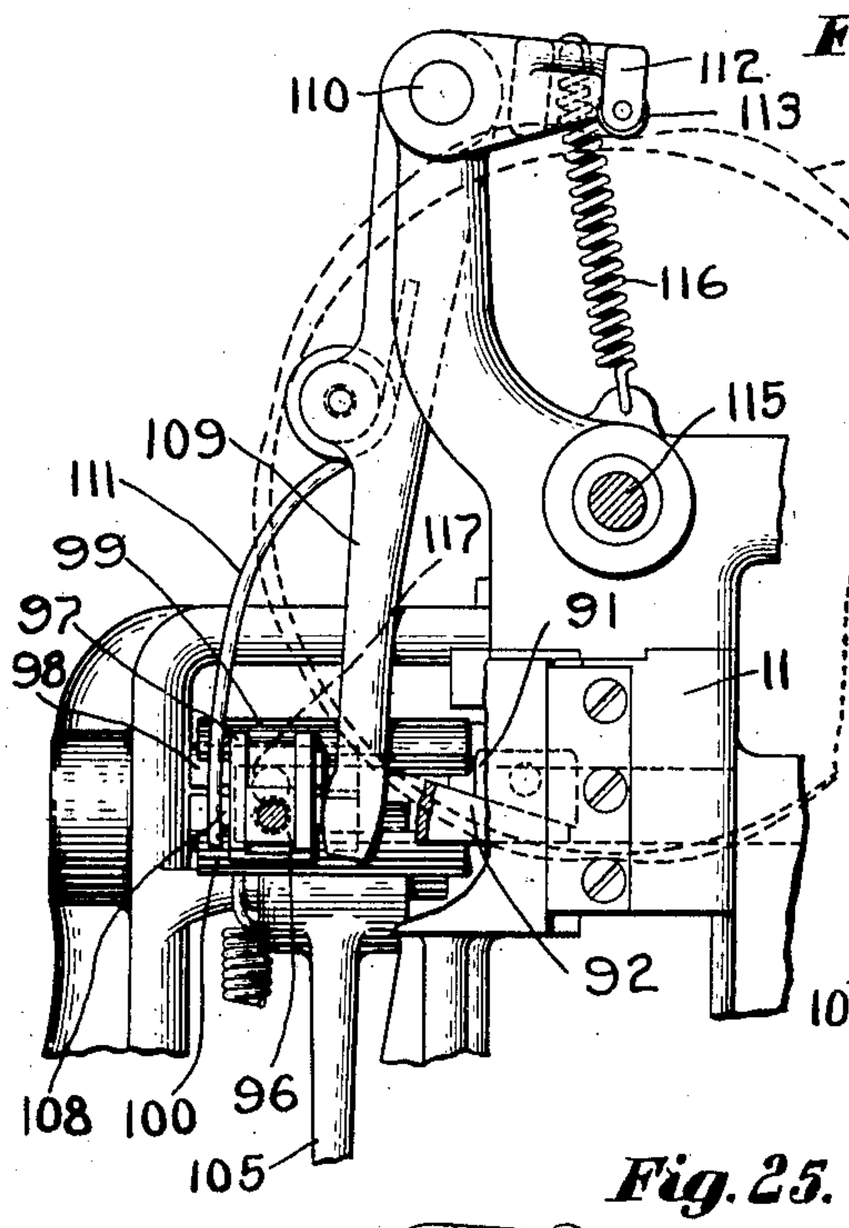
A. M. ENGLISH.

ROUGH ROUNDING MACHINE.

APPLICATION FILED AUG. 9, 1906.

30 SHEETS—SHEET 17.

Fig. 23.



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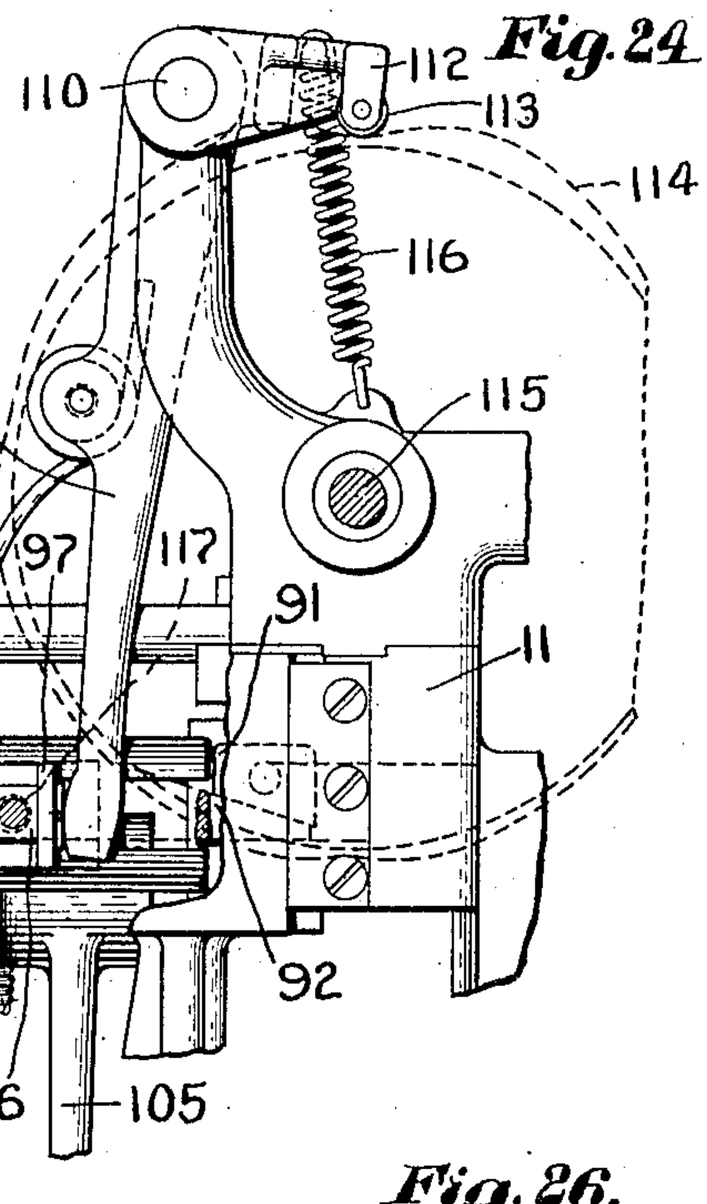

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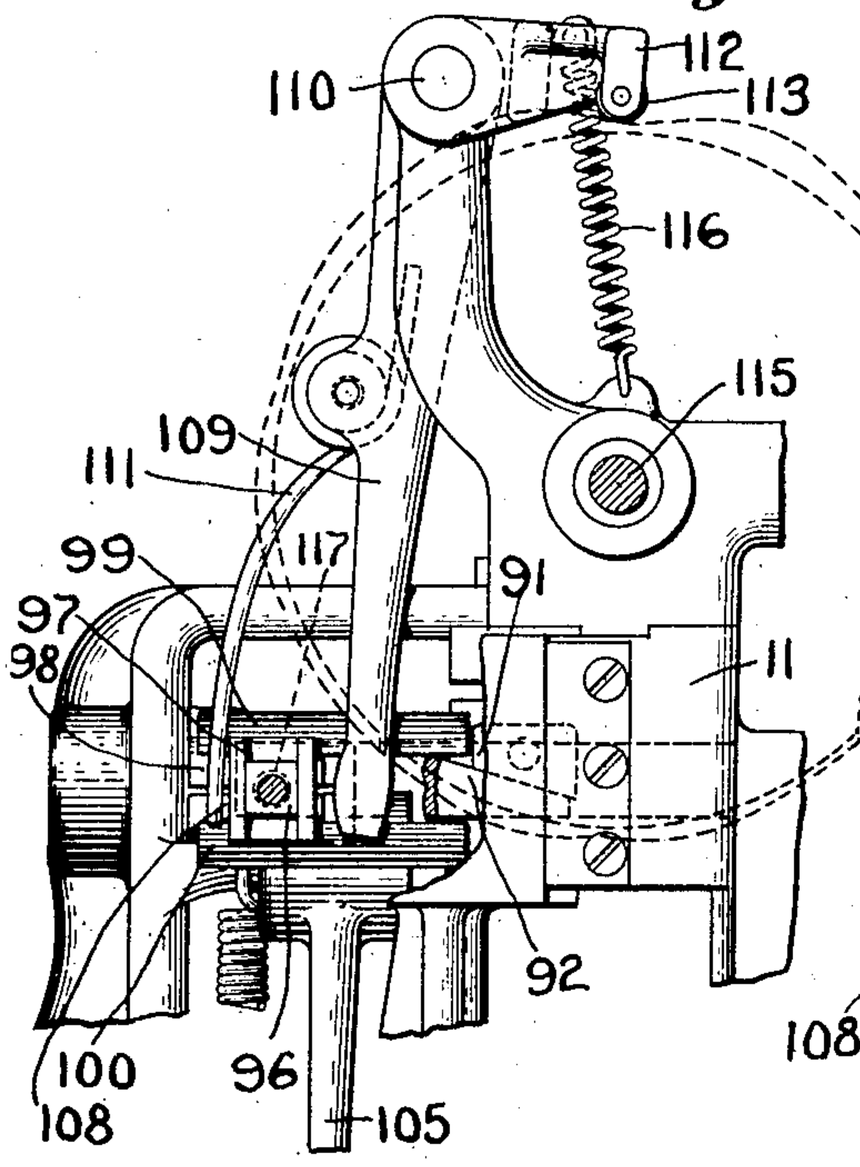

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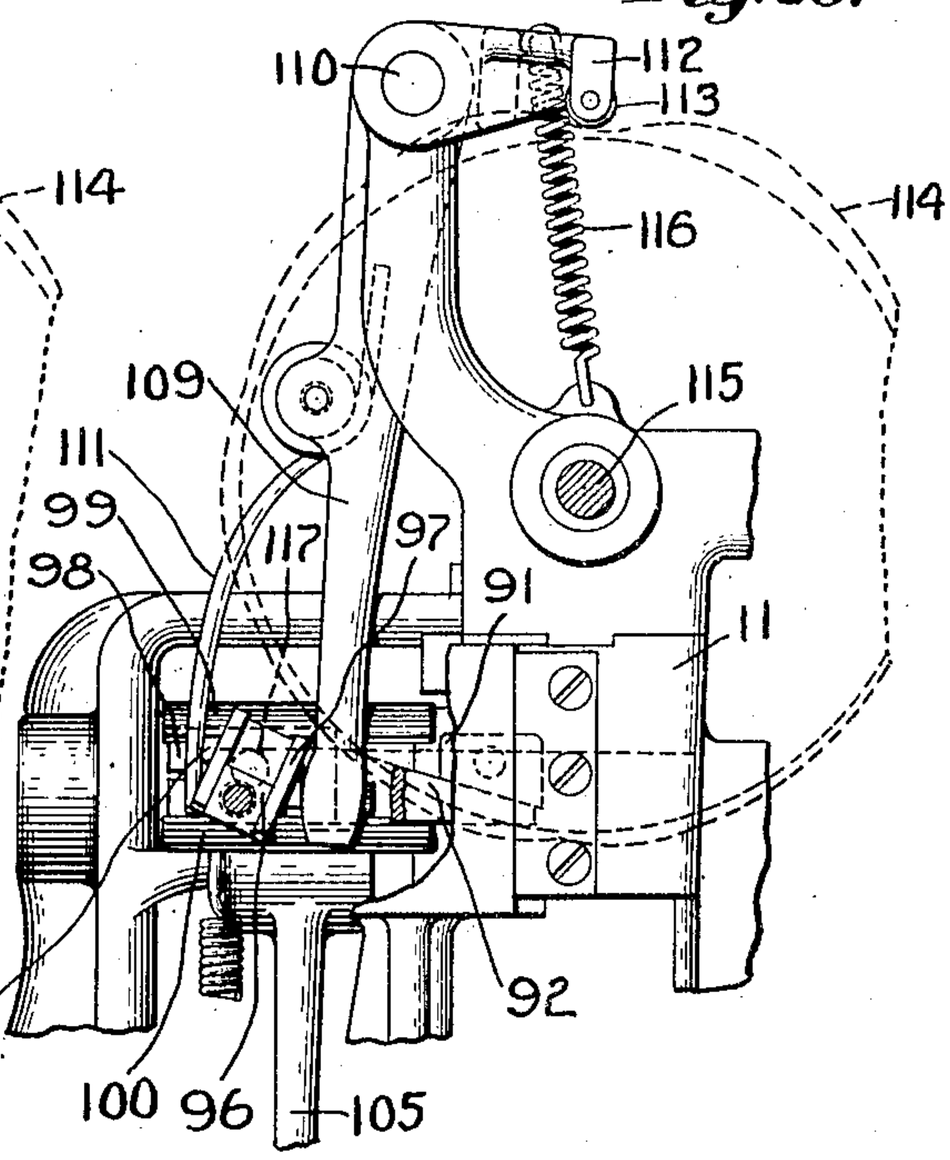


Witnesses:

Edwin P. Lucet

Robert H. Kammler.

Inventor:

Arnaldo M. English,

by Lemley & Gregory

Atty's.

No. 878,478. PATENTED FEB. 4, 1908.

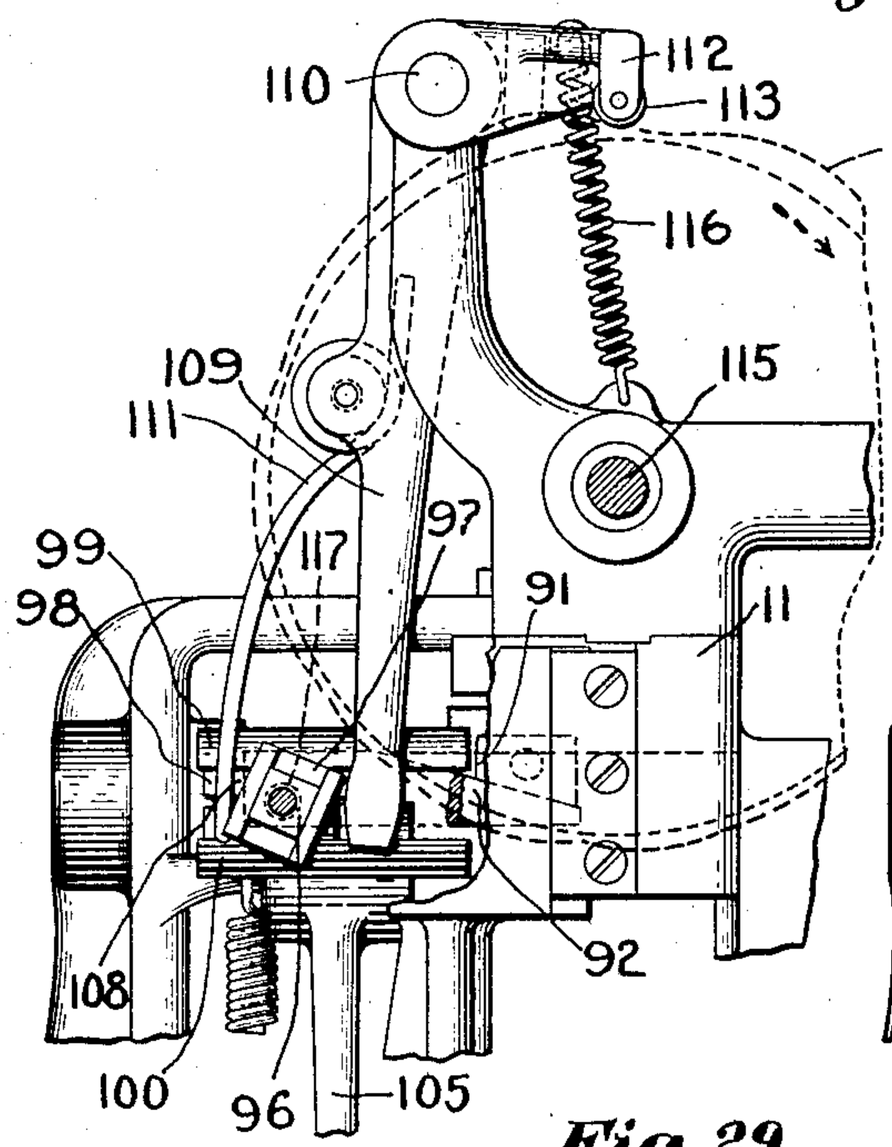
A. M. ENGLISH.

ROUGH ROUNDING MACHINE.

APPLICATION FILED AUG. 9, 1906.

30 SHEETS—SHEET 18.

Fig. 27.



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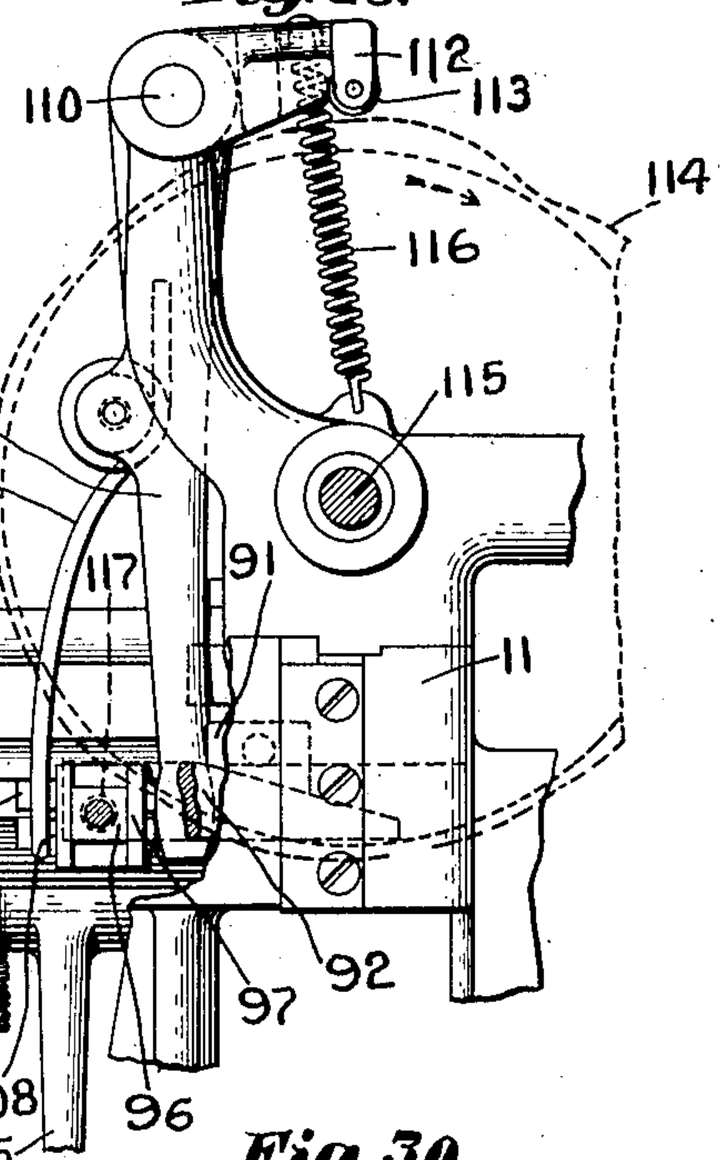


Fig. 29.

Fig. 30.

Witnesses:
Edwin F. Lucas
Robert H. Kamnla.

Inventor:
Arnaldo M. English,
by Lemby & Gregory
Atty's.

No. 878,478. PATENTED FEB. 4, 1908.

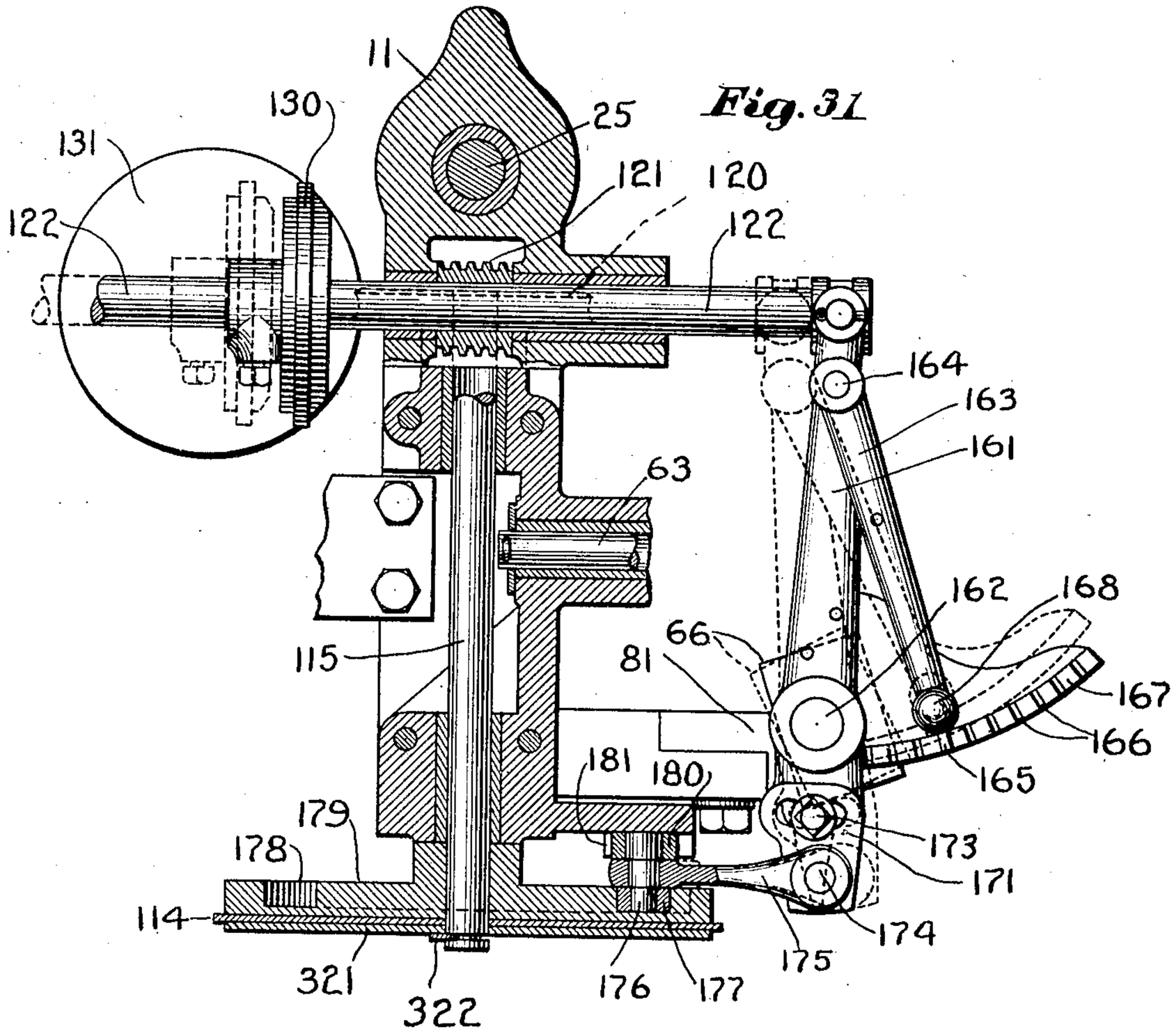
A. M. ENGLISH.

ROUGH ROUNDING MACHINE.

APPLICATION FILED AUG. 9, 1906.

30 SHEETS—SHEET 19.

Fig. 31



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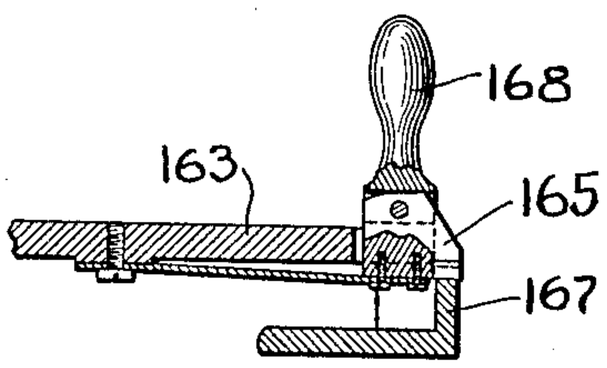

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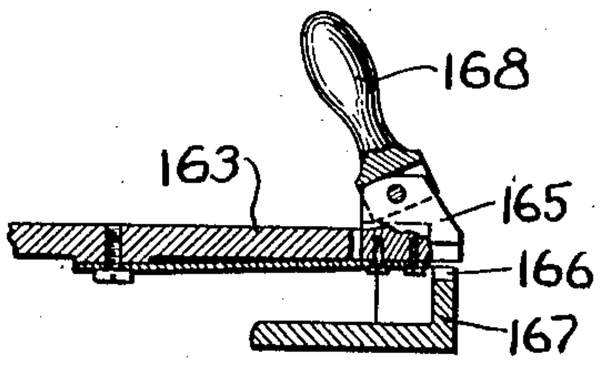


Witnesses:
Edwin T. Luce
Robert H. Kammler.

Inventor:
Arnaldo M. English.
by Lemley & Gregory Atty's.

No. 878,478. PATENTED FEB. 4, 1908.

A. M. ENGLISH.

ROUGH ROUNDING MACHINE.

APPLICATION FILED AUG. 9, 1906.

30 SHEETS—SHEET 20.

Fig. 32.

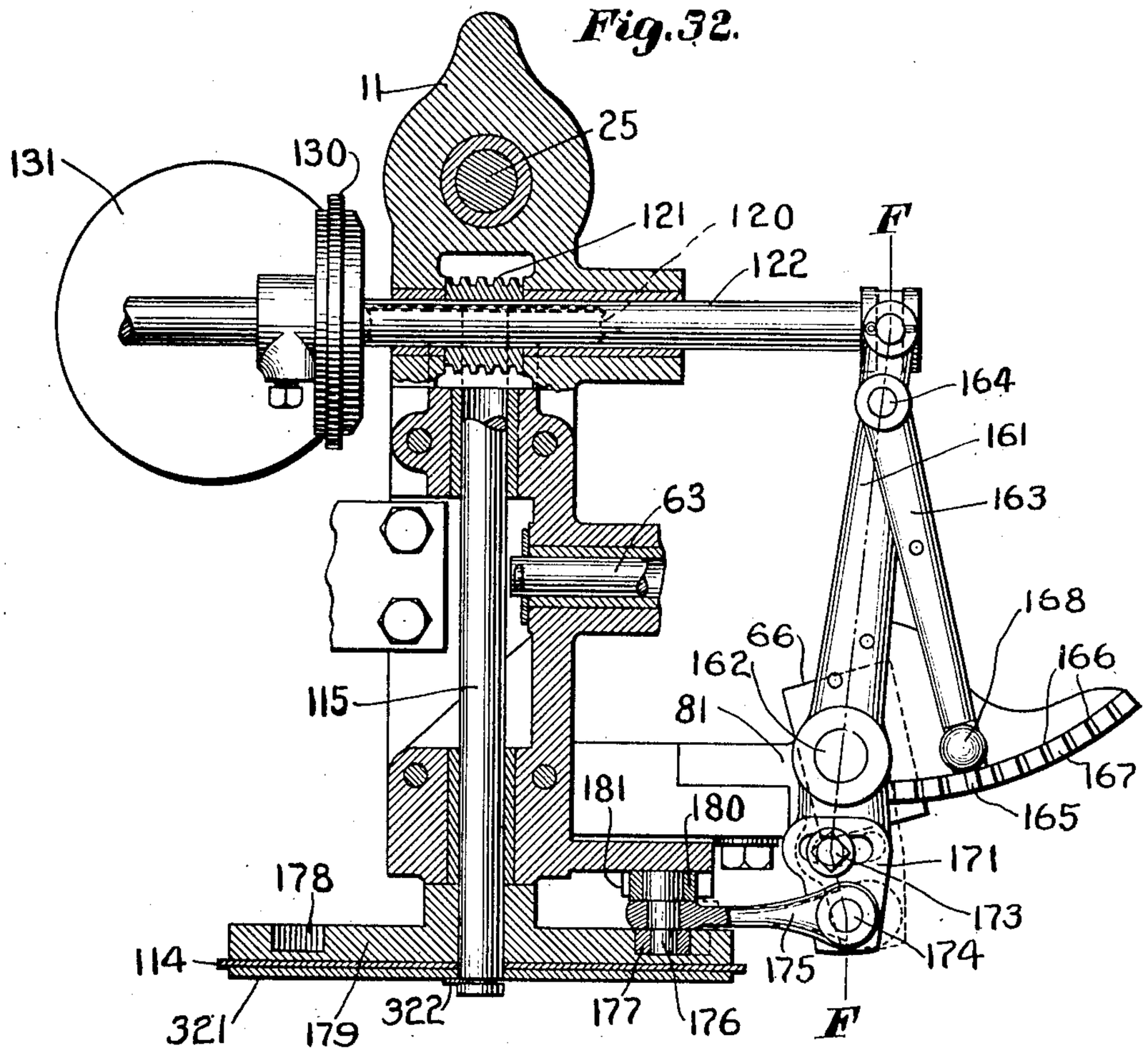
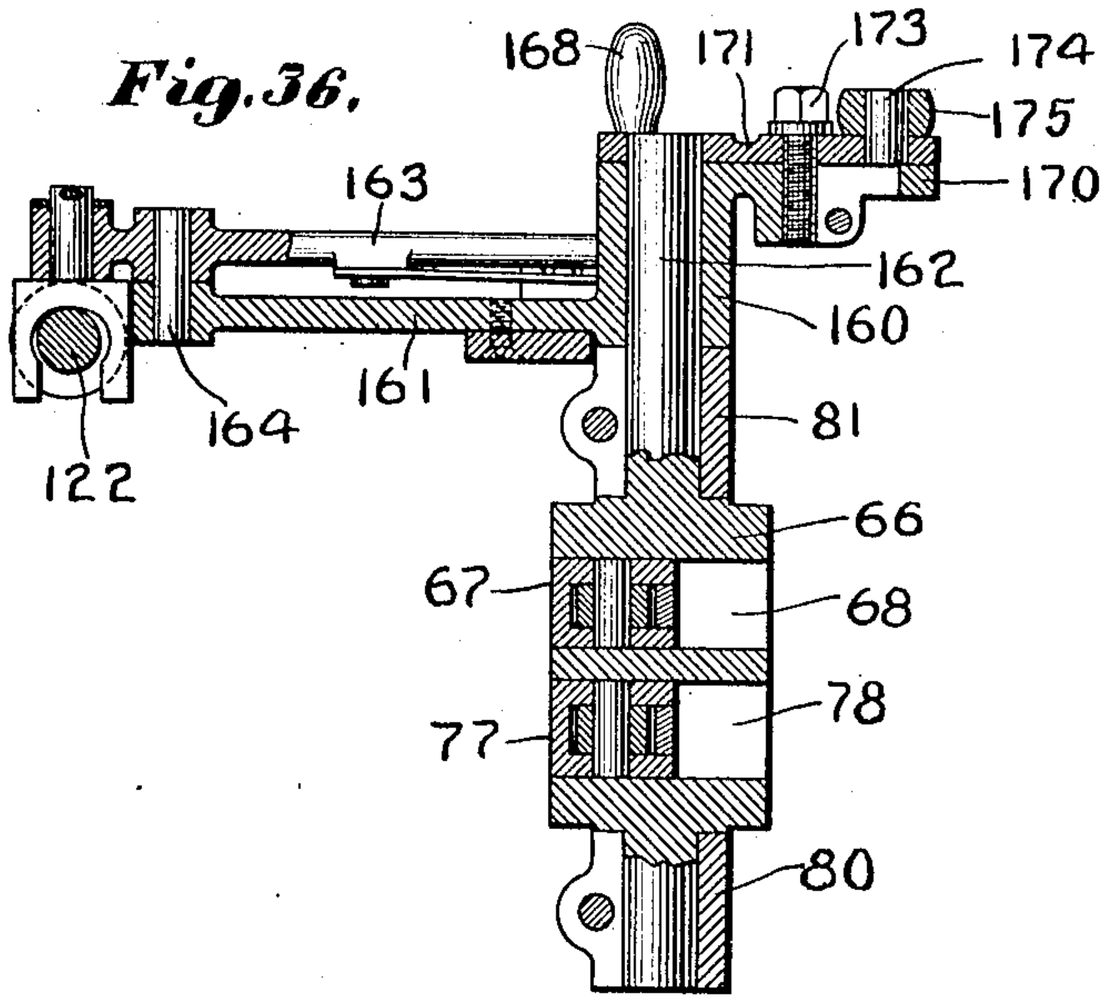


Fig. 36.



Witnesses:
Edwin T. Luce
Robert H. Kammler.

Inventor:
Arnaldo M. English.
by Lemly & Gregory *Atty's.*

No. 878,478.

A. M. ENGLISH.

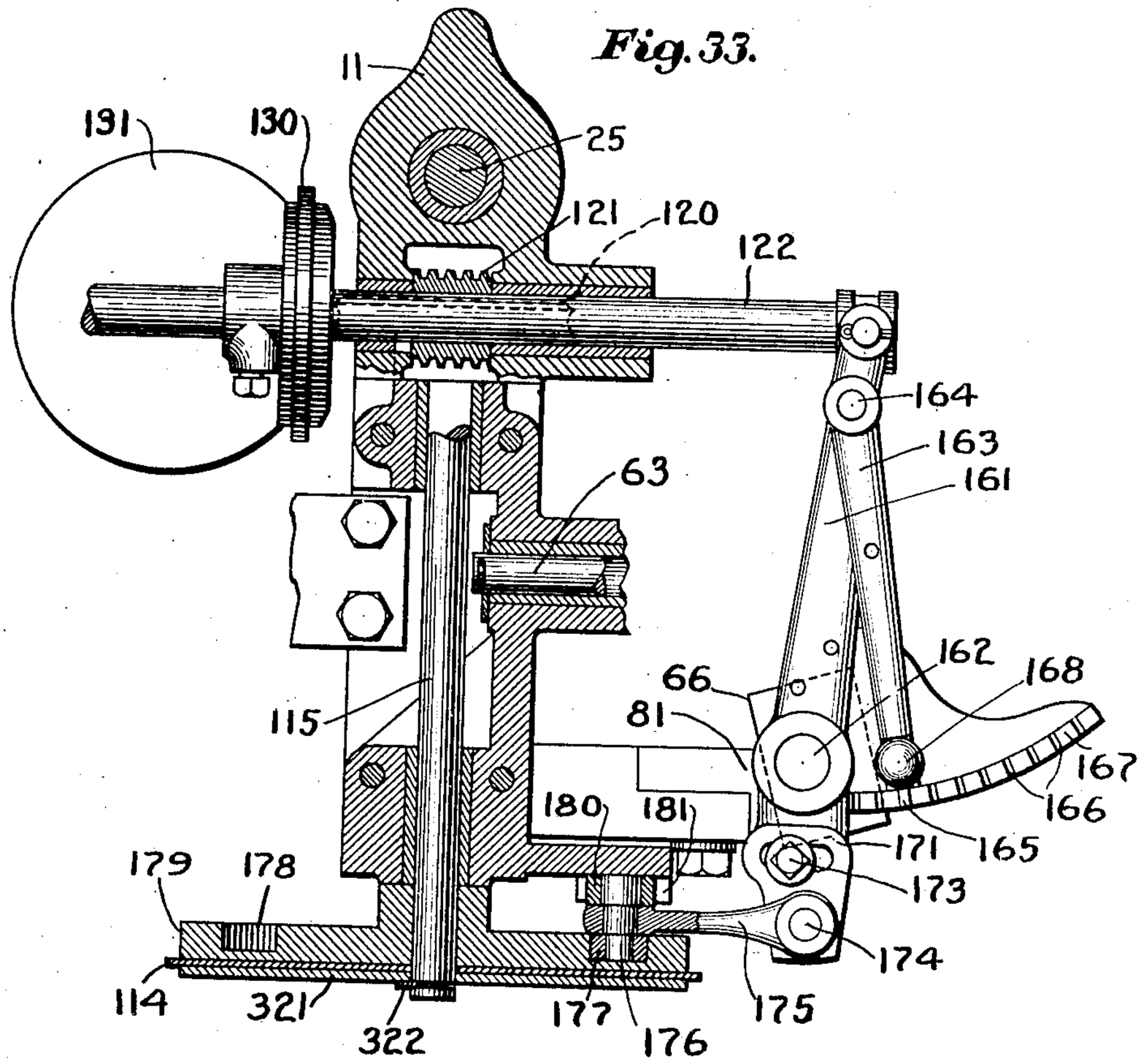
PATENTED FEB. 4, 1908.

ROUGH ROUNDING MACHINE.

APPLICATION FILED AUG. 9, 1906.

30 SHEETS—SHEET 21.

Fig. 33.



Witnesses:
Edwin F. Lucas
Robert H. Kammler.

Inventor:
Analdo M. English,
by Lovesly & Gregory Atty's.

No. 878,478. PATENTED FEB. 4, 1908.

A. M. ENGLISH.

ROUGH ROUNDING MACHINE.

APPLICATION FILED AUG. 9, 1906.

30 SHEETS—SHEET 22.

Fig. 37.

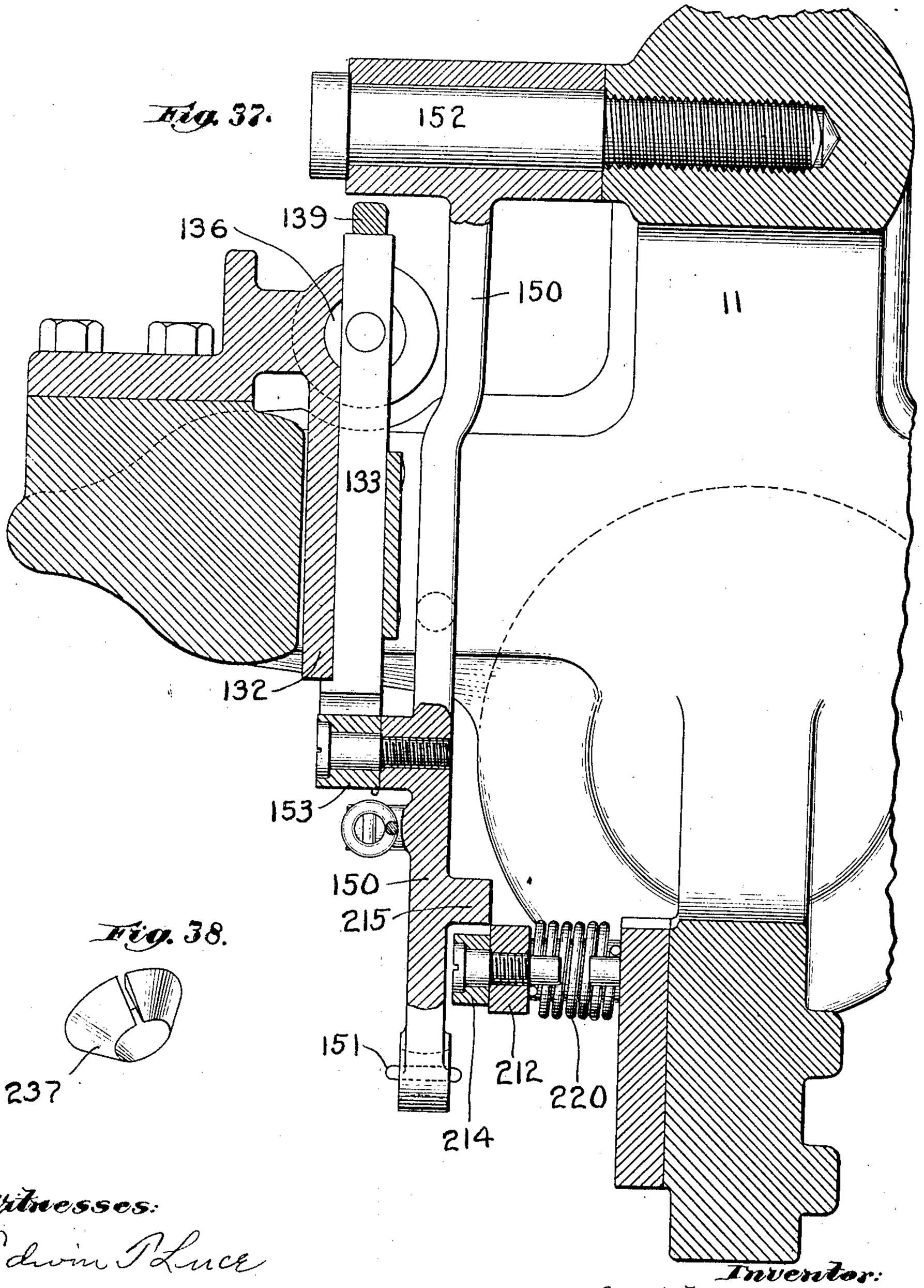


Fig. 38.

Witnesses:

Edwin P. Lyon

Robert H. Kammler.

Inventor:

Arnaldo M. English

by Cleveland & Gregory

Attorneys.

No. 878,478. PATENTED FEB. 4, 1908.

A. M. ENGLISH.

ROUGH ROUNDING MACHINE.

APPLICATION FILED AUG. 9, 1906.

30 SHEETS—SHEET 23.

Fig. 39.

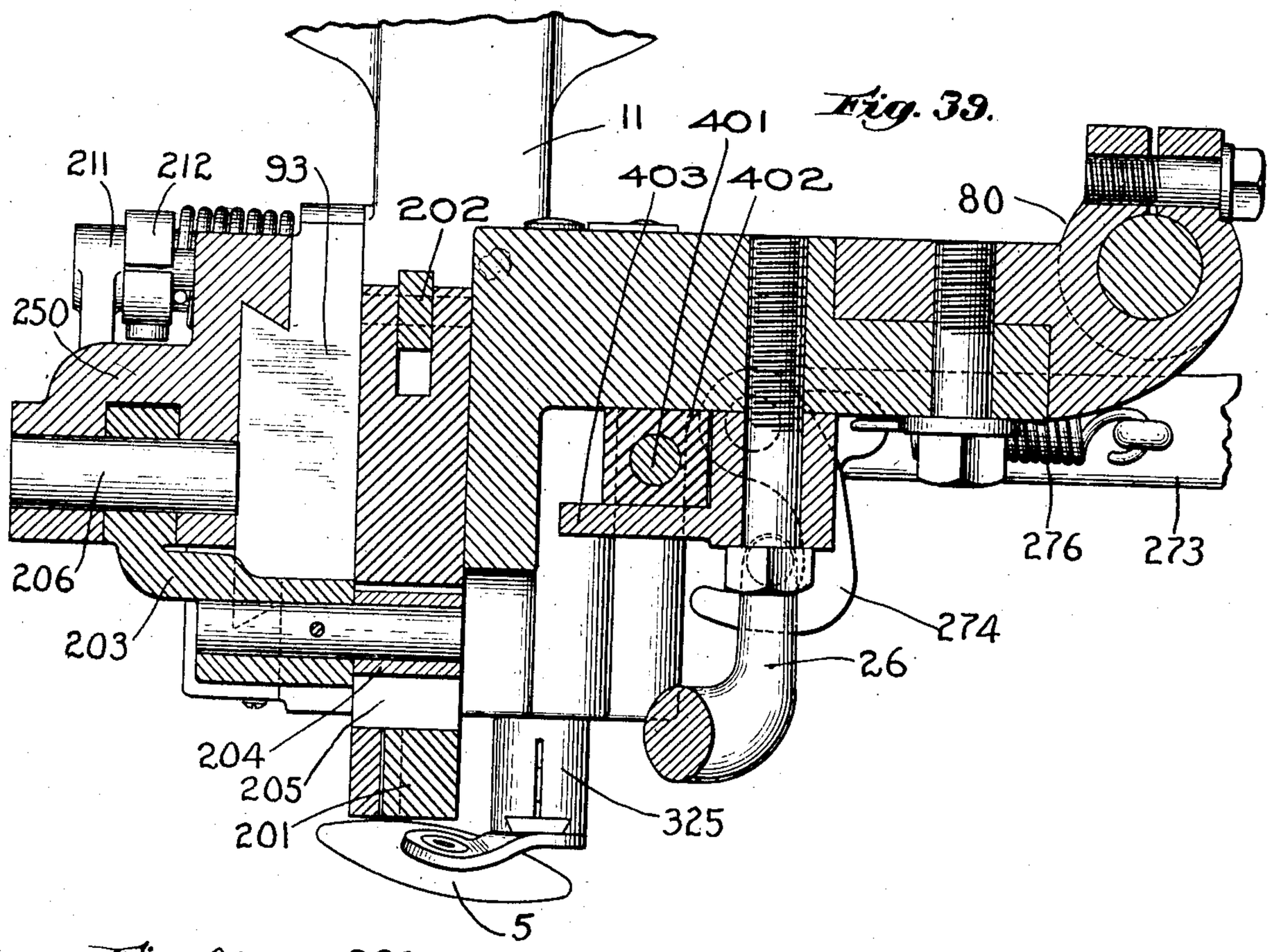
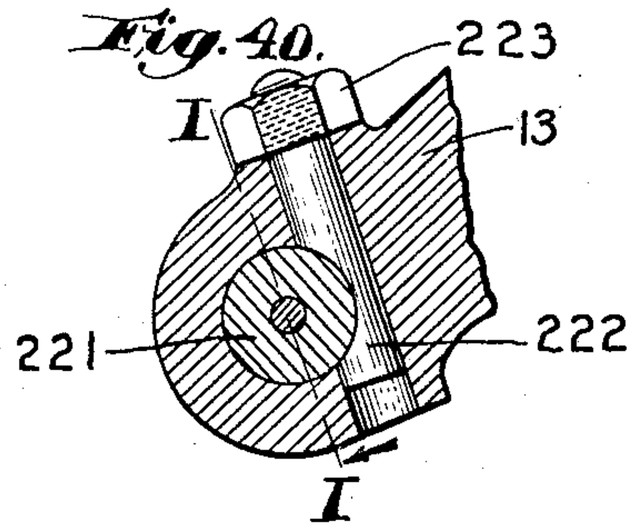


Fig. 40.



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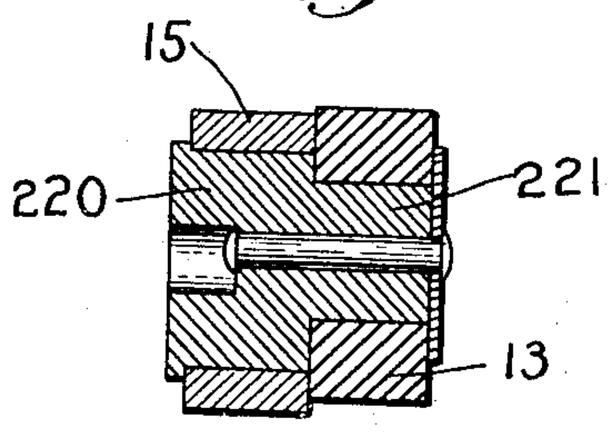

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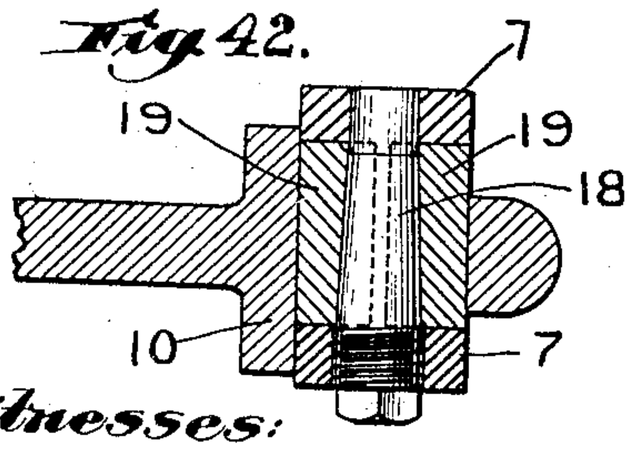
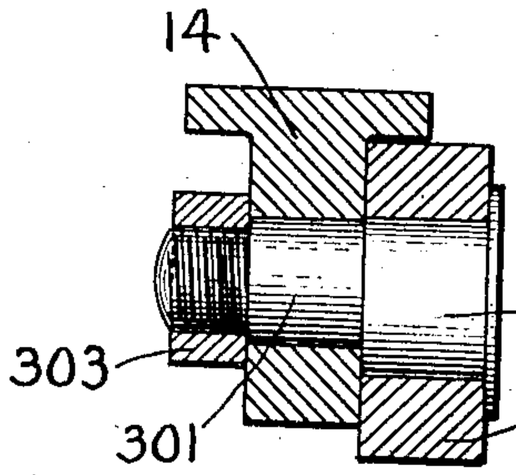


Fig. 43



Witnesses:

Edwin P. Lucas

Robert H. Kammler.

Inventor:

Analdo M. English,

by Cerrely & Gregory

Attorneys.

No. 878,478. PATENTED FEB. 4, 1908.

A. M. ENGLISH.

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APPLICATION FILED AUG. 9, 1906.

30 SHEETS—SHEET 24.

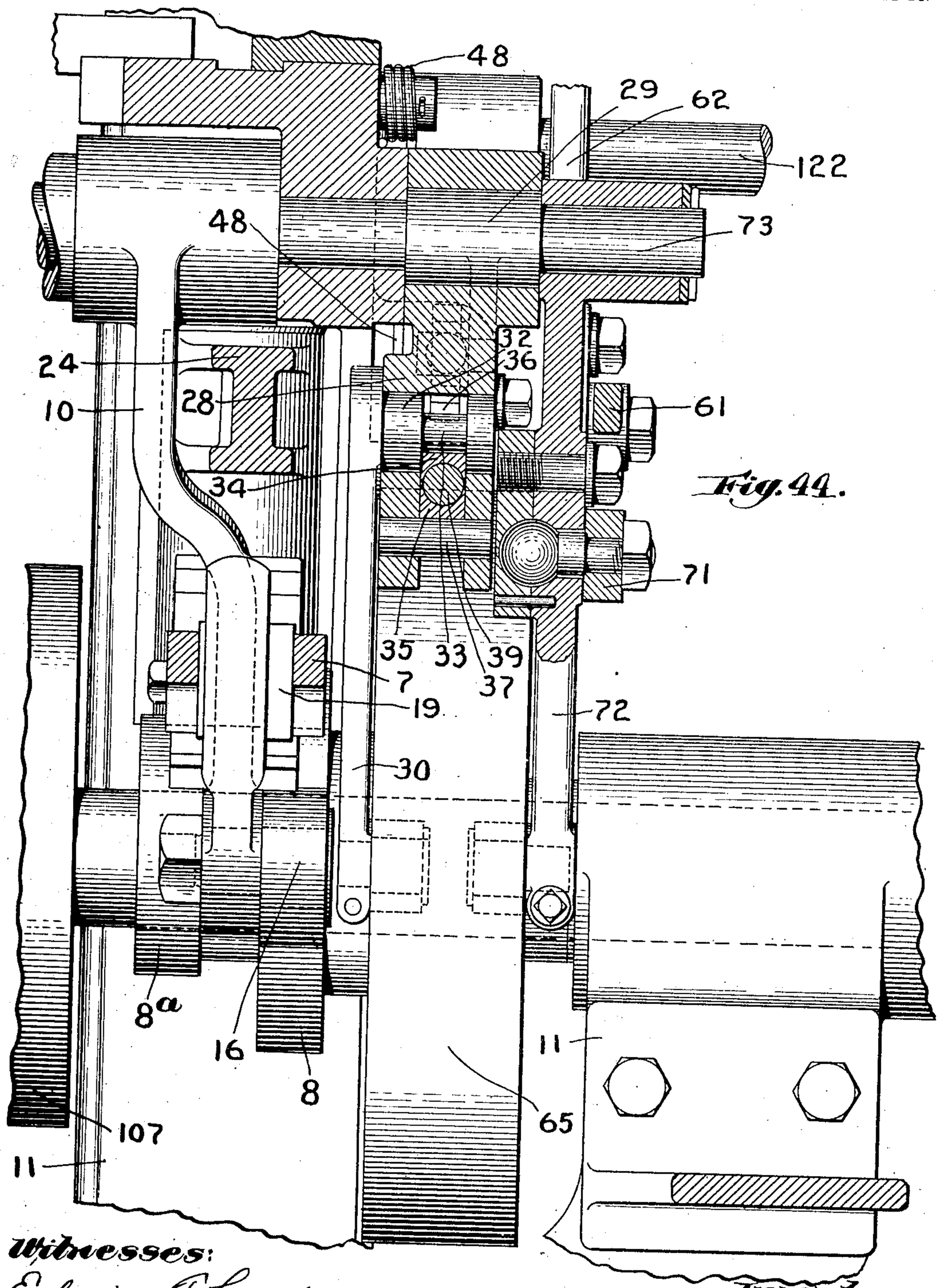

Fig. 44.

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No. 878,478. PATENTED FEB. 4, 1908.

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ROUGH ROUNDING MACHINE.

APPLICATION FILED AUG. 9, 1906.

30 SHEETS—SHEET 25.

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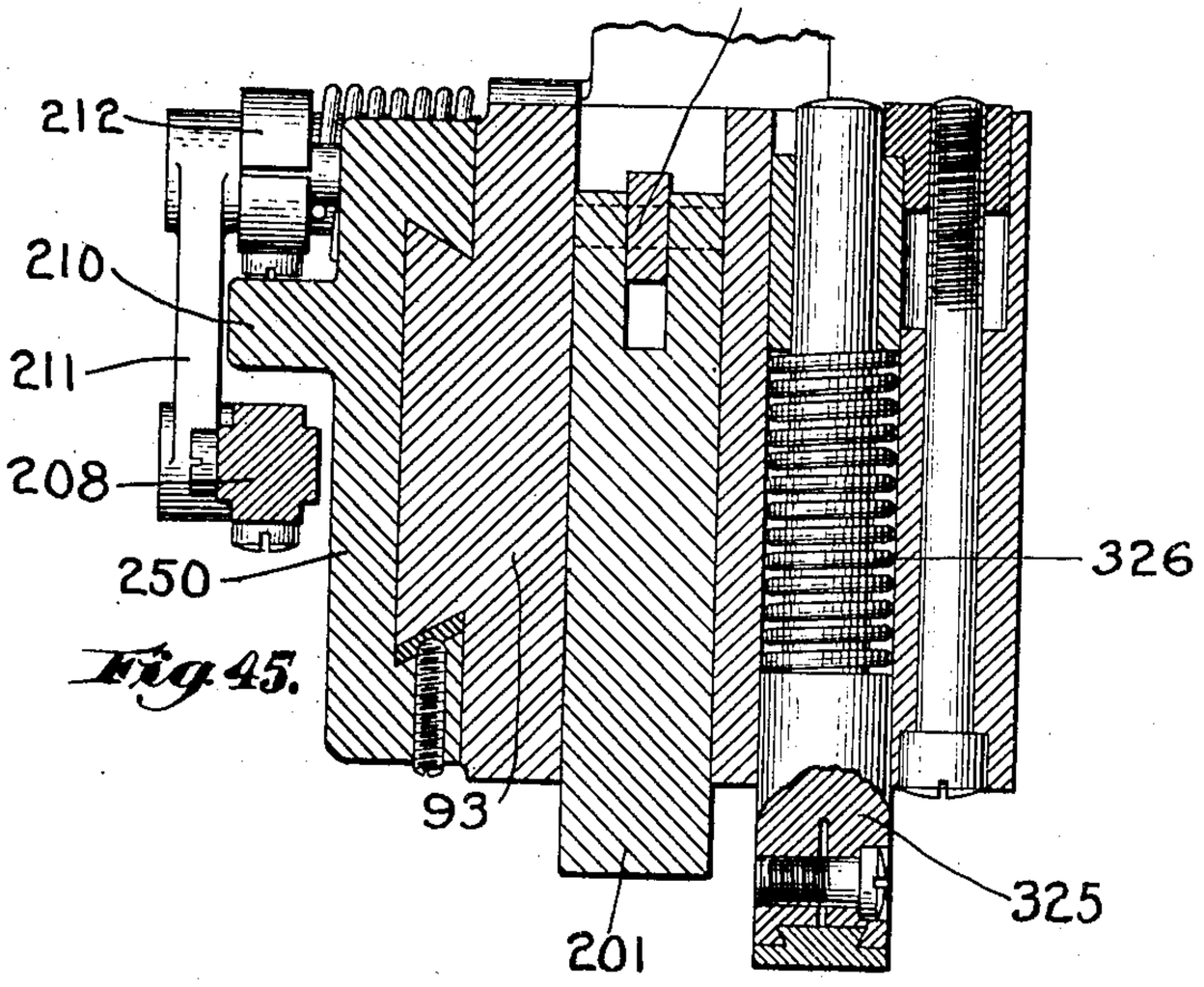


Fig. 45.

Fig. 46.

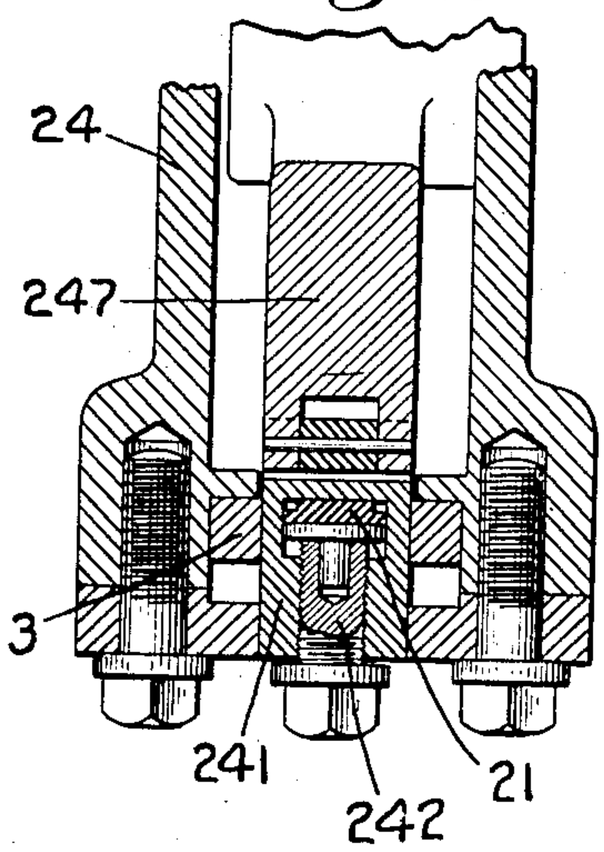
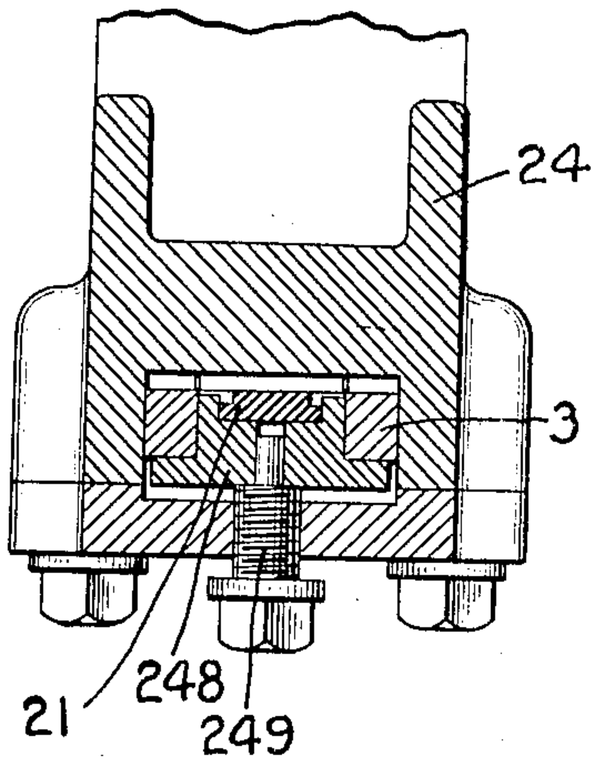


Fig. 47.



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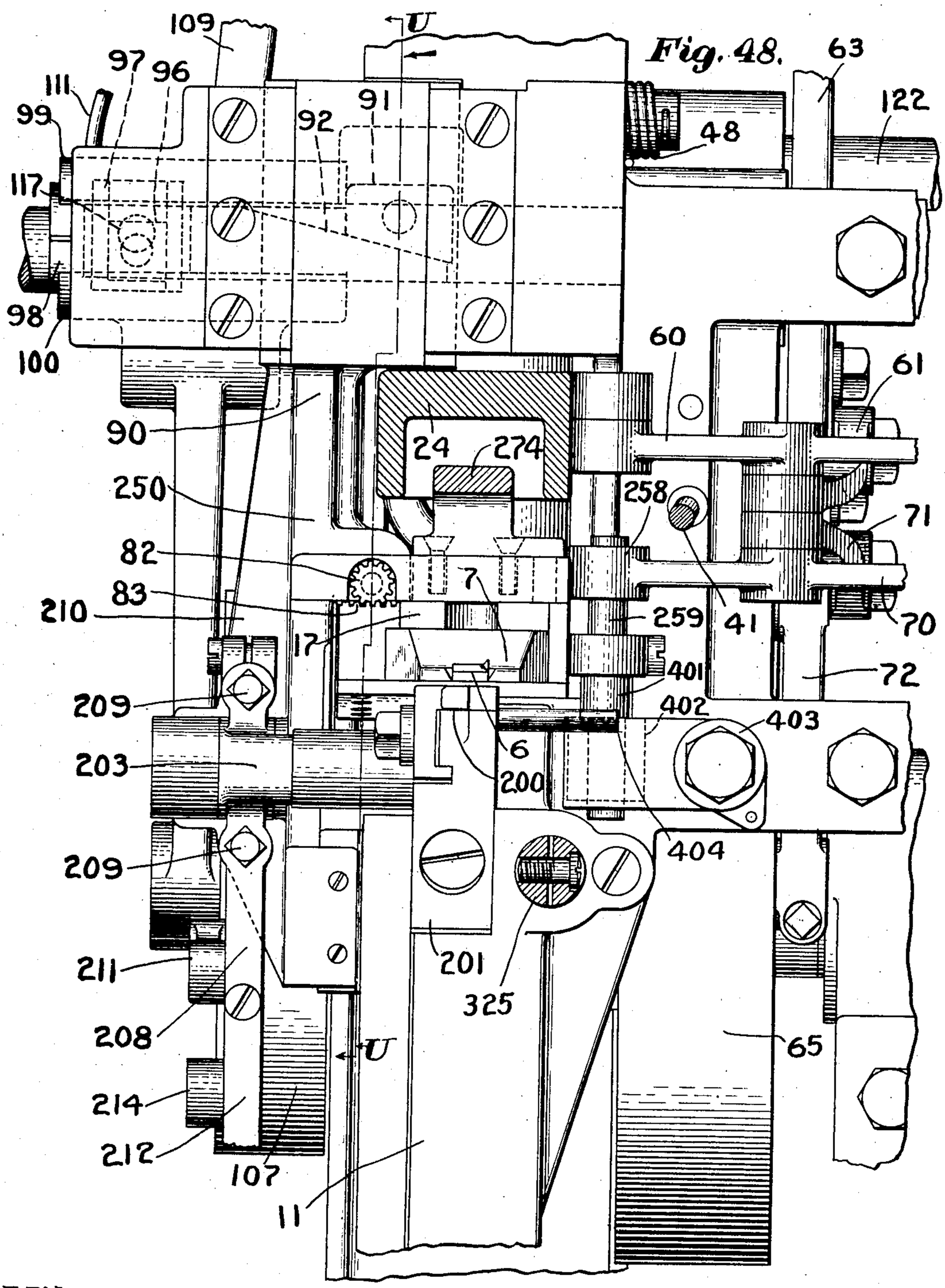
APPLICATION FILED AUG. 9, 1906.

30 SHEETS—SHEET 26.

Fig. 48.



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30 SHEETS—SHEET 27.

Fig. 49.

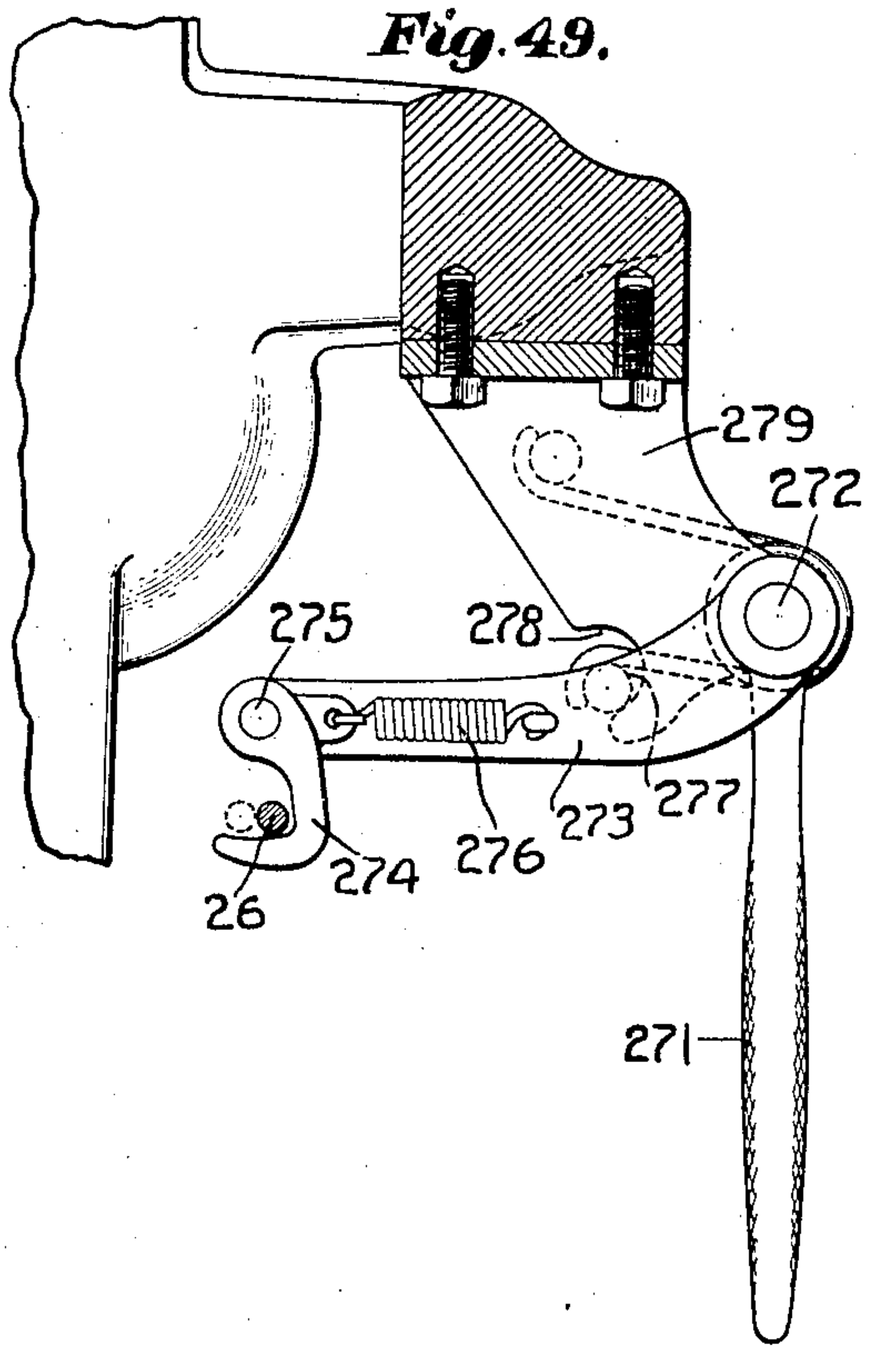


Fig. 50.

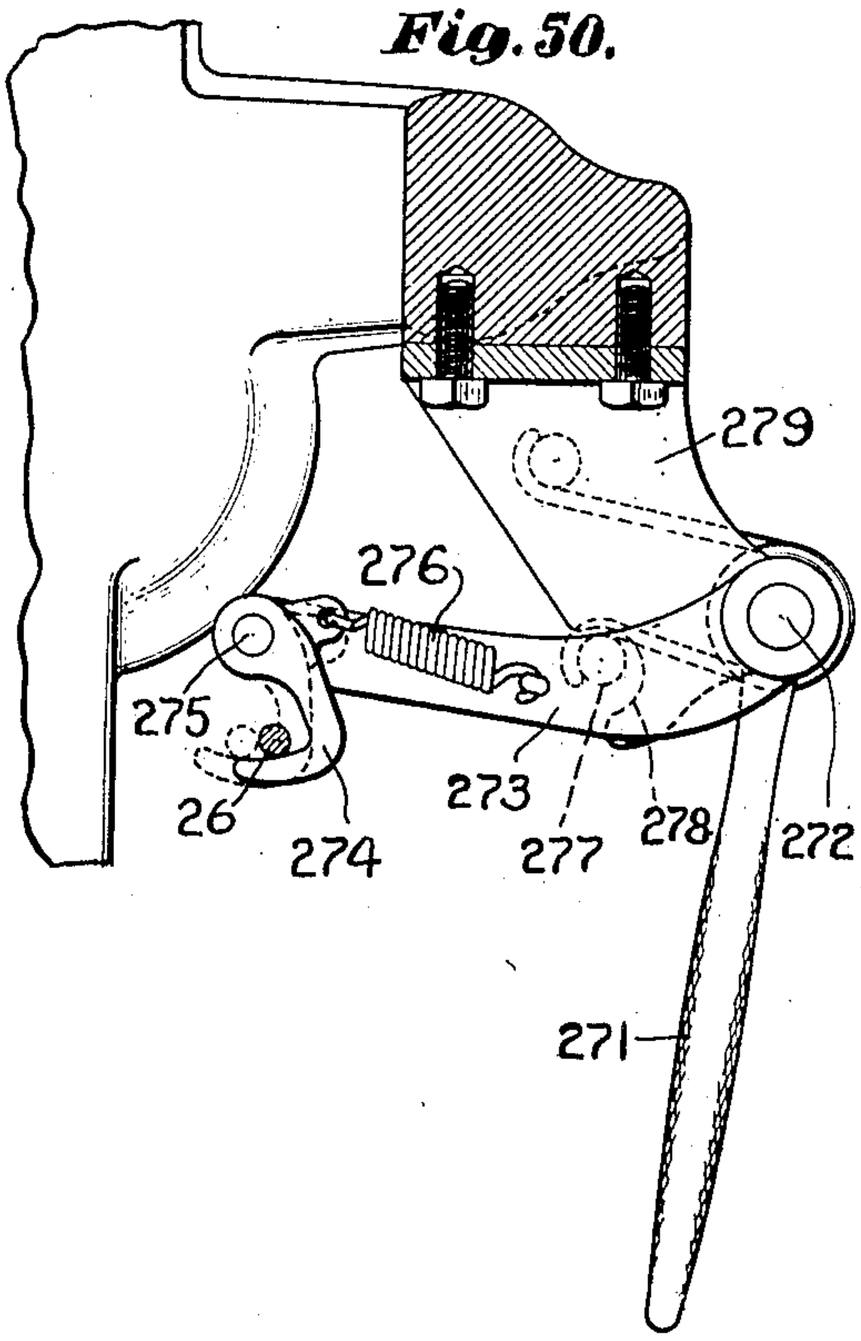
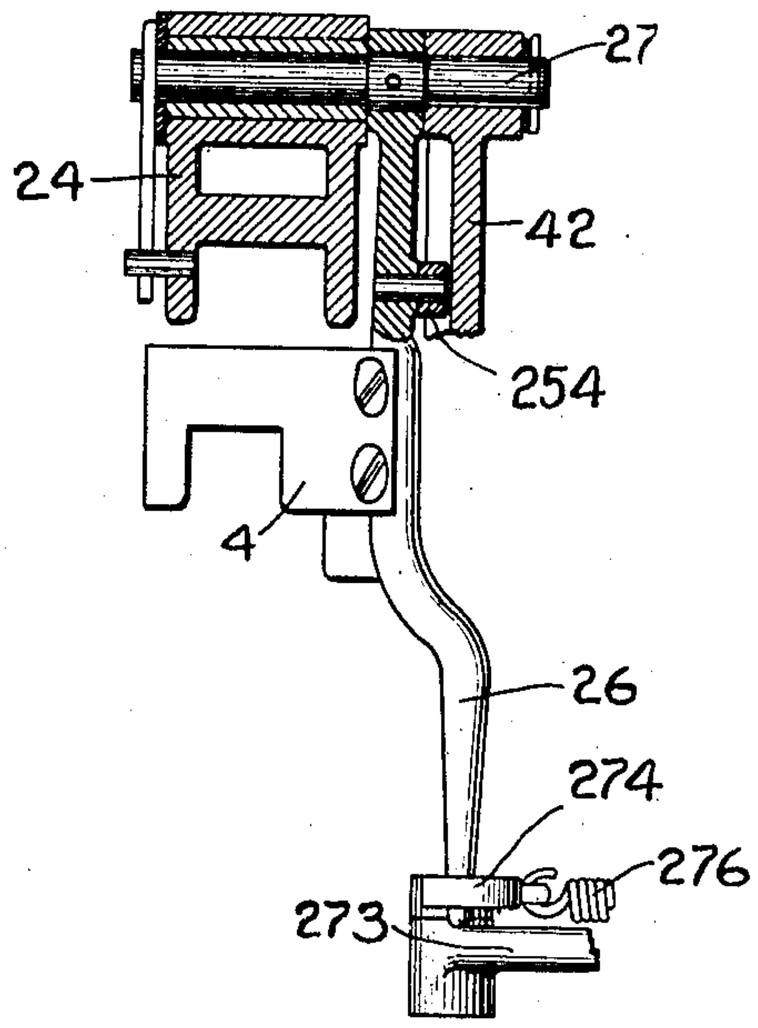


Fig. 51.



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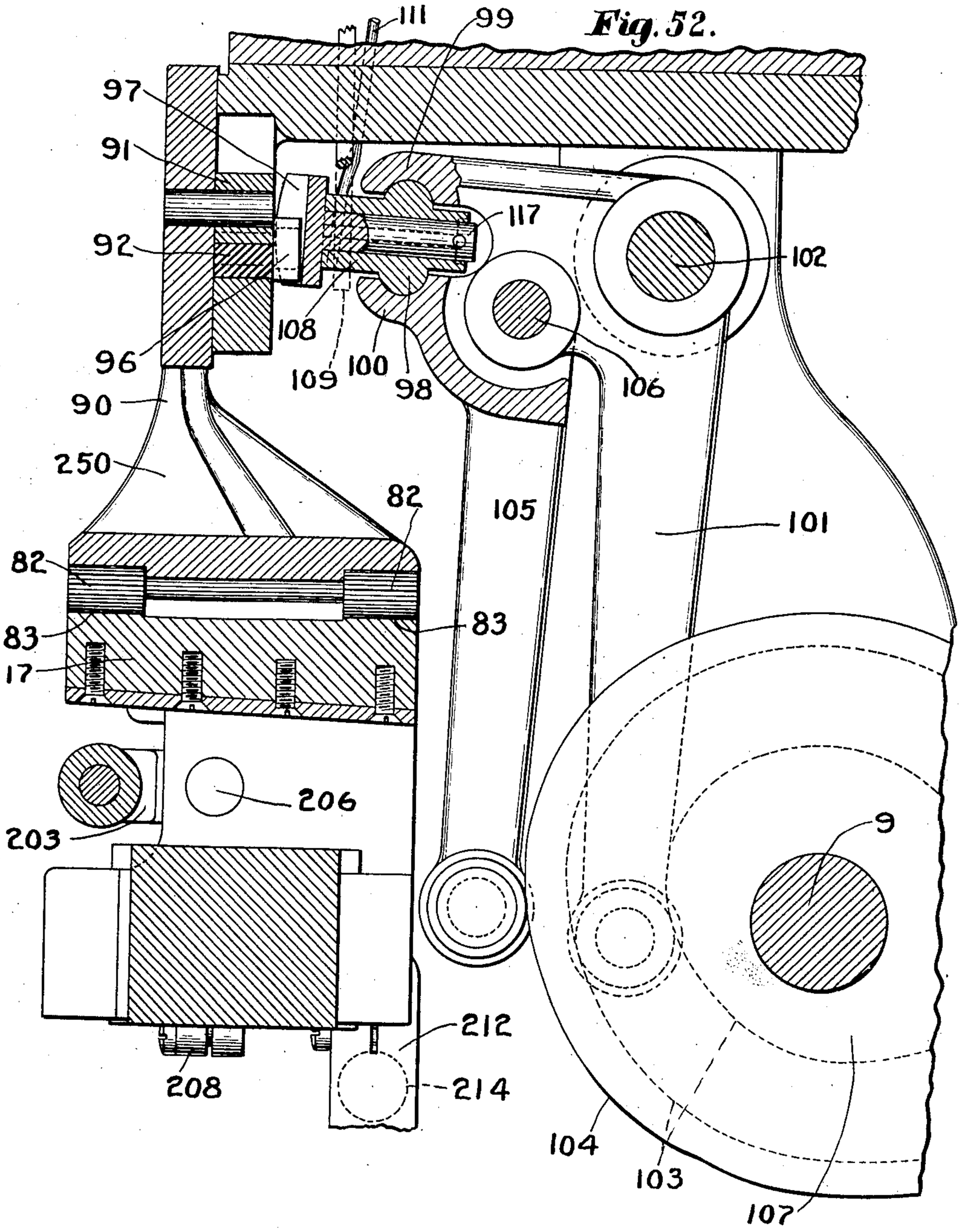
ROUGH ROUNDING MACHINE.

APPLICATION FILED AUG. 9, 1906.

30 SHEETS—SHEET 28.

Fig. 52.



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APPLICATION FILED AUG. 9, 1906.

30 SHEETS—SHEET 29.

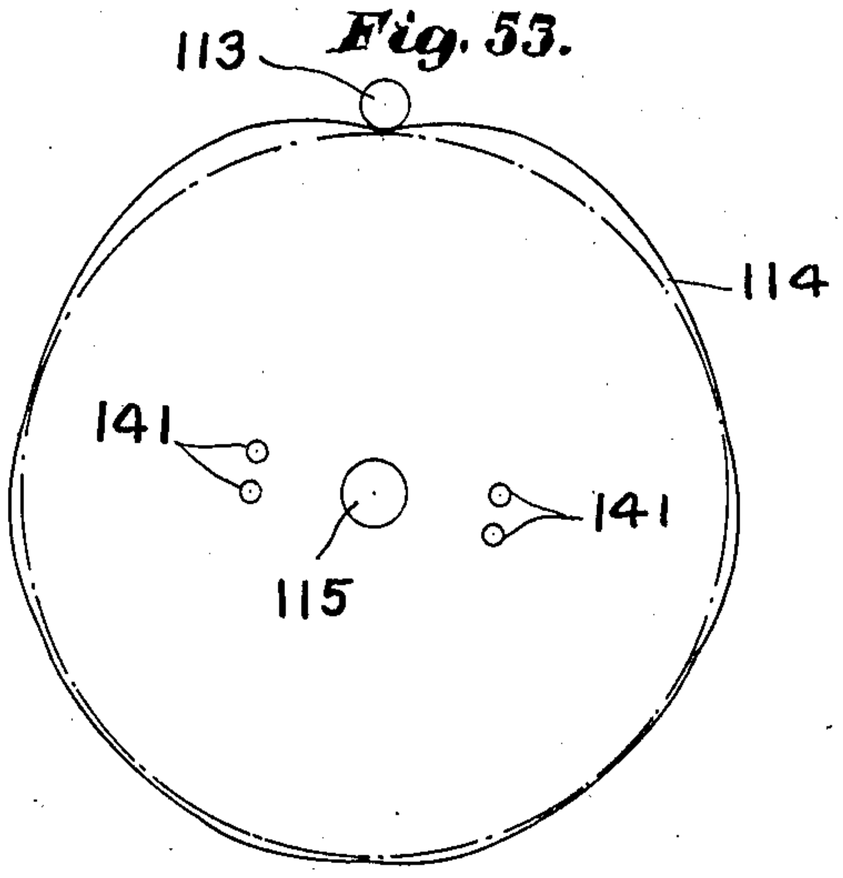


Fig. 54

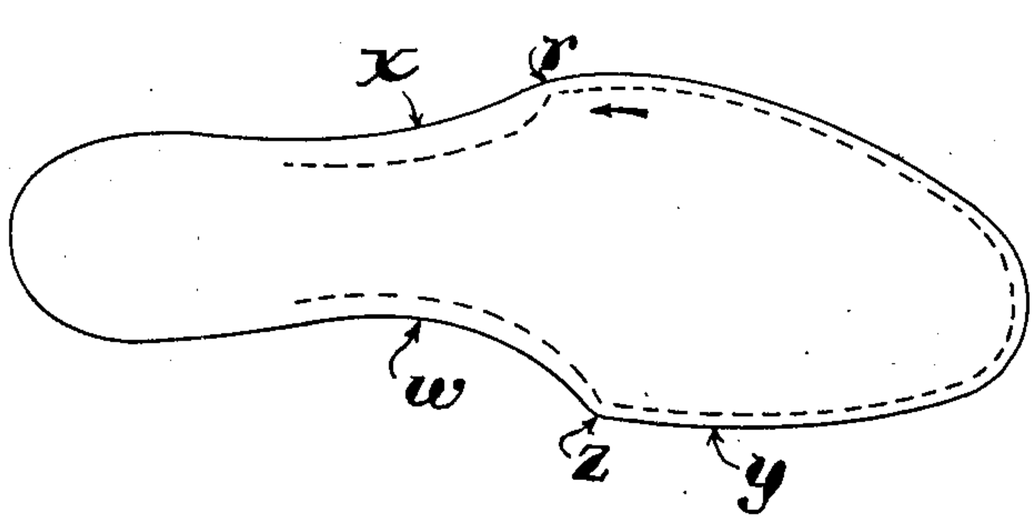
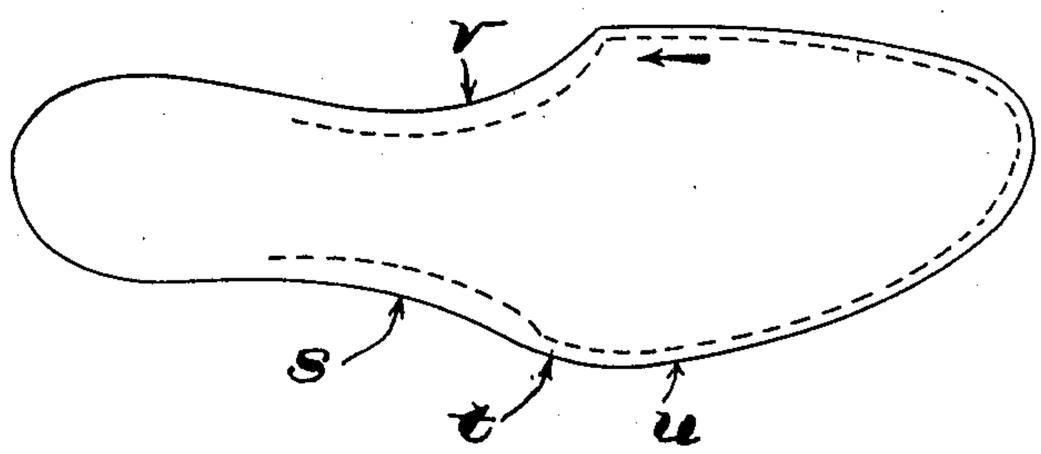


Fig. 55.



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ROUGH ROUNDING MACHINE.

APPLICATION FILED AUG. 9, 1906.

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Fig. 56.

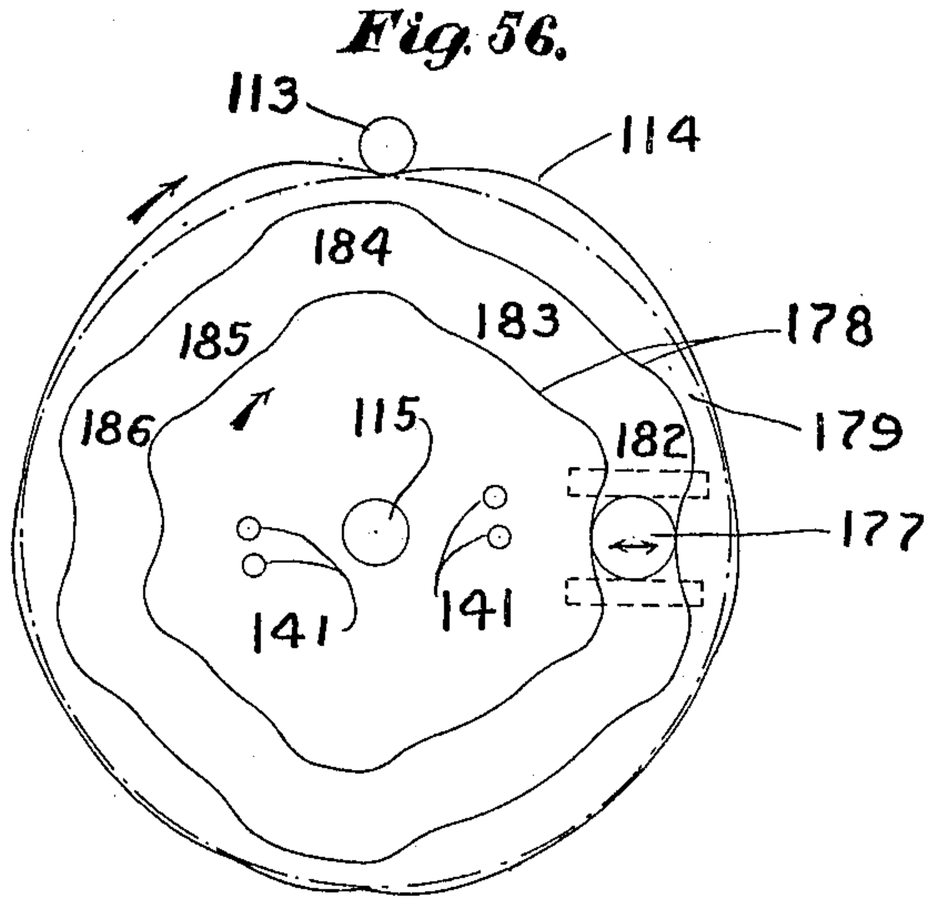
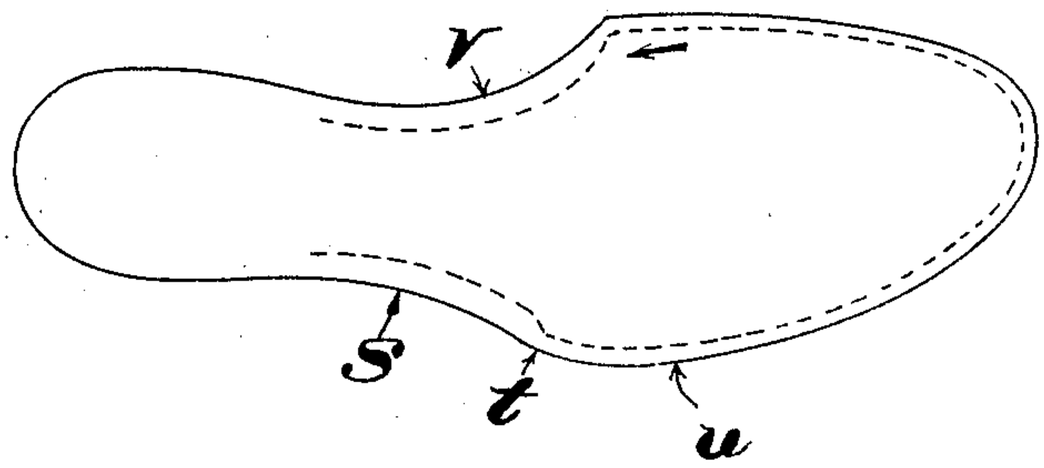


Fig. 57.

Fig. 58.



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UNITED STATES PATENT OFFICE.

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ROUGH-ROUNDING MACHINE.

No. 878,478. Specification of Letters Patent. Patented Feb. 4, 1908.

Application filed August 9, 1906. Serial No. 329,866.

To all whom it may concern:

Be it known that I, ANALDO M. ENGLISH, a citizen of the United States, and resident of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Rough-Rounding Machines, of which the following description, in connection with the accompanying drawing, is a specification, like letters on the drawing representing like parts.

This invention relates to machines known to the trade as "rough rounders," that is, machines adapted to trim the sole of boots or shoes while upon the last.

In some machines of this class means are provided not only for trimming or rough rounding the sole but also for simultaneously channeling the sole, and it is a machine of this latter class which is herein shown. In thus rough rounding or trimming of the soles of boots and shoes it is often desirable to form thereon what is known as a "Scotch" edge, that is to say, a widened extension of the sole around the ball of the shoe. Sometimes when this extension is of greater width at the outside of the ball than at the inner side thereof it is known as a "Baltimore" edge. Machines for this rough rounding or trimming the sole of a shoe and for producing either the "Scotch" or the "Baltimore" edge are old in the art, and while they are of various types yet they all embody a work guide against which the lasted shoe is pressed and by which it is guided during the trimming operation and a chopping or trimming knife, which trims the sole of the shoe as the shoe is fed relative to it and to the work guide. The "Scotch" or "Baltimore" edge is produced by relatively adjusting the work guide and trimming knife to cause the knife to cut further from or nearer to the guide according to the extension desired on the sole of the shoe. When these machines are constructed for channeling as well as for rough rounding a channeling knife is employed which cuts the channel in the sole as the shoe is fed forward. The later practice in the art has been to employ two work guides, one called a "crease guide" to run in and along the bottom of the crease between the sole and its upper, the other called a "last guide," the latter having a broader face to rest against the upper of the lasted shoe at the side of the last and adjacent the crease. I prefer to employ but a single guide, as in the earlier art, the same being shaped to permit it to follow the crease along the shank of the shoe and the last around the forepart thereof.

It has long been common to provide means for varying at will the relative position of the guide and chopping knife to obtain the desired shape of sole extension, and the common expedient of a pattern has been employed to produce this relative adjustment automatically and to obtain a predetermined shape on the sole. But in order to form the extension of the proper shape and at the proper place on the sole of the shoe it is obviously necessary that the action of this pattern should have a proper relation to the action of the means for feeding the shoe; for if the feeding means should operate to feed the shoe faster or slower relative to the speed of operation of the pattern the extra width of the extension will be formed on the sole at an improper place and a distorted shoe will result. It is a fact, however, that in practice the same feeding means will not always feed two different shoes in exactly the same way, some shoes being fed faster than others, nor will it always feed any one shoe uniformly, this difference in the rate of feed being due to several causes, such, for instance, as the character of the leather of the sole, the different structure of the shoe at different points around the sole, etc., and the amount of sole projection available for engagement by the feeding means.

One of the objects of my present invention is to provide means for correcting or for assisting to correct any variation which may occur between the rate at which the shoe is actually fed and that at which it should be fed as compared with the operation of the means for controlling the relative position of the guide and trimming knife, so that it is possible to cause the extension to be formed on the sole always substantially at the proper point regardless of whether the feeding means acts to feed the shoe faster or slower than designed. This means may, by my invention, comprehend a suitable indicating means by which the operator can always determine the exact relation which exists between the rate at which the shoe is fed and the operation of the means for varying the relative positions of the trimming knife and guide, this indicating means assisting the op-

erator very materially in bringing these two operations into their required relationship, as above described.

Another object of my invention is to provide means whereby the same means may by adjustment be used to produce the desired extension on different sized shoes without requiring substitution of patterns or other parts as heretofore.

My invention also provides means whereby the rate of speed may be varied at different points along the sole of the shoe, as for instance made slower when the chopping or trimming knife is operating on the abruptly curved portions of the shoe, which are more difficult to trim, the purpose of this being to promote the quality of the work produced.

My invention also aims to provide a novel means for controlling the position of the channeling knife whereby it may be made to cut the channel nearer to the edge of the sole around the forward part of the shoe and further from the edge along the shank of the shoe.

The above and other objects and advantages of my invention will be more clearly apparent from the following description of one embodiment of the invention selected for illustration herein, and the scope of the invention will be pointed out in the appended claims.

Figure 1 shows a front elevation of a machine embodying my invention; Fig. 2 is a plan view of Fig. 1; Fig. 3 is a right hand side elevation; Fig. 4 is a left hand side elevation; Fig. 5 is a rear elevation; Figs. 6 and 7 are sections on the line A—A, Fig. 2, said figures showing the parts in different positions; Figs. 8 to 12 are sections on substantially the line B—B, Fig. 2, said views showing the parts in different positions; Figs. 13 and 14 are vertical central sections of the machine looking from the left to the right, said views also showing the parts in different relative positions; Figs. 15 to 22 inclusive are sections on the line C—C; Fig. 13; Figs. 23 to 30 inclusive are fragmentary sections with a portion broken out on substantially the line D—D, Fig. 4; Figs. 31 to 33, are sections on the line E—E, Fig. 3, looking in the direction of the arrow; Figs. 34 and 35 details of the locking latch for the hand lever; Fig. 36 is a section on the line F—F, Fig. 32; Fig. 37 is a section on the line G—G, Fig. 6; Fig. 38 is a detail hereinafter described; Fig. 39 is a section on the line H—H, Fig. 1; Fig. 40 is a section through the arm carrying the roll 15 showing the manner of adjusting said roll; Fig. 41 is a section on the line I—I, Fig. 40; Fig. 42 is a section on the line K—K, Fig. 14; Fig. 43 is a section on the line L—L, Fig. 14; Fig. 44 is a section on the line M—M, Fig. 3; Fig. 45 is a section on the line N—N, Fig. 1; Fig. 46 is an enlarged section through the front portion of the arm 24 on the line O—O, Fig. 1; Fig. 47 is an enlarged sectional view on the line P—P, Fig. 1; Fig. 48 is a section on the line R—R, Fig. 4, looking from the front of the machine; Figs. 49 and 50 are sections on the line S—S, Fig. 1, looking down showing the parts in different positions; Fig. 51 is a section on substantially the line T—T, Fig. 3, part of the elements being broken out to better show the construction; Fig. 52 is a section on the line U—U, Fig. 48; Fig. 53 is a diagram view of the pattern cam; Figs. 54 and 55 are diagrams representing the soles of a right and left shoe to be used in explaining the operation of the pattern cam; Fig. 56 is a diagram of the cam for varying the feed of the shoe; Figs. 57 and 58 are diagrams of the sole of a left and right shoe used in explaining the operation of the variable feed mechanism.

In the machine which has been herein selected for the illustration of my invention, and which is shown in the accompanying drawings, the edge of the sole to be rough rounded is inserted between a guide 3 and a spring actuated presser foot or clamp 4, with the bottom of the sole of the shoe resting against a rest 5, as shown in Figs. 10, 11 and 12. The edge of the sole is trimmed by means of a chopping or trimming knife 6 which has a reciprocating movement in a direction perpendicular to the sole of the shoe. This trimming knife 6 is carried by a knife carrier 7, and is given its reciprocating movement by means of a frog cam which is mounted on the main shaft 9, the two members of said frog cam being designated 8 and 8^a respectively. For this purpose I have provided a cam lever 10 which is pivoted to the frame 11 of the machine, as at 12, and which has two arms 13 and 14, each bearing a cam roll, said cam rolls being designated 15 and 16 respectively. One roll bears on one member of the frog cam and the other on the other member thereof. The cam roll 15 bears on the member 8^a of the frog cam, and the cam roll 16 on the member 8 thereof. With this construction it will be seen that the frog cam will operate to swing the cam lever 10 positively in both directions, the swinging movement in one direction being accomplished by the cam member 8^a and in the other direction by the cam member 8. The cam lever 10 is pivotally connected to the chopping knife carrier 7, so that the swinging movement of the cam lever 10, caused by the rotation of the frog cam 8, 8^a, will give reciprocating movement to the knife carrier 7. The knife 7 is slidably mounted in a holder 17, Figs. 13 and 48, and at its rear end it carries a pivotal stud 18 which is journaled in the two part sliding block 19. This sliding block 19 is mounted for vertical movement in a slot 20 formed in the cam lever 10. This construction pro-

vides a sliding pivotal connection between the cam lever 10 and the knife carrier 7, the purpose of which will be more fully hereinafter described. With this construction it will be seen that the chopping knife is given a forward chopping movement at each rotation of the main shaft 9, and the movement in both directions is made positive and without any lost motion, the result being that the chopping knife actuating mechanism will work smoothly and without any noise or pounding.

In case wear occurs between the rolls 15 and 16 and the frog cam it is desirable to provide for taking up this wear so that both rolls will always be in contact with the frog cam and no lost motion will occur. To provide for this I have adjustably mounted each of the rolls 15 and 16 so that they may be moved on the arms 13 and 14 of the lever toward and from the frog cam to bring them into proper operative position. In Figs. 40 and 41 I have shown a simple way of accomplishing this, wherein the roll 15 is mounted on the eccentric portion 220 of a stud 221 which is carried by the arm 13 of the lever 10. This stud is capable of being turned in the arm, and because of the eccentricity of the portion 220 such turning movement will throw the roll toward or from the periphery of the cam. The stud 221 may be locked in its adjusted position in any suitable way, and, as herein shown, I have provided the clamping pin 222 which is cut away to partially embrace the stud, as best seen in Fig. 40. The clamping pin has a nut 223 thereon so that by tightening the nut the wall of the recess in said pin may be drawn against the periphery of the stud thereby to clamp the stud in adjusted position. The roll 16 may be adjusted in a similar manner, and in Fig. 43 it is shown as being mounted on a stud 301 provided with an eccentric portion 302. The stud is clamped in position by means of a suitable clamp nut 303. By turning the stud the roll 16 is moved toward and from the cam. To take up any wear which occurs between the split block 19 and the walls of the slot 20 the pin 18 is made conical, as shown in Fig. 42, so that by adjusting said pin the blocks may be spread more or less. The chopping knife acts against a chopping block 21, which is herein shown as mounted in the back face of the guide 3, all as will be more fully hereinafter described. The feeding of the shoe as the chopping progresses is accomplished by the combined action of the guide 3, the presser foot 4 and the chopping knife 6, and briefly stated the operation of the feeding is as follows:

When the shoe is placed in position to be operated upon the top of the edge of the sole engages the back side of the guide 3, the edge of said guide contacts with the upper 22 as it is stretched over the last 23, and the bottom of the sole rests against the presser foot 4, all as shown in Figs. 8 to 12. After the shoe has thus been inserted the presser-foot 4 is moved forwardly to clamp the sole firmly between itself and the guide 3, and then the chopping knife is moved forwardly to cut through the edge of the sole. The presser foot and guide 3 with the sole of the shoe clamped between them are then moved laterally to feed the shoe forward, the chopping knife remaining in the sole of the shoe and moving laterally with the presser foot and guide. The pressure on the presser foot 4 is then eased, and while the chopping knife remains stationary the presser foot and guide move laterally reversely to their initial position, the chopping knife meanwhile by its engagement with the sole preventing the shoe from reverse movement. The presser foot and guide after their reverse movement again grip the sole and then the chopping knife is withdrawn and moved laterally to its initial position ready for another cut. The necessary lateral movement of the chopping knife is provided by making the holder 17 capable of lateral movement; and the lateral movement of the presser foot 4 and guide 3 is provided for by mounting both of them upon an arm 24, see Figs. 13 and 14 mounted for lateral movement. In this embodiment of my invention said arm is journaled at its rear end upon a vertical stud 25 carried by the frame 11 of the machine, whereby the forward end of said arm which carries the presser foot and guide can swing laterally. The manner of mounting the arm 24 on the stud 25 holds it against vertical movement. These various movements of the presser foot, guide and chopping knife may be best understood by reference to Figs. 15 to 22.

In Fig. 15 the sole *a* of the shoe is shown clamped between the presser foot 4 and the guide 3, and in said figure the chopping knife 6 with its carrier 7 is withdrawn ready to make its forward cutting stroke.

In Fig. 16 the knife carrier 7 and the chopping knife 6 have been moved forwardly by the swinging arm 10 and the frog cam 8, 8^a, to cause the chopping knife to enter the stock, see Fig. 10. After the chopping knife has thus entered the stock it with the presser foot 4 and guide 3 are moved laterally to the left, as shown in Fig. 17, these parts carrying with them the shoe, as will be obvious. The means for giving these elements their above described movements is so arranged that the lateral movement begins before the knife has passed clear through the stock, and the final cutting action is accomplished during this lateral movement. After the knife has cut through the stock against the chopping block 21 said knife is partially withdrawn to clear it from the chopping block, as shown in Figs. 18 and 11, and at the same time the pressure of the presser foot is eased off or released,

this being also shown in Figs. 18 and 11. As a matter of fact the presser foot never loses contact with the sole of the shoe, although for the sake of illustrating the operation the more or less diagrammatic view in Fig. 18 appears to show the presser foot as slightly separated from the sole.

After the presser foot has been released from the sole it and the guide 3 are moved to the right, as shown in Fig. 19, and during this movement the shoe is held from retrograde movement by the chopping knife 6, and for this purpose the chopping knife may have a gouge like shape, the cutting edge thereof either being curved or the cutting edge may be straight and have at one or both sides an angular flange which cuts into the stock and prevents the retrograde movement thereof. After the presser foot 4 and guide 3 have been moved laterally to the right, as in Fig. 19, the presser foot is moved forwardly to take a fresh grip on the sole of the shoe, Fig. 20, and then the cutting knife is withdrawn, as shown in Fig. 21, and moved laterally to the right into the position shown in Fig 15, in which position it is ready for its next forward cutting stroke. The means herein shown for giving the knife carrier and the arm 24 their requisite lateral movements to perform this feeding of the stock have been designed to operate without any pounding such as would naturally occur in rapidly reciprocating any element; and this object is accomplished by transmitting the movement from the cam or prime mover either to the knife carrier or the arm 24 through a member which works in a direction inclined to the member operated, and which inclined member I have for the sake of convenience herein designated an "actuator". There is one such actuator for the knife carrier and another for the arm 24. The actuator for the arm 24 (which arm carries the presser foot and the guide 3) is designated by 60, and it is pivoted at one end to the arm 24, and is also connected to a cam actuated lever 62 by a link 61. The lever 62, see Fig. 3, is pivotally supported at one end by the frame, as shown at 63, and at its lower end is provided with a roll or stud playing in a cam groove 64 formed in one face of the cam member 65. This cam member, may, if desired, be the same one that has in its opposite face the cam groove 31.

The link 61 is connected to the lever 62 intermediate of its ends, and is also connected to the actuator 60 intermediate of its ends. The free end of the actuator 60 has sliding engagement with a resistance member 66, and for this purpose I have pivoted to the end of the actuator 60 a block 67 which is adapted to slide back and forth in a suitable guideway 68 formed in the resistance member 66. With this construction it will be observed that when the lower end of the lever 62 is thrown forwardly or to the left, Fig. 3, the free end of the actuator 60 will be moved forwardly on the resistance member 66 or from the position shown in Fig. 15 to that shown in Fig. 17; the result of this movement being to crowd the arm 24 laterally thereby to carry laterally the presser foot and guide, and similarly when the lever 62 is swung to the right, Fig. 3, the free end of the actuator 60 will be withdrawn rearwardly back into its initial position and will thereby pull the arm 24 back into its initial position, as shown in Fig. 15. Substantially the same mechanism is employed for giving the chopping knife 6 its lateral movement, that is, the holder 17 has pivoted thereto an actuator 70 which is similar in all respects to the actuator 60, and which has pivoted at its free end a block 77 adapted to slide back and forth in a guideway 78 in the resistance member 66.

Connected to the actuator 70 is a link 71 which connects said actuator with an arm 72 also suspended from the frame 11, as at 73. The lower end of this arm 72 is provided with a stud or roll which operates in a cam groove 74 formed in the cam member 65. The cam grooves 64 and 74 are shown so shaped and timed relative to each other, and relative to the frog cam and the cam for operating the presser foot 4, that after the sole of the shoe has been clamped between the presser foot and the guide 3 and the chopping knife 6 has moved forwardly into the position shown in Fig. 16 the two cam grooves 64 and 74 both operate on the levers 62, 72, to swing them forward thus swinging the actuators 60 and 70 into the position shown in Fig. 17, and similarly swinging both the holder 17 and the arm 24 to the left thereby to feed the shoe forward. After the presser foot 4 has released its pressure on the sole of the shoe and the knife has been partially withdrawn, as shown in Fig. 18, the cam groove 64 actuates the lever 62 thereby to swing the latter rearwardly, Fig. 3, and to move the actuator 60 to its initial position, as shown in Fig. 19, this operation obviously resulting in moving the arm 24 to the right or into position to get a fresh grip on the sole of the shoe. After the presser foot has again gripped the shoe sole and the knife has been withdrawn the cam groove 74 actuates the lever 72, thereby to return the actuator 70 to its initial position and thereby restore the knife carrier 7 into the position shown in Fig. 15. It will be noted from the above that the actuators 60 and 70 operate in a direction which is inclined to the direction of the lateral movement of the knife carrier and the arm 24, and it will also be noted that the engagement between the sliding blocks 67 and 77 and the resistance member 66 is a sliding engagement. It will further be noted that the parts are so constructed that the various parts of the mechanism for giving this trans-

verse movement to the elements of the feeding mechanism do not at any time lose contact with each other, but that during their relative movements there is always a sliding contact. This is important in that it obviates the jar or pounding incident to mechanism where two coöperating parts move out of contact with each other and are brought back into contact again. I have also provided means for varying the extent of the feeding movement at each lateral reciprocation of the arm 24, so that the shoe may be fed a greater or less distance at each stroke of the chopping knife.

Referring to Figs. 15 to 22, it will be seen that the lateral movement of both the chopping knife and the arm 24 is caused by sliding the free ends of the actuators 60 and 70 along the inner surface of the resistance member 66, and hence that the extent of the lateral movement will depend upon the relative angular position of the guideways 68 and 78 of this resistance member. It will also be observed that the nearer the said guideways are thrown into parallelism with the arm 24 the greater will be the extent of lateral movement of the said arm on the operation of the actuators, and that if said guideways are thrown into such a position as to stand substantially tangential to the swinging movement of the free ends of the actuators about their pivotal connection with the holder and the arm 24, as shown in Fig. 22, the movement of the actuators will give practically no lateral movement to the parts connected thereto. I have accordingly provided for regulating the extent of the feeding movement by so mounting the resistance member 66 that it may be turned to bring the guideways 68, 78, into different angular positions. For this purpose said resistance member is pivotally mounted in arms 80 and 81 extending from the frame 11 of the machine, and an adjusting device is provided for either manually or automatically adjusting it as it is desired to change the extent of feeding movement. The mechanism for adjusting the resistance member 66 will be more fully hereinafter described.

It is essential that the holder 17 be moved in right lines that is, have a movement in parallel lines rather than a swinging movement. The holder 17 is mounted in a supporting frame 250 which is sustained by the frame of the machine, and said holder is guided in its transverse movement by said supporting frame. To provide for moving the holder in parallel lines I have journaled in the supporting frame 250 a double pinion 82, which meshes with separated rack teeth 83 formed on the holder 17. This construction insures that both ends of the holder shall move together and that said holder shall always maintain its proper right line movement. The holder may also be guided at its other side, that is, the side opposite to that on which the double pinion 82 is situated, and for this purpose said holder has depending therefrom a pin 401, Figs. 39 and 48, which extends into a guide block 402 that is adapted to play back and forth in a guide 403 as the holder moves laterally. The presser foot 4 is not only moved automatically to clamp and unclamp the edge of the sole, but is also capable of being moved back out of the way when it is desired to put a shoe into position to be operated on. For this purpose said presser foot is mounted on a swinging arm 26, see Fig. 8, which carries a stud 27 that is pivotally mounted on the arm 24. The presser foot is yieldingly held against the bottom of the sole by means of a comparatively light spring while said presser foot and guide are moved backwardly with reference to the shoe to get a new grip, and said presser foot is firmly and solidly pressed against the shoe to grip the sole of the latter between itself and the guide 3 by a positive actuating mechanism when the chopping knife is making its cutting stroke and while the shoe is being fed forward; and the action of this positive actuating mechanism ceases at the proper time after the shoe has been fed forward to permit of the return lateral movement of the presser foot. This positive actuating mechanism is preferably made adjustable so that the sole of the shoe may be gripped more or less tightly according to the character of the material of the sole. In other words, the extent of the forward gripping or clamping movement of the presser foot may be varied. This is desirable because where the leather of the sole is of a soft or rather spongy nature a further forward movement of the presser foot will be necessary to firmly grip the sole than where the material of the sole is hard and comparatively unyielding.

In order to get the proper movement of the presser foot for gripping the sole of the shoe and in order to provide for the regulation or adjustment of the length of the forward gripping stroke of the presser foot I have provided the following mechanism, which is best illustrated in Figs. 8 to 12. Mounted on a stud 29 carried by the frame of the machine is a plate 28, and pivoted to this plate is a depending arm or lever 30 which has a roll or projection to enter a cam groove 31 in a cam member which may be the cam member 65. The lever 30 has rigid therewith at its upper end the stud 32 which is journaled in the plate 28, and this stud is provided with the eccentric portion 33 which rests in a recess in the upper side of a gripping jaw 34. Coöperating with the jaw 34 is another jaw 35, and both jaws are received in a suitable recess 36 in the pivoted plate 28, the gripping jaw 35 resting on a rest or pin 37 fixedly sustained by the plate 28. Received between the gripping jaws 34 and 35 is a thrust rod

39 which extends partially through and is guided by an aperture 40 in the frame of the machine, said thrust rod 39 acting during its forward movement to push the presser foot 4 forwardly. The movement of the presser foot is in the arc of a circle while the movement of the thrust rod 39 is in a forward and backward direction, and I have, therefore, made the thrust rod in two members, the member 41 having a pivotal connection with the member 39 to permit of the swinging movement of the lever 26. In this embodiment of my invention the member 41 has a ball and socket bearing on the end of the member 39, and at its other end said member 41 has a ball bearing in a suitable socket in a swinging member 42, which is pivotally mounted upon the stud 27. The motion of the thrust rod is transmitted to the member 26 through the member 42, and for this purpose said swinging member 42 has an arm 44 extending therefrom through which passes a bolt or stud 45 that is rigidly secured to an arm 46 rigid with the lever 26. A cushion or safety spring 47 is interposed between the arm 44 and the head of the bolt 45. The light spring which is continuously acting on the end of the thrust member 39 and by its action tends to push said thrust rod forwardly is designated by 48.

In the operation of the mechanism just described the swinging movement of the arm or lever 30 about the stud 32 operates to cause the gripping members 34, 35, to grip and release the thrust rod 39 owing to the eccentricity of the crank portion 33. For it will be observed that when the arm 30 swings backwardly, as shown in Fig. 11, said arm turns about the stud 32 as a pivot, and thereby elevates or retracts the eccentric or crank portion 33 from the gripping jaw 34. When these parts are in this position the thrust member is released and the lever 26 may be swung backwardly against the action of the spring 48 to carry the presser foot away from the guide 3, or if the lever 26 is released it will be swung forwardly by the action of the spring 48 to bring the presser foot against the sole of the shoe. As the lever 30 is swung forwardly by the cam 31 the first part of the movement of said lever, or that from the position shown in Fig. 11 to that shown in Fig. 12, is about the stud 32 as an axis, and during this first part of the movement the eccentric portion 33 is brought down against the gripping jaw 34 and the thrust member 39 is firmly gripped between the jaws. During further forward movement of the arm 30 the said arm and the plate 28 move together as one piece, and because of the fact that the thrust rod 39 is gripped between the two jaws 34 and 35 said thrust rod is positively moved forwardly thus pushing forwardly or firmly pressing the presser foot 4 against the sole of the shoe and clamping the latter against the guide 3, as seen in Fig. 10. It will thus be seen that when the arm 30 is swung to the rear so as to release the gripping jaws 34 and 35 the presser foot 4 is held against the sole of the shoe solely by the action of the light spring 48, but when the arm 30 is swung forwardly the gripping jaws operate to grip the thrust rod 39 and to positively move said thrust rod forwardly and force the presser foot hard against the sole.

It is desirable to be able to vary the extent of the forward positive movement of the presser foot according to the character of the leather of the sole, and also according to the thickness of the sole. I have, therefore, provided means whereby the extent of the positive thrust of the thrust rod 39 may be varied without changing the shape of the cam 31 or the extent of movement of the arm 30. In this embodiment of my invention this is provided for by means of an adjustable stop which co-acts with the swinging plate 28. The plate 28 is acted upon by a suitable spring 50 which tends to throw the plate 28 backwardly or to the right Fig. 11. Said spring 50 is herein shown as confined in a recess in the frame 11, and as acting against a follower 51 which engages the front edge of the plate 28.

For limiting the backward movement of the plate I have shown an adjustable stop 52, which is screw threaded in a boss 53 carried by the frame. This stop 52 has a ball and socket connection with a thrust member 54 which is adapted to engage the plate 28 and limit its backward movement. The spring 50 acts to normally maintain the plate 28 in its rearward position, or as far to the right Figs. 8 to 12, as the stop 52 will allow it to go and therefore said plate 28 is resting against the stop except at the times when the arm 30 is moved forwardly to give the forward movement of the thrust rod.

It will be observed from Figs. 8 to 12 that the further to the right the plate 28 is permitted to go by the stop 52 the greater will be the forward movement of the thrust rod upon the actuation of the arm 30; and the further to the left that said plate 28 is held by the stop the less will be the forward movement of the thrust rod upon the actuation of the arm 30. This is so because as the lower end of the plate 28 swings to the rear or to the right, Fig. 11, the stud 32 is carried thereby to the right, and the upper end of the arm 30 is moved into position to bring the eccentric portion 33 toward the gripping jaw 34, (the lower end of said arm 30 being held from movement by the cam 31) and, therefore, when the stop 52 is retracted the parts are in such a position that a very slight movement of the lower end of the arm 30 will cause the jaws 34 and 35 to grip the thrust rod and the main portion of the movement of said arm

30, which is caused by the cam 31, will be expended in giving forward movement to the thrust rod 39. On the other hand when the stop 52 is advanced so as to carry the plate 28 into a normal position to the left, Figs. 8 to 12, this movement carries the upper end of the arm 30 to the left thus lifting the eccentric portion 33 away from the jaw 34, and consequently a much greater movement of the lower end of the arm 30 will be required to cause the jaws 34 and 35 to grip the thrust member 39 and consequently a much less portion of the forward movement of the arm 30 is expended in giving forward movement to the thrust rod. It will thus be seen that by adjusting the stop 52 the extent of the positive forward movement of the thrust rod and consequently of the presser foot 4 can be regulated to suit the exigencies of the case.

In order to avoid the noise and jar incident to any loss of contact between the plate 28 and stop and the bringing of these parts back into contact again during the operation of the machine, I have provided a contact between the stop and plate of such a character that the parts never lose engagement with each other.

It will be observed that the thrust member 54 is formed at its forward end with a fork 56, which engages a roll or stud 57 carried by the plate 28. The inner surface of the fork 56 is curved, and the curve is on a much larger radius than the peripheral curve of the roll or stud 57. A spring 55 is employed which acts on the thrust member 54 and tends to keep the upper arm of the fork 56 always in contact with the stud 57. With this construction it will be seen that as the plate 28 swings back and forth the stud 57 will roll along the curved portion of the fork 56 in moving from the position shown in Figs. 9, 10 and 11, but that during this time the parts never lose contact with each other. This makes a practically noiseless stop mechanism, and one in which the jar and vibration due to the sudden impinging of one member against the other is avoided.

In the operation of the machine the cam 31 is so timed that the arm 30 is moved backwardly to release the gripping jaws 34 and 35 (Fig. 11) just prior to the time when the presser foot 4 and the guide 3 are moved to the right, as shown in Fig. 19, preparatory to getting a new grip on the sole of a shoe, so that during this time the presser foot is held against the shoe solely by the action of the light spring 48. After the presser foot and guide have moved laterally to the right, or into the position shown in Fig. 19, the cam 31 operates to move the lever 30 forwardly thus causing the jaws 34 and 35 to grip the thrust rod 39 sooner or later in the forward movement of the arm 30 according to the adjustment of the stop 52 and when the jaws 34 and 35 have gripped the thrust rod the presser foot 4 is moved forwardly thereby to firmly grip the sole between itself and the guide, as shown in Fig. 11, the presser foot being thus firmly held against the shoe while the chopping knife 6 is being withdrawn from the stock, as shown in Fig. 20, and moved laterally as shown in Fig. 21, and moved forward again into the stock to cut, as shown in Fig. 16.

The object of interposing the cushion spring 47 between the lever 46 and the swinging member 42 is to provide a yielding connection between the thrust rod 39 and the presser foot which will permit the presser foot to yield slightly in case the forward thrust on the thrust rod is of sufficient extent to tend to crush or injure the sole. The relief or cushion spring 47 limits the amount of pressure which can be applied to the sole, for when the pressure transmitted by the thrust rod exceeds a predetermined amount said spring will yield thereby preventing the sole from becoming injured. I have also interposed between the member 42 and the lever 26 a silent pawl or stop similar in some respects to the stop member 54.

Referring to Fig. 10, it will be seen that the stop 251 is pivoted to the member 42, as at 252, and that said stop is formed at its forward end with a recess having a curved wall 253. Within this recess is received a projection 254 carried by the lever 26. The curve of the wall 253 is on a larger radius than that of the projection 254, so that when the lever yields relative to the member 42, as shown in Fig. 10, the projection 54 tends to move out of the recess but the wall of the recess is always held in contact with the projection by means of a suitable spring 255. This construction prevents any clicking or sharp noise caused by the separation of two members of a stop mechanism from each other and their impinging against each other again.

In the rough rounding of soles it is often desirable to provide different widths of extension on the sole for different styles of shoe, and also to provide a greater or less extension at different parts of the sole. This latter is especially desirable in forming what is known as the "Scotch" or "Baltimore" edge wherein the sole is provided with a greater extension around the ball portion of the shoe than around the other parts of the shoe. Furthermore, a less extension of sole is required at the shank of the shoe than around the forepart. The machine herein illustrated has provision for obtaining different widths of extension around the forepart of the shoe, and also different widths of extension around different parts of the sole, whereby any desired extension and also any desired shape may be given to the sole of the shoe. The varying of the width of the extension is provided for by mounting the chopping knife so that

it can be moved transversely to its cutting stroke to bring it nearer to or carry it further from the guide 3. For it will be observed that if said knife is raised relative to the guide the extension will be greater, while if said knife is lowered relative to the guide the extension formed on the sole will be less. The guide determines the position of the shoe, and the position of the chopping knife relative to the guide determines the width of the extension at any particular point. The position of the chopping knife relative to the guide is preferably determined automatically by means of a suitable pattern mechanism, this pattern mechanism determining also the shape of the sole when trimmed. In order to permit the chopping knife to be moved transversely to its cutting stroke I have in this embodiment of my invention mounted it in a supporting frame 250 which has extending therefrom an arm 90, see Figs. 4, 6 and 52, which is provided with a cam block 91 which coöperates with a wedge 92, and suitable pattern-controlled means is provided for determining the position of the wedge thereby to determine the vertical position of the supporting frame 250 and of the chopping knife.

The supporting frame 250 is guided in its vertical movement by means of a dovetail rib 93 on the frame of the machine, see Figs. 39 and 45, which is received in a correspondingly shaped groove in the supporting frame, and the cam block 91 is held in engagement with the wedge 92 by any suitable means such as a spring 95. The movement of the wedge laterally will obviously raise or lower the supporting frame 250, and as said supporting frame sustains the holder 17 the knife carrier 7 and chopping knife 6, the vertical movement of the frame raises or lowers the knife relative to the guide. The sliding pivotal connection between the knife carrier 7 and the arm 10 permits said carrier to be thus vertically adjusted without any binding of the parts. It will be remembered that the actuator 70 is pivoted to the holder 17, and to permit the holder to be adjusted vertically without throwing said actuator out of position, I have made said actuator with a hub 258 which loosely fits over and is capable of both turning and sliding on a stud 259 carried by the holder (see Figs. 3, and 8 to 12).

For controlling the position of the wedge 92 I have in this embodiment provided the following mechanism. Pivoted to the wedge is a block 96, which is slidably mounted in a guideway 97, that in turn is pivoted to a two-part block or member 98 confined between two jaws 99 and 100, see Figs. 2, 4, 6, 7 and 23 to 30. The jaw 99 is formed on one arm of a lever 101 which is pivoted to the frame, as at 102, the other arm of said lever having a roll or stud which is engaged in a cam groove 103 on the cam member 104. The jaw 100 is mounted on one arm of a lever 105, which is herein shown as pivoted to the lever 101, as at 106, said lever 105 having at its lower end a roller stud which is acted upon by the exterior cam surface of the cam member 104. The cam member 104 and the cam groove 103 are so shaped that the flange or partition 107, which runs between the rolls or studs on the levers 101 and 105 is of varying width with the result that as the cam member 104 turns these levers 101 and 105 are separated from each other, thereby to close the jaws 99 and 100 together and are allowed to move toward each other thereby to open said jaws. Furthermore, the cam groove 103 is so shaped that the lever 101 and consequently the pair of gripping jaws have a bodily swinging movement. The two-part block 98 has a shank portion 108 against one side of which bears one end of a pattern-controlled lever 109 pivoted to the frame of the machine, as at 110, and against the other side of which bears a follower spring 111 carried by the lever 109, said spring being for the purpose of holding the lever 109 against the shank 108. The lever 109 has rigid therewith an arm 112 provided with a roll 113 which bears on a pattern member 114, which may be provided with an index, as at 10ª, Fig. 1, said pattern member being mounted upon a shaft 115 supported in suitable bearings in the frame of the machine, said roll being held against the pattern member by a spring 116. The pattern member is rotated from the main shaft 9 of the machine, as will be more fully described hereinafter, and as it rotates it controls the position of the lever 109. From the above it will be observed that the gripping jaws 99 have both an opening and closing movement, and also a bodily up and down swinging movement, and upon referring to Figs. 6 and 7 it will be seen that the member 104 is so shaped that the jaws are open during the upward swinging movement but are closed together against the two-part block 98 during their downward movement. The result of this construction is that as the position of the pattern-controlled lever 109 shifts as determined by the pattern member 114 the two-part block 98 will be correspondingly shifted in the jaws 99 and 100 during the time that the jaws are open and during their upward movement.

When the jaws are in their elevated position, the axis of the stem 117 on which the block 97 is pivoted is above the axis of the block 96, as shown in Figs. 6, 26 and 52, and if during the upward movement of the jaws the pattern-controlled lever 109 has shifted the block 97 laterally one way or the other, said block because of its pivotal connection with the two-part block 98 will assume an angular position, the axis of the block 97

standing at one side of that of the block 96, as shown in either Fig. 26 or Fig. 29. Before the jaws 99 and 100 swing downwardly they are moved together to grip firmly the two-part block 98, and thus hold it from lateral movement, and when said jaws move downwardly they will shift the wedge 92 in one direction or the other, and thereby either raise or lower the chopping knife 6. This will be best understood by reference to Figs. 23 to 30. In Fig. 23 the pattern member 114 is shown in its initial position, or the position it occupies before the shoe is operated on, and the jaws 99 and 100 are in their elevated position, and are consequently open. In Fig. 24 the jaws have been closed and are in their lowered position. In Fig. 25 the pattern member 114 has been advanced slightly thus swinging the arm 109 to the right, but since during this time the jaws 99 and 100 are gripping the block 98, said block is not moved. When the jaws swing upwardly again and open, as in Fig. 26, the follower spring 111 shifts the block 98, and because of the fact that the block 96 on the wedge is stationary the guide 97 will be turned into the angular position shown in Fig. 26. When the jaws 99 and 100 close together again and swing downwardly the guide 97 acts on the block 96 to move the wedge 92 to the right, as in Fig. 27. This action is repeated so long as the roll 113 is moving outwardly until the highest point in the pattern member has passed said roll, as in Fig. 28, after which time as the pattern member rotates the wedge is gradually shifted to the left, as shown in Figs. 29 and 30. Since the jaws are opened and closed during every revolution of the main shaft 9, and hence once for every cutting stroke of the knife, it will be observed that opportunity is afforded for readjustment of the wedge 92, and, therefore, readjustment of the vertical position of the chopping knife 6 once during every rotation of the main shaft, or once for every stroke of the chopping knife.

I desire particularly to call attention to the fact that the pattern is not a cam in the sense that it imparts movement to the knife or other element which is to be moved to vary the extension, but on the other hand said pattern is in the nature of a stop to determine how far such knife or other element shall be moved by actuating mechanism other than the pattern. And it is none the less essentially a stop so far as the knife or other element is concerned even though for convenience it acts through the medium of a lever. In the complete embodiment shown the pattern acts as a means to determine the position of the wedge, which is a spacing member, and this in turn determines the proper position of the chopping knife. The knife, however, is actually moved from one position to the other as demanded by the pattern by mechanism other than the pattern.

I will not describe the mechanism herein illustrated for operating the pattern 114. This mechanism is preferably of such a character that the rate at which the pattern is rotated can be varied as required, and it is so constructed that while the starting of the pattern is under manual control yet its stopping is accomplished automatically. As stated above this pattern cam is mounted on a shaft 115 which has fast thereto, at one end, a worm gear 120 which meshes with and is driven by a worm 121 fast on a countershaft 122 which is journaled in the frame 11. This countershaft 122, see Fig. 4, is driven by a vertical shaft 123 journaled in a suitable bearing 124 carried by the frame of the machine, and having thereon a gear, herein shown as a spiral gear 125, which meshes with and is driven by a spiral gear 126 on the main shaft 9, as shown in dotted lines in Fig. 4.

The pattern which I employ, see Fig. 53, is a two-part or double pattern, one half being shaped for a right shoe and the other half for a left shoe; and the mechanism for driving the pattern is so arranged that said pattern will always rotate in one direction, and after making a one-half revolution or a sufficient portion of a revolution to secure the rounding of the sole of a right shoe, said pattern will stop automatically, and after having been manually set in operation again it will rotate the other half revolution, or a sufficient distance in the same direction as before to effect the rough rounding of the left shoe.

In the rough rounding of shoes it is important that the "Baltimore" or "Scotch" extension should be properly formed at the ball portion of the shoe, but it is often difficult to time the feeding movement of the shoe with reference to the pattern mechanism so that the chopping knife will be making the wide extension at the proper time on the shoe. The quality of the leather making up the soles of different shoes varies greatly, and if the roughly shaped or "blocked" soles do not present sufficient edge for the knife to engage with its gouged or right angled end, it will not drag the shoe forward as it should, and as a consequence different shoes may be fed at different rates of speed with the same feeding mechanism. If, therefore, the pattern mechanism and the feeding mechanism are always moving in unison it would not always be possible to cause the feeding mechanism to feed all shoes exactly alike, and, therefore, in some shoes the wide extension might come at a different point than it would on other shoes. Furthermore, in forming the channel on a shoe it is desirable that said channel shall be formed further from the edge of the sole along the shank portion of the shoe

and nearer the edge of the sole around the forepart of the shoe, and also that the change in the position of the channel should occur at the ball portion of the shoe.

In my present invention I have provided a driving mechanism for the pattern 114 which is purposely made elastic so that the operator may always adjust manually the timing of the feeding movement and that of the pattern so as to insure that the wide extension on the sole shall come at the proper points and to insure that the change in the position of the channel shall always come at the proper point. To do this the driving means for the pattern is so arranged that it may be manually set in motion, and after it has thus been set in motion it will continue in operation while one side of the sole and the toe is being trimmed, and will then be automatically stopped before the ball at the other side of the shoe is reached, and when said pattern has been stopped it will dwell at its point until it is again manually set in operation by the operator when the ball on the last named side of the shoe has been reached in the trimming operation; this period of dwell being sufficient to permit the operator to allow the feeding mechanism to catch up with the pattern or to retard the feeding mechanism so as to bring the pattern and the shoe feeding mechanism into proper relation to each other. Perhaps this can best be explained by reference to Figs. 53 to 55, in which are shown the pattern in outline and top views of soles of right and left shoes.

The rough rounding of the shoe is commenced at the shank of the sole, and of a left shoe on the outside of the shoe. In my machine when the chopping knife has trimmed the sole of a left shoe to about the point *x*, Fig. 54, the operator sets in operation manually the pattern, and this pattern determines the position (constant or variable) of the chopping knife for rounding the ball portion of the shoe on the outside of the sole, and continues in operation until the chopping knife has trimmed to approximately some desired point, as for instance the point *y*, at which time the pattern automatically ceases or remains at rest. The feeding of the shoe then continues until the chopping knife reaches substantially the point *z*, at which time the operator again starts the pattern and it continues in operation while the chopping knife trims round the ball portion on the inside of the shoe and until said knife reaches about the point *w*, at which time the pattern is again automatically thrown out of operation. The time when the pattern is idle between the points *y* and *z*, which time may vary more or less according to the character of the leather in the sole, is sufficient to permit the operator to bring the feeding of the shoe into proper relationship to the movement of the pattern, so that when the ball portion on the inside of the shoe is rounded the pattern will be correctly positioned to effect such rounding and produce the desired shape. Similarly, for rounding the sole of a right shoe the movement of the pattern is started manually by the operator when the chopping knife reaches about the point *v*, Fig. 55, and said pattern continues in operation until the chopping knife reaches approximately some desired point as, for instance, the point *u* when said pattern is automatically thrown out of operation and remains so until the chopping knife reaches the point *t* when the operator again manually starts the pattern, it then continuing in operation until the chopping knife has reached approximately the point *s*.

The pattern-driving mechanism may be so arranged that the pattern will automatically cease its operation at approximately any desired points, on either or both sides of the shoe, and in this description, I have used the points, *x*, *y*, *u* and *t* merely to illustrate the principle of the invention. For giving this intermittent movement to the pattern, I have provided the following mechanism:—The countershaft 122, see Figs. 4 and 2, is provided with a friction wheel 130 which is driven by a friction disk 131 carried by the shaft 123. The shaft 123 is mounted for vertical movement in its bearings 124, whereby the friction disk may be thrown into or out of engagement with the friction wheel 130. For this purpose, I have shown the bearing 124 as having a boss 132, Fig. 6, projecting therefrom, which boss forms a bearing for a sliding actuator 133. This actuator is engaged by two members 134, one of which engages a bearing block 135 on which the shaft 123 rests, the other of which engages a resistance block 136, which is sustained by a screw 236 screw-threaded in a block or bushing 138, which, in turn, is screw-threaded into the lower end of the bearing 124. To prevent the supporting screw 236 from working loose I have provided the split conical locking device 237, see Fig. 38, which surrounds the screw 236 and is received in a conical recess in the upper end of the block 138, said locking member being held in place by spring 137. The two members 134, see Fig. 6, together with the actuator 133 form, in effect, a toggle joint of such a construction that when the actuator 133 is moved to the right, as in Fig. 4, the toggle joint is broken and the shaft 123 can drop sufficiently to withdraw the friction disk 131 from the friction wheel 130, while when said actuator is moved to the left, as in Figs. 6 and 7, the said shaft 123 is elevated to bring the friction disk into engagement with the friction wheel 130. The actuator 133 is acted upon at one end by a controlling lever 139, which i

pivoted to the frame, as at 140, and which is adapted to be actuated at the proper times to move the actuator 133 to the right, thereby to break the toggle joint by means carried by or rotating with the worm gear 120. In the present embodiment of my invention this worm gear 120 has a plurality of lugs or projections 141 extending from the face thereof which are adapted to engage an arm 142 extending from the upper end of the lever 139, these projections and this arm being so shaped that when any projection strikes the arm the upper end of the lever 139 is moved backwardly, thereby moving the actuator 133 forwardly and breaking the toggle joint to disconnect the friction driving mechanism.

The arm 142 is pivotally mounted on the lever 139, and is capable of a limited swinging movement thereon, the connection being such however that when a projection 141 strikes the lower end of the arm 142 the lever 139 is thrown backwardly. There are in the present instance four such stops 141, and they are so placed on the gear 120 as to have a position relative to the pattern, shown in Fig. 53. In rough rounding the left shoe, in the manner described, the first stop 141 corresponding to the "left" portion of the pattern is so positioned that it will engage the arm 142 and thereby disconnect the friction driving mechanism when the shoe has been rough rounded to approximately the point *y*, Fig. 54; and the second stop 141 corresponding to the "left" portion of the pattern is so situated that after the pattern has been set in operation at substantially the point *z* said second stop will throw the pattern out of operation when substantially the point *w* is reached. Similarly the stops 141, corresponding to the "right" portion of the pattern are, in the instance referred to, so positioned that the first stop will engage the arm 142 and thus disconnect the friction driving mechanism when the right shoe has been rounded approximately to the point *u*, Fig. 55, and after the pattern has been again manually started, at substantially the point *t*, the second stop corresponding to the "right" portion of the pattern will throw the pattern out of operation when substantially the point *s* has been reached. The position and number of the stops 141 however may be varied, and they may be so placed as to stop the pattern when the rounding has progressed to any desired point around the sole.

The actuator 133, see Fig. 6, is manually shifted to connect the friction disk 131 with the friction wheel 130 by means of a swinging arm 150 to which is connected a suitable treadle (not shown) by means of a link 151. This arm is pivoted to the frame of the machine, as at 152, and has projecting therefrom a roll or lug 153 which is adapted to engage the right hand end of the actuator 133, see Fig. 6, said end of the actuator preferably being beveled so that as the starting lever 150 is moved to carry the projection 153 past the end of the actuator 133, said actuator is thrown to the left, as in Fig. 6, thereby to set the friction mechanism for the driving pattern into operation. This manual starting of the driving mechanism should take place when the rounding has proceeded to the desired points, in this embodiment to substantially the points *x* and *z* for the left shoe, and substantially to the points *v* and *t* for the right shoe. The stopping of the pattern however is preferably automatically accomplished, as above described. With this machine, (which has been selected for illustrative purposes) therefore, the starting of the pattern is always under manual control, but the stopping thereof is accomplished automatically.

It will be obvious that the distance around the shoe depends upon its size, and, therefore, it would take a greater number of strokes of the chopping knife to cut around a large sized shoe than to cut around a small sized shoe. If, therefore, the means for feeding were non-adjustable it would follow that the extension which is desired at the ball portion of the shoe would come at different positions on different sized shoes. In order to make these extensions come at the correct positions for all sizes of shoes I have provided for adjusting the feeding mechanism so that the shoe will be fed faster or slower according to the size thereof. This adjustment is herein provided for, as above stated, by shifting the angular position of the resistance member 66, Figs. 15 to 22. Furthermore, it is sometimes desirable to vary the rate of feed at different portions of the sole. For instance, in passing around the ball portion of the sole or around the toe where the sole is more or less sharply curved, a better edge can be secured and by a less experienced operator if the forward feeding movement for each stroke of the knife is comparatively short, because if at these points the maximum feeding stroke is used the outline given to the sole might be more or less angular; while along the sides of the sole where the outline is more nearly straight a smooth edge can be secured without especial difficulty even if the shoe is fed forward the maximum distance each stroke because the shoe is not turned to any great extent between successive cutting strokes. Accordingly, I have provided means whereby the rate of feeding movement of the shoe may be varied, that is, may be faster or slower, and have also provided suitable means for controlling the time of variation of this rate of feed so that the shoe will be fed slower at times, preferably while the abruptly curved portions of the sole are being rounded, and will be fed faster at other

times as while the straighter portions of the sole are being acted on. I have also provided means whereby the rate of movement of the pattern can be varied so that if it is desired to work on different sizes of shoes with the same rate of feed the pattern may be operated slower or faster according to the size of the shoe.

To accomplish these various results, I have provided the following mechanism:—The resistance member 66 (see Fig. 31 shown partly in dotted position) has projecting from each end a stud or trunnion, which studs or trunnions are journaled in the bearings 80 and 81, see Fig. 36. The upper trunnion 162 has secured thereon the hub 160 of a controlling lever 161. This controlling lever 161 is pivoted at one end to an adjusting lever 163, as at 164, and said adjusting lever at its end has a pivotal connection with the shaft 122, said connection being such as to permit the shaft to rotate but uniting said shaft and lever for longitudinal movement. The other end of the hand lever 163 is provided with a hand-operated pawl or catch 165 which is adapted to engage any one of a number of notches 166 in a quadrant 167, which quadrant is shown as rigid with the hub 160. The hub 160 is adapted either to be rigidly clamped to the trunnion 162 or to be loosely mounted thereon for turning movement thereabout according as it is desired to vary the rate of feed of the shoe or to operate the machine with a fixed feed but with means operative to vary the speed of the pattern. For clamping the hub 160 to the trunnion when it is desired to operate the machine with a varying feed any suitable device may be employed, such as a set screw (not shown). So long as the hub 160 is loosely mounted on the trunnion 162 it will be obvious that the swinging of the arm 161 will not operate to turn the resistance member 66, but if the hub 160 is clamped rigidly to the trunnion then the turning movement of the arm 161 will turn the resistance member and will thus operate to vary the rate of feed. In either event the swinging of the arm 161 operates to shift the friction wheel 130 on the friction disk 131 and thereby operates to vary the rate at which the pattern is rotated. For the small sized shoes it is necessary to speed up the pattern because the distance which the chopping knife has to cut around the shoe is less than in the larger sized shoes, and consequently the pattern must complete its movement in a less time, and to do this the adjusting lever 163 is shifted in toward the hub 160, as shown in Fig. 33, this operation resulting in moving the friction wheel 130 toward the periphery of the friction disk 131, and thus increasing the speed of the pattern. For operating on the larger sized shoes the adjusting lever 163 is shifted in the opposite direction, as shown in Fig. 32, thus carrying the friction wheel 130 toward the center of the friction disk 131 and reducing the speed of the pattern surface.

Preferably the quadrant 167 will be marked to indicate different sizes of shoes, and the hand lever 163 may then readily be shifted to a position corresponding to the size of the shoe being operated upon, and when thus shifted it will be locked by means of a locking latch 165, the latter having a handle 168 by which it may be operated. Whenever it is desired merely to vary the speed of the pattern surface 114 for different sized shoes without changing the rate of feed the hub 160 will be free to turn on the trunnion 162 when any movement of the levers 161 or 163 will merely shift the friction wheel 130 without turning the resistance member 66. If, however, it is desired to vary both the speed of the pattern surface 114 and the rate of feed, as, for instance, when rounding an abruptly curved portion of the sole or any other difficult point, the hub 160 will be made fast to the trunnion 162, then any shifting of the hand lever 163 or any movement of the arm 161 not only operates to shift the friction disk 130 and thus vary the speed of the pattern surface, but also operates to turn the resistance member 66 and thus vary the rate at which the shoe is fed.

I have provided a construction herein whereby the rate at which the shoe is fed may be varied either automatically or by hand. The means for automatically controlling the rate of the feed is so constructed that the rate of the feeding mechanism will be reduced as the chopping knife is cutting around the ball portions of the shoe and around the toe thereof, but will be increased along the straighter portion of the sole. For this purpose the hub 160, Fig. 36, has extending from its upper end an arm 170 on which rests a second arm 171 also journaled on the trunnion 162. This arm 171 has a slot therein through which passes a set screw 173 that is screw-threaded into the arm 170, and said arm 171 also has a stud or pin 174 on which is pivotally mounted one end of a link 175, the other end of said link having fixed therein a pin 176, one end of which is provided with a roll 177 which is received in a cam groove 178 in the cam member 179 that is mounted on the shaft 115, and the other end of which has pivoted thereon a block 180 which is slidably mounted in a guide 181 carried by the frame 11. The cam groove 178 will operate according to its contour to move the link 175 to the right or to the left, Fig. 31, and if the arm 171 is clamped to the arm 170 such movement will be communicated to the lever 161.

In case the hub 160 is made fast to the trunnion 162, and in case the hand lever 163 is locked by its pawl 165, see Fig. 32, then the movement of the lever 161 will operate both

to shift the friction wheel 130 on the friction disk 131 and also to turn or change the angular position of the resistance member 66. The result of these two acts is that the length of the feeding stroke of the feeding mechanism is adjusted and also the speed of the pattern is correspondingly varied, the speed of the pattern being reduced as the length of the feeding stroke is decreased and vice versa.

The cam groove 178 may be of various contours according to the effects desired to be produced. Fig. 56 shows one shape which may be adopted for this groove, and in said figure the roll 177 is shown and also the roll 113 which rests on the pattern cam 114.

Referring now to Fig. 56 it will be seen that as the pattern 114 and the cam member 179 rotate the roll 177 passes through the elevated portion 182 of said cam groove, and the link 175 is thus thrown to the right, Fig. 31, or into the dotted line position, this occurring just as the ball portion on the outside of the sole of the left shoe is being rounded or the portion *r*, Fig. 57. The moving of the link 175 and lever 161 into the dotted line position, Fig. 31, results in slowing down the feeding mechanism and also in correspondingly slowing down the movement of the pattern, and as a result the successive cuts of the chopping knife will be closer together and the rounded portion of the ball of the shoe will be cut evenly and safely. As the cam member continues its rotation the roll 177 extends into the portion 183 of the cam groove with the result that the lever 161 is moved back toward its full line position, and both the feeding mechanism and the pattern is speeded up. When rounding the toe of the shoe the roll 177 passes into the elevated portion 184 of the cam groove, and again the speed of the feeding mechanism and of the pattern is reduced. While the roll 177 is passing along the portion 185 of the cam groove the speed of both the feeding mechanism and the pattern 114 is again increased until the pattern stops at substantially the point *y*, Figs. 54 and 57, as above described. When the pattern is again started manually and is passing along the ball portion on the inside of the sole the roll 177 passes through the elevated portion 186 of the cam groove and again the speed of the feeding movement and the pattern is decreased. With the arrangement above described, it will be seen that the speed of both the pattern and the feeding mechanism are varied simultaneously.

If the variable feed feature of the machine is not desired the set screw 173 is loosened so as to permit the arm 171 to vibrate as called for by the cam groove 178 without giving movement to the lever 161; and when the set screw 173 is loosened and also the set screw which clamps the hub 160 to the trunnion 162 the adjustment of the hand lever 163 will merely vary the position of the friction wheel 130 and thus change the speed of the pattern relative to the feeding mechanism without giving said pattern a variable speed at different parts of the cycle of operations. As the shoe is fed forward and rounded, as above described, the channel is also cut by the channeling knife 200, as above stated. This channeling knife is mounted in a holder 201 which is hung at its rear end from a link 202 that is suspended from the holder 17. The front end of the block or channel knife holder is sustained on one arm 203 of a T-lever, said arm for this purpose having pivoted thereto a block 204 which is received in a slot 205 in the holder 201, see Figs. 13 and 14. The T-lever 203 is pivoted to the supporting frame 250, Fig. 6, as at 206, and the two arms 207 and 208 thereof are each provided with set screws 209 which are adapted to engage the rib 210 on the holder to limit the rocking movement of the T-lever. The arm 208 is extended and has connected thereto a link 211 which is connected to the upper end of a link 212 that is fulcrumed on a pin 213 extended from the head 11. The link 212 has extending therefrom a roll or stud 214 which is adapted to be engaged by a cam ledge 215 extending from the controlling lever 150, this cam ledge being so disposed that when the controlling lever is thrown from its upper to its lower position it engages the roll or stud 214 and rocks the T-lever thereby to elevate the channeling knife.

The channeling knife is yieldingly held in its forward position, and for this purpose the holder 201, see Fig. 14, is bored out to receive a spring 216, one end of which engages a follower 217 that rests against the link 202, the other end of which engages a screw 218 fast in the holder 201. The spring in this way acts both against the link 202 and against the holder 201, and by its expanding action tends to throw the link backwardly which results in pressing the holder forwardly.

In cutting the channel around a shoe it is desirable that the channel shall be some distance in from the edge of the sole at the shank portion of the shoe, and shall be nearer the edge of the sole around the forepart of the shoe. The construction above described for controlling the position of the channel knife accomplishes this object, and in the operation of the machine the channeling knife is normally in its lowered position see Fig. 4, it being held there by a suitable spring 220, which acts against the link 212.

When the treadle is elevated or in its normal position the controlling lever 150 is also elevated, as seen in Fig. 4, and the cam ledge 215 is situated above the roll 214. The chopping knife and feeding mechanism are constantly operating and are not controlled by the treadle or the controlling lever 150, see Fig. 6, this latter operating to control

only the starting of the pattern mechanism, and the position of the channeling knife.

After the shoe has been placed in position the rounding operation commences on the shank portion, and when the chopping knife 6 reaches about the point *x*, Fig. 54, the operator depresses the treadle to carry the controlling lever 150 from its elevated position, shown in Fig. 4, to its intermediate position shown in Fig. 6, this movement of the controlling lever being just sufficient to carry the roll 153 thereon against the actuator 133, thereby to throw the actuator into its active position and bring the friction disk 131 into engagement with the friction roll 130. This starts the pattern which continues to rotate until it is stopped automatically by the stop 141. When the point *r* is reached, at which point the channeling kinfe is to be shifted from its inner to its outer position, the treadle is completely depressed thereby carrying the lever 150 into the position shown in Fig. 7, the movement into this position bringing the cam ledge 215 against the roll 214 and moving the link 212 to swing the T-lever and elevate the channel knife, as shown in Fig. 7. The operation of the machine continues with the treadle depressed until about the point *y*, Fig. 54, is reached by the chopping knife, when one of the stops 141 engages the lever 142 thereby to stop automatically the pattern mechanism. The rounding of the sole then continues until the point *z* is reached at the ball portion of the shoe, at which point the abrupt change in the position of the channel is to take place. At this point the operator raises the treadle to allow the controlling lever 150 to pass into its uppermost position, as shown in Fig. 4, in which position the cam ledge 215 passes off from the roll 214 and the channeling knife drops to its initial position. While the controlling lever 150 is thus moving back into its uppermost position, as shown in Fig. 4, the roll 153 engages the actuator 133 again thereby to operate it to start the pattern, and the pattern will continue in operation until automatically stopped again by the second stop 141. It will thus be seen that the time of making the abrupt change in the position of the channel is under the control of the operator, and by watching the shoe and the pattern sufficiently it is possible to make this abrupt change always at the right point in the shoe with relation to the position of the pattern.

It will be noted that the pattern is arranged in a vertical position directly in the front of the machine, and is in a position to be readily seen by the operator. Furthermore, it is comparatively large in size, and either it or an indicating disk separate therefrom but carried by the shaft 115 may be marked to indicate the portion corresponding to the right shoe and that corresponding to the left shoe, and also if desired other marks may be placed thereon to indicate the points corresponding to the inside and outside ball portion of the shoe and to the toe of the shoe, etc., so that by keeping watch of the indicating disk or of the markings on or associated with the pattern, the operator can readily see just how his work is progressing or how it should progress, and may retard or assist the same, and when the dwell in the operation of the pattern comes along opportunity is permitted for him to bring all the various parts of the machine into proper time and relationship to each other. When the marking above referred to is placed on the front face of the pattern member 114, such front face constitutes an indicator which is distinct so far as its function as an indicating means is concerned from the pattern as a pattern, the latter being constituted by the periphery of the member 114. Both the indicating means and the pattern may be on a single element or they may be on separate elements, but in either case they are distinct functionally from each other.

The chopping block 21 although sustained at the rear face of the guide 3 is made capable of vertical movement with the chopping knife 6, so that as the chopping knife is moved up or down by the pattern mechanism the chopping block moves up and down in unison therewith. As seen in Figs. 46 and 47 the chopping block 21 is received in a recess in the back face of the guide 3, and is capable of sliding up and down in said recess. The chopping block 21 is clamped to a head 241, as shown in Fig. 46, by means of a suitable clamping screw 242, and said head is pivoted to an arm 247 which extends into a recess in the arm 24 which extends from the supporting frame 250, Fig. 14, so that as the supporting frame rises and falls the chopping block rises and falls with it. The head 241 is guided in its vertical movement by the end of the arm 24, as seen best in Fig. 46. The guide 3 is also made capable of adjustment in the arm 24 so that it may be lowered or raised, and when it has been properly adjusted it is clamped fixedly in place by means of a clamping block 248, see Fig. 47, which is acted on by a clamping screw 249. The upper end of the guide is slotted to receive the block 241, see Fig. 46.

The lever 26 is preferably so constructed that by it the channeling knife may be moved back when it is desired to insert a shoe into position to be operated on. For this purpose the lever or the presser foot may be so shaped as to engage a lug or projection 404 on the holder 201 when said lever is swung back, as in Fig. 9, thereby to retract the holder and channeling knife. A suitable hand lever or arm is provided for manually moving the presser foot back out of the way, when it is desired to put a shoe in position.

271 designates a handle or arm extending

from the spring-pressed shaft 272, which is supported in the frame of the machine, and said shaft has rigid therewith an arm 273 provided at its end with a hook member 274 for engaging the lower end of the lever 26, see Figs. 49, 50 and 51. When the arm 271 is swung into the position shown in Fig. 50, the lower end of the lever 26 will be carried backward, thus carrying the presser foot away from the shoe. The hook member 274 has such a construction that it will always be maintained in engagement with the lower end of the lever 26 in all positions, and, therefore, the movement of the arm 271 will not cause any banging as would be the case if the parts lost contact with each other. The hook member 274 is pivoted to the arm 273, as at 275, and is held in engagement with the lower end of the lever 26 by a suitable spring 276. The swinging movement of the arm 271 is limited by a stop 277 which plays in a recess 278 in the bracket 279 to which the shaft 272 is pivoted.

The pattern 114 is preferably removably mounted on the shaft 115 so that any one pattern can be removed and another of a different shape substituted in its place. Said pattern is also adjustably mounted on the shaft so that it can be manually turned relative to the shaft through 180° and locked in its adjusted position. This is so that if desired two right shoes or two left shoes can be successively rounded. As shown best in Figs. 13 and 14 the pattern is confined between the cam member 179 and the outer plate 321 and is loosely mounted on the shaft 115, the outer plate being held in position by a pivoted locking member 322. The pattern 114 is locked in place by a locking pin 323 which normally passes through said pattern and enters one of two recesses 324 in the cam member 179. By withdrawing the pin 323 the pattern may be turned on the shaft 215 into the desired position, in which position it may be locked by said locking pin entering one of the notches 324.

The rest 5 against which the shoe is held is herein shown as carried by a yieldingly sustained support 325 which is slidably mounted in the frame of the machine, said support being acted upon by a spring which tends to hold the support in its forward position. This rest is of such a construction that it tends automatically to hold the shoe in cutting position against the guide independent of the effort of the operator. For this purpose the rest is herein shown as a rotatable rest in the form of a disk which is mounted to rotate upon an axis extending in a nearly perpendicular direction from the sole of the shoe, so that the shoe rests against the flat face of the rest. The rest however has a slight angular position, and the sole of the shoe rests with greatest force against the upper side of the rest. The angular position is such that as the shoe is fed the turning movement of the angularly positioned rest tends to carry and hold the shoe up against the guide, and thus tends to maintain the shoe in the proper position for the action of the chopping knife. This construction of rest therefore materially assists the operator in properly holding and positioning the shoe.

Although many advantages of my invention will be readily apparent to those skilled in the art from the foregoing description, yet I desire to call particular attention to the fact that special attention has been paid to the elimination of loss of contact between coöperating elements, and the effort has been made to maintain such elements constantly in contact and thus to avoid the severe jar and pounding which heretofore has existed in rapidly working machines of this class.

Although it has been necessary in describing my invention to describe particularly one embodiment thereof yet it will be understood that the invention is not limited to the embodiment shown, nor in any way not enforced by the claims.

The embodiment of the invention herein shown is according to my present tests the preferred embodiment and is sufficient to illustrate the invention intended to be claimed.

Having described my invention what I claim as new and desire to secure by Letters Patent is:—

1. A machine for operating on the soles of boots and shoes containing in combination an operating tool, feeding means permitting a variable feed under manipulation of the operative, and work travel indicating means.

2. In a machine for operating upon the soles of boots and shoes, comprising in combination an operating tool having capacity for variable path movement, feeding means for the work, and means to control the path of tool movement, said means being arranged to indicate to the operative, while presenting the shoe to the operation of the machine, the relative travel of the work and said tool controlling means.

3. A machine for operating on the soles of boots and shoes, comprising, in combination, an operating tool, work-feeding means, controlling means for the tool, including a pattern positioned for visual inspection by the operative whereby the position of said controlling means may be determined relative to the progress of the work.

4. In a machine for trimming the soles of boots and shoes, the combination with a guide for the shoe, and a knife, said guide and knife being movable relative to each other to vary the width of the extension on the sole, of means constructed and arranged to indicate to the operator at any time the width of the extension being cut.

5. In a machine for trimming the soles of boots and shoes, the combination with a guide for the shoe, and a knife to trim the edge of the sole, said guide and knife being movable relative to each other to vary the width of the sole extension, of visual means to indicate to the operator at any time the relative position of the knife and guide.

6. In a rough rounding machine, the combination with a guide for the shoe, a knife to trim the edge of the sole, said guide and knife being movable relative to each other to vary the extension on the sole, of means to indicate to the operator the relative position of the knife and guide, said means having one portion corresponding to the right shoe and another corresponding to the left shoe.

7. In a rough rounding machine, the combination with a guide for the shoe, and a knife to trim the edge of the sole, said knife and guide being movable relative to each other to vary the width of the extension on the sole, of a rotary indicator to indicate the relative position of the knife and guide.

8. In a rough rounding machine, the combination with a guide for the shoe and a knife to trim the edge of the sole, said knife and guide being movable relative to each other to vary the width of the extension on the sole, of a rotary indicator to indicate the relative position of the knife and guide, said indicator having a portion corresponding to a right shoe and another portion corresponding to a left shoe.

9. In a machine for operating on the soles of boots or shoes, in combination, an operating tool, means to feed the shoe, a pattern and connections to determine the line along which the tool operates, said pattern being so located as to indicate to the operator at any time while handling the shoe the relation existing between the operation of the shoe feeding means and that of the pattern.

10. In a machine for operating on the soles of boots and shoes, in combination, an operating tool, means to feed the shoe, a pattern and connections to determine the line along which the tool operates, said pattern and connections including visual means to enable the operator to determine at any time while handling the shoe the relation existing between the operation of the shoe feeding means and that of the pattern.

11. In a machine for operating on the soles of boots and shoes, in combination an operating tool, and a pattern to determine the line along which the tool operates, said pattern being situated to be seen by the operator while handling the shoe whereby it serves as an indicator to indicate the position of the tool.

12. In a machine for operating on the soles of boots and shoes, in combination an operating tool, a means to determine the line along which the tool operates, said means including an index to indicate the position of the tool.

13. In a rounding machine, the combination with a guide for the shoe, and a knife to trim the edge of the sole, said guide and knife being movable relative to each other to vary the width of the extension edge on the sole, of a pattern to determine the relative position of the knife and guide, said pattern being situated to be seen by the operator and thus serving also as an indicator to indicate the width of the extension.

14. In a rounding machine, the combination with a guide for the shoe, and a knife to trim the edge of the sole, said knife being movable transversely to its cutting stroke to vary the width of the extension edge on the sole, of a pattern and devices controlled thereby to determine the position of the knife, said pattern having such a position as to be readily seen by the operator and serving as an indicator to indicate the progress of the work.

15. In a machine for operating on the soles of boots and shoes, an operating tool, pattern mechanism to determine the line along which the tool operates, and automatic means to stop the operation of the pattern mechanism before the tool has finished its operation on the shoe.

16. In a rounding machine, a knife for trimming the edge of a sole, automatic means to determine the line along which the knife cuts, and means to stop the operation of said automatic means after a portion of but before the entire sole of the shoe has been rounded.

17. In a rounding machine, a knife to trim the edge of a sole, automatic means under starting control of the operator to determine the line along which the knife cuts, and other means to stop automatically the operation of said automatic means after one side and the toe of the shoe has been rounded but before the ball on the other side of the shoe is reached.

18. In a rounding machine, a knife for trimming the edge of the sole, pattern mechanism under the starting control of the operator to determine the line along which the knife cuts, and means to stop automatically the operation of said pattern mechanism after a portion of the shoe has been rounded and, after said pattern mechanism is again started in operation, to stop the latter when the shank of the shoe is being reached.

19. In a rounding machine, a guide for the shoe, a knife to trim the edge of the sole, pattern controlled means under starting control of the operator to vary the relative position of the knife and guide to produce an extension edge on the sole, and automatic means

to stop the operation of the pattern mechanism after one side and the toe of the shoe has been rounded and before the knife reaches the ball at the other side of the shoe.

20. In a rounding machine, a guide for the shoe, a knife to trim the edge of the sole, pattern controlled means under starting control of the operator to vary the relative position of the knife and guide to produce an extension edge on the sole, and automatic means to stop the operation of the pattern mechanism after one side and the toe of the shoe has been rounded and before the knife reaches the ball at the other side of the shoe, and after the pattern mechanism has been again manually set in operation to stop it at the proper time after said ball portion of the shoe has been rounded.

21. In a rounding machine, a guide for the shoe, a knife for trimming the edge of the shoe, pattern mechanism to vary the position of the knife relative to the guide to produce a "Baltimore" or "Scotch" edge, and automatic means to stop the operation of the pattern mechanism after one side and the toe of the shoe has been rounded but before the ball on the other side of the shoe has been reached and again after said ball has been rounded.

22. In a rounding machine, a knife to trim the edge of the sole, pattern controlled means to shift the knife transversely to its cutting stroke, and automatic means to cause the pattern controlled means to dwell after a portion of the sole has been rounded and before the rounding operation is completed.

23. In a rounding machine, a guide for the shoe, a knife to trim the edge of the shoe, means including a pattern to adjust the knife relative to the guide to vary the extension formed on the edge of the sole, and automatic means to cause the pattern to dwell after a portion of the sole has been rounded and before the ball portion of the shoe is reached.

24. In a machine for operating on the soles of boots and shoes, an operating tool and means to actuate it to predetermine the line along which said tool shall operate, and automatic means to arrest effective operation of said predetermining means while the tool remains in operation.

25. In a rounding machine, a guide for the shoe, a knife to trim the edge of the sole, a supporting frame for the knife, and a wedge to control the position of the frame relative to the guide.

26. In a rounding machine, a guide for the shoe, a knife to trim the edge of the sole, a supporting frame for the knife, and a pattern controlled mechanism to control the position of the frame relative to the guide.

27. In a rounding machine, a guide for the shoe, a knife to trim the edge of the sole, a wedge for determining the relative position of the knife and guide, and pattern controlled means for moving the wedge in both directions.

28. In a rounding machine, a guide for the shoe, a knife to trim the edge of the sole, a wedge to determine the relative position of the knife and guide, a moving member for actuating the wedge, and pattern mechanism to determine the extent that the moving member shall move the wedge at each operation thereof.

29. In a rounding machine, a guide for the shoe, a knife to trim the edge of the sole, a wedge to determine the relative position of the knife and guide, a pair of moving jaws, means to open and close the said jaws, and a wedge shifting device carried by the jaws.

30. In a rounding machine, a guide for the shoe, a knife to trim the edge of the sole, a wedge to determine the relative position of the knife and guide, a pair of moving jaws, means to open and close the said jaws, a wedge shifting device carried by the jaws, and pattern means to determine the position in the jaws of the wedge shifting device.

31. In a rounding machine, a guide for the shoe, a knife to trim the edge of the sole, a device to cause the knife to operate upon the sole at varying distances from the sole edge, and means including a pattern to engage said device intermittently and move it variably as determined by said pattern.

32. In a rough rounding machine for operating on the soles of boots and shoes, a reciprocating tool for operating on the shoe, shoe-feeding means, and automatic means to vary the speed at which the shoe is fed.

33. In a rough rounding machine for operating on shoes, a reciprocating tool, shoe-feeding mechanism, tool-operating mechanism, and means controllable during the operation of the machine to vary the relative speeds at which the tool-operating mechanism and shoe-feeding mechanism operate.

34. In a rough rounding machine for operating on shoes, a reciprocating tool, shoe-feeding mechanism, tool-operating mechanism, and automatic means to vary the relative speeds at which the tool-operating mechanism and shoe-feeding mechanism operate.

35. In a rough rounding machine, a reciprocating knife to trim the edge of the sole transverse to the plane thereof, shoe-feeding means, and automatic means to vary the speed at which the shoe is fed.

36. In a rough rounding machine, a reciprocating knife to trim the edge of the sole transverse to the plane thereof, shoe-feeding means, and automatic means to retard the feeding movement of the shoe when the knife is trimming around the abruptly-curved portions of the sole.

37. In a rounding machine, a knife to trim the edge of the sole, means to reciprocate the knife, shoe-feeding means, and

automatic means to retard the feeding movement of the shoe when the knife is trimming around the ball and toe portion of the shoe.

38. In a rounding machine, a knife to trim the edge of the sole, means to move the shoe forward with a step-by-step movement, and means to vary the length of the step as the rounding operation proceeds about the shoe.

39. In a rounding machine, a knife to trim the edge of the sole, means to move the shoe forward with a step-by-step movement, and automatic means to vary the length of the forward step.

40. In a rounding machine, a knife to trim the edge of a sole, a plurality of members contributing to the feed of the work and means to move the same, means to return some of said members in advance of others, and means to vary the effective feed of said members.

41. In a rounding machine, a knife to trim the edge of a sole, a plurality of members contributing to the feed of the work, actuating means therefor capable of varying the effective feed imparted thereby, and means engaging the work to hold the latter against retractive movement during return of said feeding members.

42. In a rounding machine, a knife to trim the edge of the sole, clamping members to clamp the sole, means to move the clamping members laterally to feed the shoe forward, and automatic means to vary the extent of said lateral movement.

43. In a rounding machine, a knife to trim the edge of the sole, a plurality of feeding members all movable laterally to feed the work, means to return the feeding members to their initial position at the end of the feeding stroke, means to return subsequently the knife to its initial position, and means to vary the extent of the lateral movement of the members and knife.

44. In a rounding machine, a knife to trim the edge of the sole, a plurality of feeding members all movable laterally to feed the work, means to return the feeding members to their initial position at the end of the feeding stroke, means to return subsequently the knife to its initial position, and automatic means to vary the extent of the lateral movement of the members and knife.

45. In a rounding machine, a knife to trim the edge of the sole, clamping members, an actuator connected at one end thereto, a resistance member against which the other end of the actuator has sliding engagement, and means to operate the actuator to give lateral movement to the clamping members.

46. In a rounding machine, a knife to trim the edge of the sole, clamping members, an actuator connected at one end thereto, a resistance member against which the other end of the actuator has sliding engagement, means to operate the actuator to give lateral movement to the clamping members, and means to change the angular position of the resistance member to vary the length of the feeding stroke.

47. In a rounding machine, a knife to trim the edge of the sole, clamping members, an actuator connected at one end thereto, a resistance member against which the other end of the actuator has sliding engagement, means to operate the actuator to give lateral movement to the clamping members, and automatic means to change the angular position of the resistance member to vary the length of the feeding stroke.

48. In a rounding machine, a knife to trim the edge of the sole, a knife-carrier, a pair of clamping members, an actuator connected at one end thereto, a resistance member against which the other end of said actuator has sliding engagement, a second actuator connected at one end to the knife-carrier, and also having sliding engagement at its other end against the resistance member, and means to operate said actuators to move the clamping jaws and knife laterally.

49. In a rounding machine, a knife to trim the edge of the sole, a knife-carrier, a pair of clamping members, an actuator connected at one end thereto, a resistance member against which the other end of said actuator has sliding engagement, a second actuator connected at one end to the knife-carrier, and also having sliding engagement at its other end against the resistance member, means to operate said actuators to move the clamping jaws and knife laterally, and means to change the angular position of the resistance member to vary the effective operation of the actuators.

50. In a rounding machine, a knife to trim the edge of the sole, a knife-carrier, a pair of clamping members, an actuator connected at one end thereto, a resistance member against which the other end of said actuator has sliding engagement, a second actuator connected at one end to the knife-carrier, and also having sliding engagement at its other end against the resistance member, means to operate said actuators to move the clamping jaws and knife laterally, and automatic means to change the angular position of the resistance member to vary the effective operation of the actuators.

51. In a rounding machine, a trimming knife, a guide coöperating therewith, means including a moving pattern to vary the relative position of said knife and guide to produce an extension on the edge of the sole, and a variable speed driving mechanism for the pattern.

52. In a rounding machine, a knife to trim the edge of the sole, a guide coöperating therewith, a rotatable pattern to determine the relative position of the knife and guide,

and variable friction-driving mechanism for rotating the pattern.

53. In a rounding machine, a knife to trim the edge of the sole, a guide coöperating therewith, a rotatable pattern to determine the relative position of the knife and guide, and variable speed friction driving mechanism for rotating the pattern.

54. In a rounding machine, a knife to trim the edge of the sole, a guide coöperating therewith, a rotatable pattern to determine the relative position of the knife and guide, and friction driving mechanism under starting control of the operator for rotating the pattern, and automatic means to render the driving mechanism inoperative.

55. In a rounding machine, a trimming knife, a channeling knife, a pattern to control the line along which the trimming knife operates, and a single controller arm operating both to shift the position of the channeling knife relative to the trimming knife and to control the operation of the pattern.

56. In a rounding machine, a trimming knife, a channeling knife, a pattern to control the line along which the trimming knife operates, and a single controller arm under manual control operating both to shift the position of the channeling knife relative to the trimming knife and to control the operation of the pattern.

57. In a rounding machine, a trimming knife, a channeling knife, a pattern to control the line along which the trimming knife operates, and a controller arm operative when in one position to set in operation the pattern mechanism, and when in another position to shift the position of the channeling knife relative to the trimming knife.

58. In a machine for operating on boots and shoes, a pair of clamping members for feed clamping the sole of a shoe, one clamping member being movable relative to the other, and means to automatically vary the clamping pressure of the movable member during the operation of the machine.

59. In a machine for operating on boots and shoes, a pair of clamping members to clamp the sole of a shoe, one movable relative to the other, power mechanism to operate the movable clamping member, and means to vary the clamping effect of the clamping member when the said power mechanism is inactive.

60. In a machine for operating on the soles of boots and shoes, clamping members to clamp the sole of a shoe, one movable relative to another, means for actuating said movable member to clamp the work for feeding movement, and other constantly actuating means for actuating said member.

61. In a machine for operating on boots and shoes, clamping members to clamp the sole of a shoe, positive means for moving said members to clamp the work and yielding means acting to maintain the clamping members in contact with the work when it is released by the positive clamping means.

62. In a machine of the class described, a pair of clamping members to clamp the sole of a shoe, one clamping member movable relative to the other, a constantly moving actuator and means to vary the effective operation of the actuator in moving the movable member.

63. In a machine of the class described, a pair of clamping members to clamp the sole of a shoe, one being movable relative to the other, a constantly moving actuator and an adjustable connection between the actuator and the movable member, whereby the degree of movement of said member can be regulated.

64. In a machine of the class described, a pair of clamping members to clamp the sole of a shoe, one being movable relative to the other, a cam having a fixed throw, and means between said cam and movable member to vary the effective operation of the cam on the movable member.

65. In a machine of the class described, a pair of clamping members to clamp the sole of a shoe, one movable relative to the other, a cam for operating the movable clamping member, and means to render more or less of the movement of the cam effective in moving said movable member.

66. In a machine of the class described, a pair of clamping members to clamp the sole of a shoe, one movable relative to the other, a thrust member for giving the movable member its movement, and adjustable means to move the thrust member more or less, depending on the amount of clamping movement it is desired to give the movable member.

67. In a device of the class described, a pair of clamping members to clamp the sole of a shoe, one of said clamping members being movable, a thrust member connected to said movable member, and a pair of gripping jaws to grip the thrust member and give it its forward movement.

68. In a device of the class described, a pair of clamping members to clamp the sole of a shoe, one of said clamping members being movable, a thrust member connected to said movable member, and a pair of gripping jaws to grip the thrust member and give it its forward movement, and a cam to operate the gripping jaws, and means to predetermine the point in the movement of the cam when the jaws shall grip the thrust member.

69. In a machine for operating on the soles of boots and shoes, a knife to trim the edge of the sole, a moving pattern to determine the contour along which the knife acts, means to feed the shoe, and automatic means to vary simultaneously the speed of movement of the pattern and the speed with which the shoe is fed.

70. In a machine for operating on the soles of boots and shoes, a knife to trim the edge of the sole, a pattern to determine the line along which the knife operates, means to feed the shoe, means to vary the speed of operation of the pattern, and means whereby the speed with which the shoe is fed may be varied either simultaneously with or separately from the variation in the operation of the pattern.

71. In a machine for acting on the soles of boots and shoes, a knife to trim the edge of the sole, a rotatable pattern to determine the contour along which the knife acts, means to feed the shoe, and means whereby the rotative movement of the pattern and the speed with which the shoe is fed may be simultaneously varied.

72. In a machine for acting on the soles of boots and shoes, a knife to trim the edge of the sole, a rotatable pattern to determine the contour along which the knife acts, means to feed the shoe, means whereby the rotative movement of the pattern and the speed with which the shoe is fed may be simultaneously varied, and automatic means to vary simultaneously the speed of movement of the pattern and the speed with which the shoe is fed.

73. In a rounding machine, the knife 3, the presser foot 4, the thrust member 39 for operating the presser foot, and the gripping jaws 34, 35, to grip the thrust member and move it forward.

74. In a rounding machine, the knife 3, the presser foot 4, the thrust member 39 for operating the presser foot, the gripping jaws 34, 35 to grip the thrust member and move it forward, and means to cause said jaws to grip the thrust member sooner or later dependent upon the amount it is desired to operate the presser foot.

75. In a rounding machine, a guide, a knife to trim the sole of the shoe, a wedge 92 to control the relative position of the knife and guide, and a wedge-shifter 98.

76. In a rounding machine, a guide, a knife to trim the sole of the shoe, a wedge 92 to control the relative position of the knife and guide, a wedge-shifter 98, and a pattern 114 to determine the extent the wedge-shifter shall shift the wedge.

77. In a rounding machine, a trimming knife, a channeling knife, and a controller arm 150 to control the position of the channeling knife relative to the trimming knife.

78. In a rounding machine, a trimming knife, a channeling knife, a pattern 114 to determine the contour along which the trimming knife operates, and a controller lever 150 which in one position sets in operation the pattern and in another position shifts the channeling knife relative to the trimming knife.

79. In a rounding machine, a trimming knife, and a rotatable pattern, means disposed between the pattern and trimming knife for determining the contour along which the trimming knife operates, said pattern being arranged in a vertical plane in full face view of the operator.

80. In a machine of the character described, the combination of a knife, means for controlling the position of the knife to determine the sole contour, work feeding means, and means for selectively varying the speed of operation of the controlling means and work feeding means.

81. In a machine of the general character described, the combination of a tool for acting on a shoe sole, controlling means for determining the operative position of said tool, work feeding means, and provisions for varying the action of either the controlling means in positioning the tool or work feeding means in its feeding actions.

82. In a machine for operating on the soles of boots and shoes, the combination with a knife-carrier, of a pivoted member connected thereto, said member having two arms and two separate cam members, one coöperating with each arm, and one adapted to swing the pivoted member in one direction and the other in the other direction.

83. In a machine for operating on the soles of boots and shoes, the combination with a knife to trim the edge of the sole and actuating mechanism therefor, of means to maintain effective contact between the elements of the actuating mechanism as the direction of movement of the knife is reversed, whereby to eliminate pounding of the knife and incomplete cutting of the work.

84. In a machine for operating on the soles of boots and shoes, the combination with a reciprocating knife for trimming the edge of the sole, of means to impart to the knife a lateral movement, said means comprising elements working against an inclined surface.

85. In a machine for operating on boots and shoes, the combination with a reciprocating knife to trim the edge of the sole, of an actuator pivotally connected to the knife at one end, an inclined resistance member against which the other end of the actuator has sliding engagement, and means to move the actuator relative to the resistance member.

86. In a machine for operating on the soles of boots and shoes, the combination with a reciprocating knife for trimming the edge of the sole, of means to impart to the knife a lateral movement, said means comprising elements working against a shiftable inclined surface.

87. In a machine for operating on the soles of boots and shoes, the combination with a pair of feeding jaws, of means to move said jaws laterally, said means comprising an actuator operating against an inclined surface.

88. In a machine for operating on the soles

of boots and shoes, the combination with a pair of feeding jaws, of means to move said jaws laterally, said means comprising an actuator pivotally connected to the jaws, and a resistance member having an inclined surface against which the actuator operates.

89. In a machine for operating on the soles of boots and shoes, the combination with a pair of feeding jaws, of means to move said jaws laterally, said means comprising an actuator pivotally connected to the jaws, and a resistance member having a shiftable inclined surface against which the actuator operates.

90. In a machine for operating on the soles of boots and shoes, the combination with a pair of feeding jaws, of means to move said jaws laterally, said means comprising an actuator pivotally connected to the jaws, a resistance member having a shiftable inclined surface against which the actuator operates, and means to move the actuator relative to the resistance member in a direction transverse to the lateral movement of the jaws.

91. In a machine for operating on the soles of boots and shoes, the combination with a guide for the shoe and a presser-foot coöperating with said guide to feed the shoe, of means for moving the presser-foot toward the guide to clamp the shoe, and a stop to limit the backward movement of the presser-foot, said stop having continuous engagement with the member it acts against.

92. In a machine of the class described, the combination with a guide for the shoe and a presser-foot to clamp the shoe against the guide, of means for actuating the presser-foot comprising a swinging member having a projection, means to swing said member in one direction, and a stop having a forked end continuously in engagement with said projection.

93. In a machine for operating on the soles of boots and shoes, the combination with a knife to trim the edge of the sole, of a bearing wheel constructed and arranged to present its active face in substantially a vertical plane, said vertical plane being disposed at an angle to the line of feed for the work to cause the bearing wheel to direct the work in a direction at an angle to the feed movement.

94. In a machine for operating on the soles of boots and shoes, the combination with a knife to trim the edge of the sole and a guide for the shoe, of a rotating rest constructed and arranged to engage the work oblique to a vertical plane passing through the axis of the knife and acting by its rotation to move the work at an angle to the work feeding movement.

95. In a machine of the character described, the combination of a shaft, a pattern carrying member connected thereto, a pattern mounted on the shaft and rotatable with relation thereto, an outer plate for detachably holding the pattern on said shaft while permitting rotative movement of the pattern on the shaft, and means carried by the outer plate and adapted for engagement with both the pattern and pattern carrying member for locking the pattern to the shaft.

96. In a machine for operating on the soles of boots and shoes, the combination with a guide for the shoe, and a knife to trim the edge of the sole, of a rotatable rest for the sole of the shoe opposed to said guide, said rest having its operative face disposed at an angle to the line of feed and arranged to tend to move the work towards the guide and at an angle to the feed movement.

97. In a machine for operating on the soles of boots and shoes, the combination with a guide for the shoe and a knife to trim the edge of the sole, of a rotatable rest to engage the sole of the shoe, said rest having the active portion of its face arranged in substantially a vertical plane disposed at an angle to the vertical plane containing the line of feed, said rest acting by its rotation to move the work at an angle to the work feeding movement.

98. A machine for operating upon the soles of boots and shoes containing, in combination, an operating tool, a guide for the shoe, means to vary the relative positions of the tool and guide to cause the tool to operate on a predetermined line, and visual indicating means to indicate to the operator while presenting the shoe to the operation of the machine the progress made along said line.

99. A machine for operating upon the soles of boots and shoes, containing, in combination, an operating tool, a guide for the shoe, automatic means to vary the relative position of the tool and guide to cause the tool to operate on a predetermined line, and visual indicating means to indicate to the operator while presenting the shoe to the operation of the machine the progress made along said line.

100. A machine for trimming the soles of boots and shoes containing, in combination, a knife to trim the edge of the sole, a guide for the shoe, automatic means to vary the position of the knife relative to the guide to cause said knife to operate along a predetermined line, and indicating means disposed and arranged to indicate to the operator while presenting the shoe to the operation of the machine the progress made along said line.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

ANALDO M. ENGLISH.

Witnesses:

LOUIS C. SMITH,

FREDERICK L. EMERY.