

No. 844,128.

PATENTED FEB. 12, 1907.

J. J. HEYS.  
LEATHER SPLITTING MACHINE.

APPLICATION FILED OCT. 17, 1902.

3 SHEETS—SHEET 1.

Fig. 1.

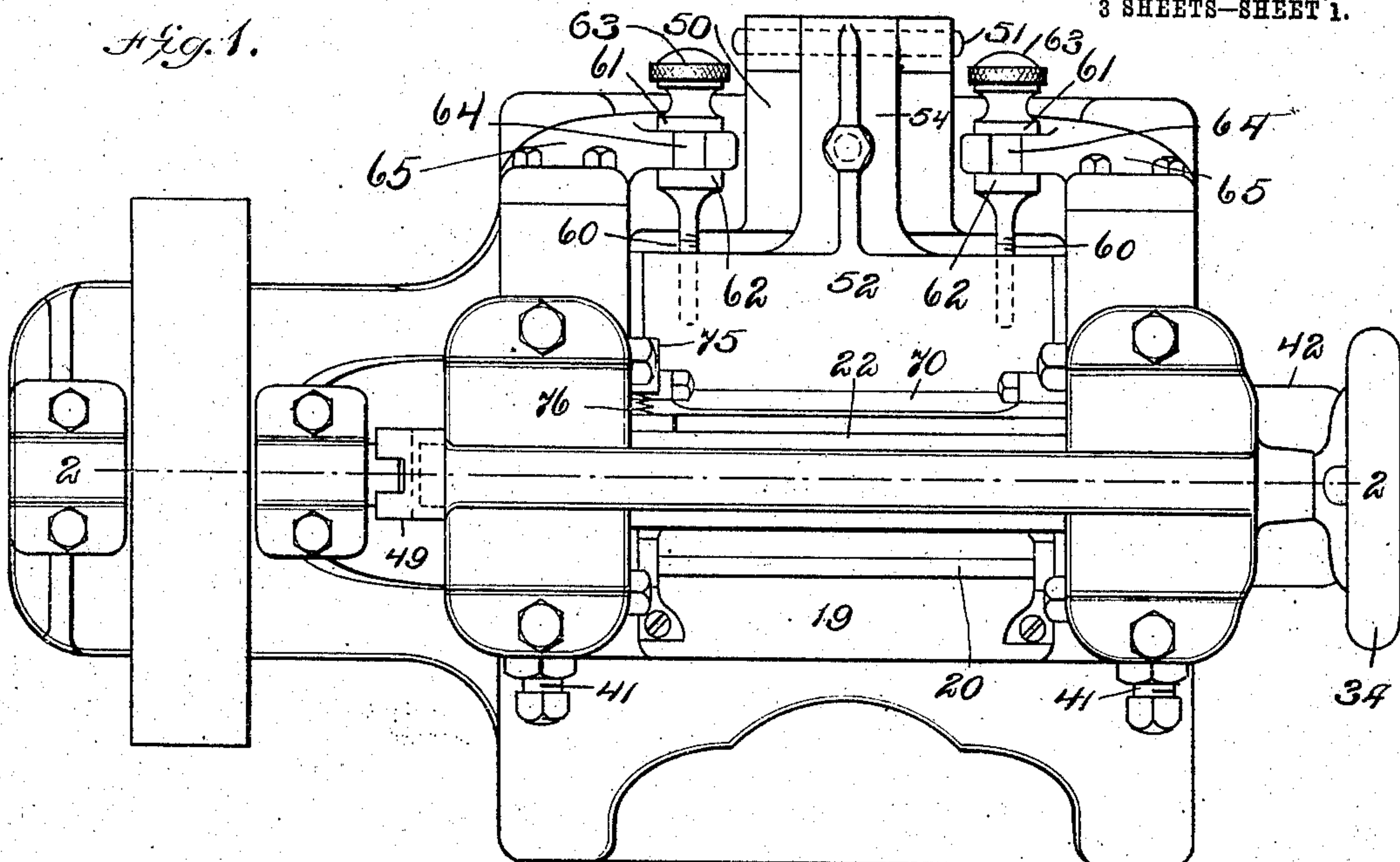
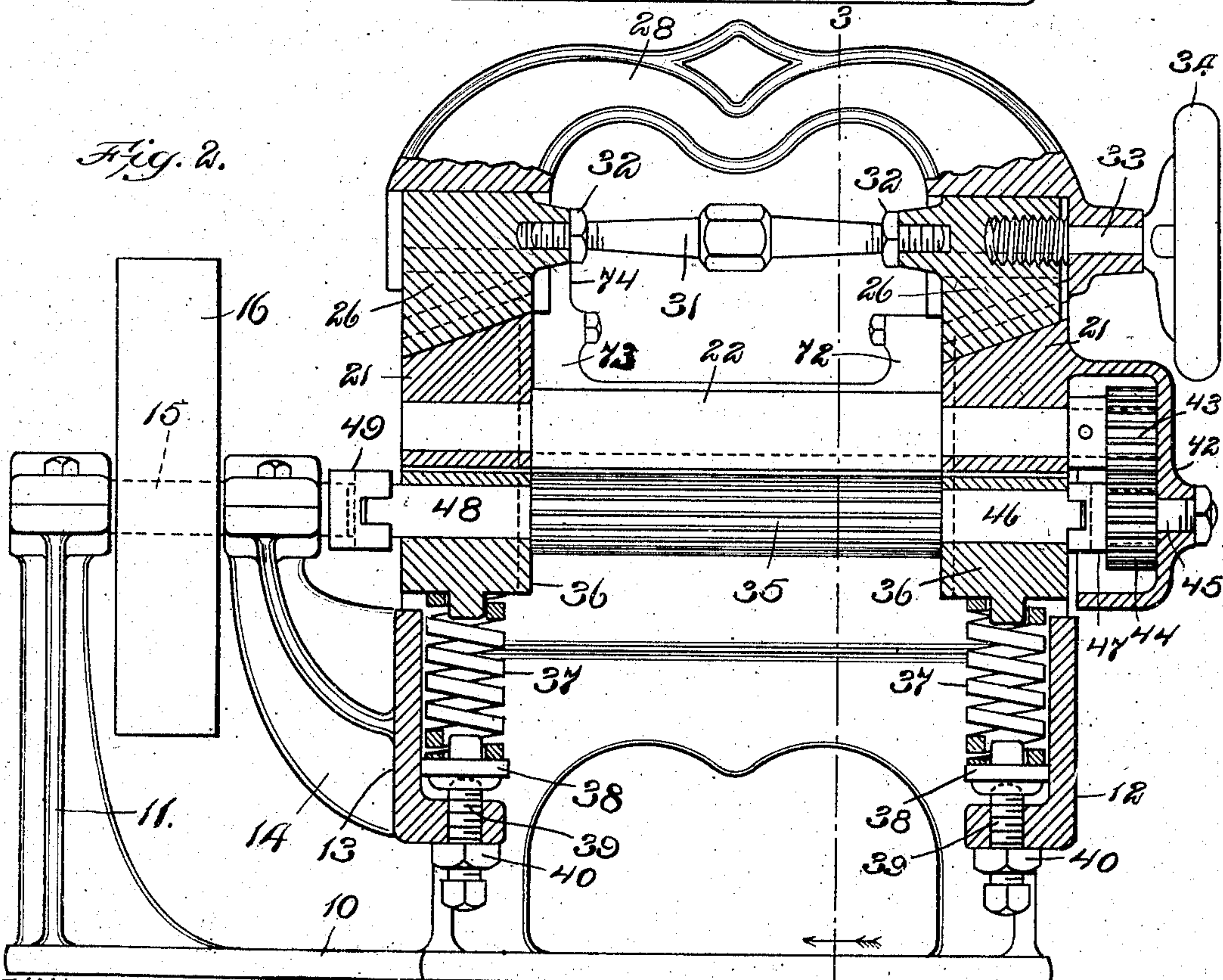


Fig. 2.



Witnesses:  
Halter & Abell.  
P. H. Pizette.

Inventor:  
J. J. Heys.  
By Knight Brown & Company  
Attorneys

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3 SHEETS—SHEET 2.

Fig. 3.

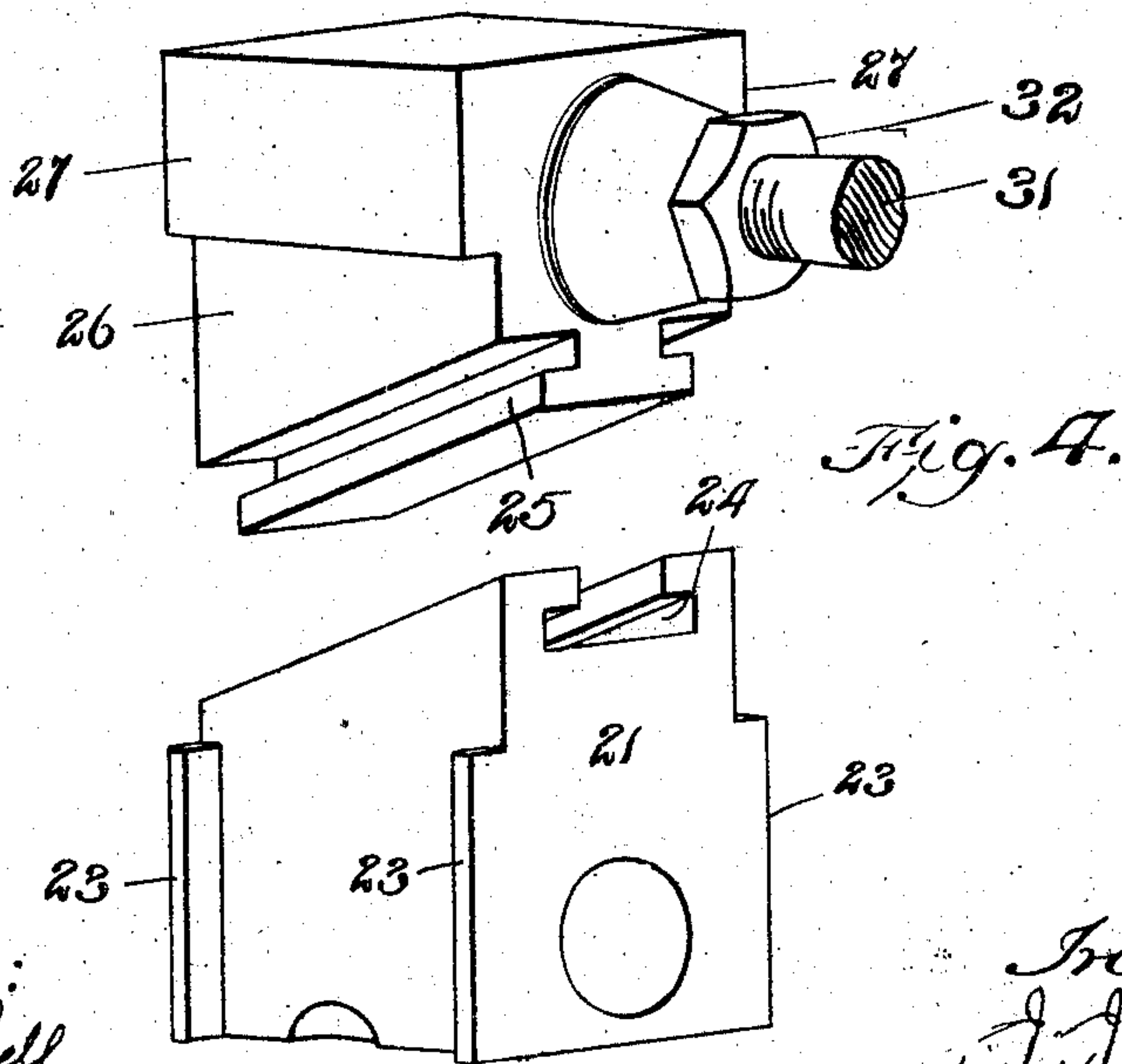
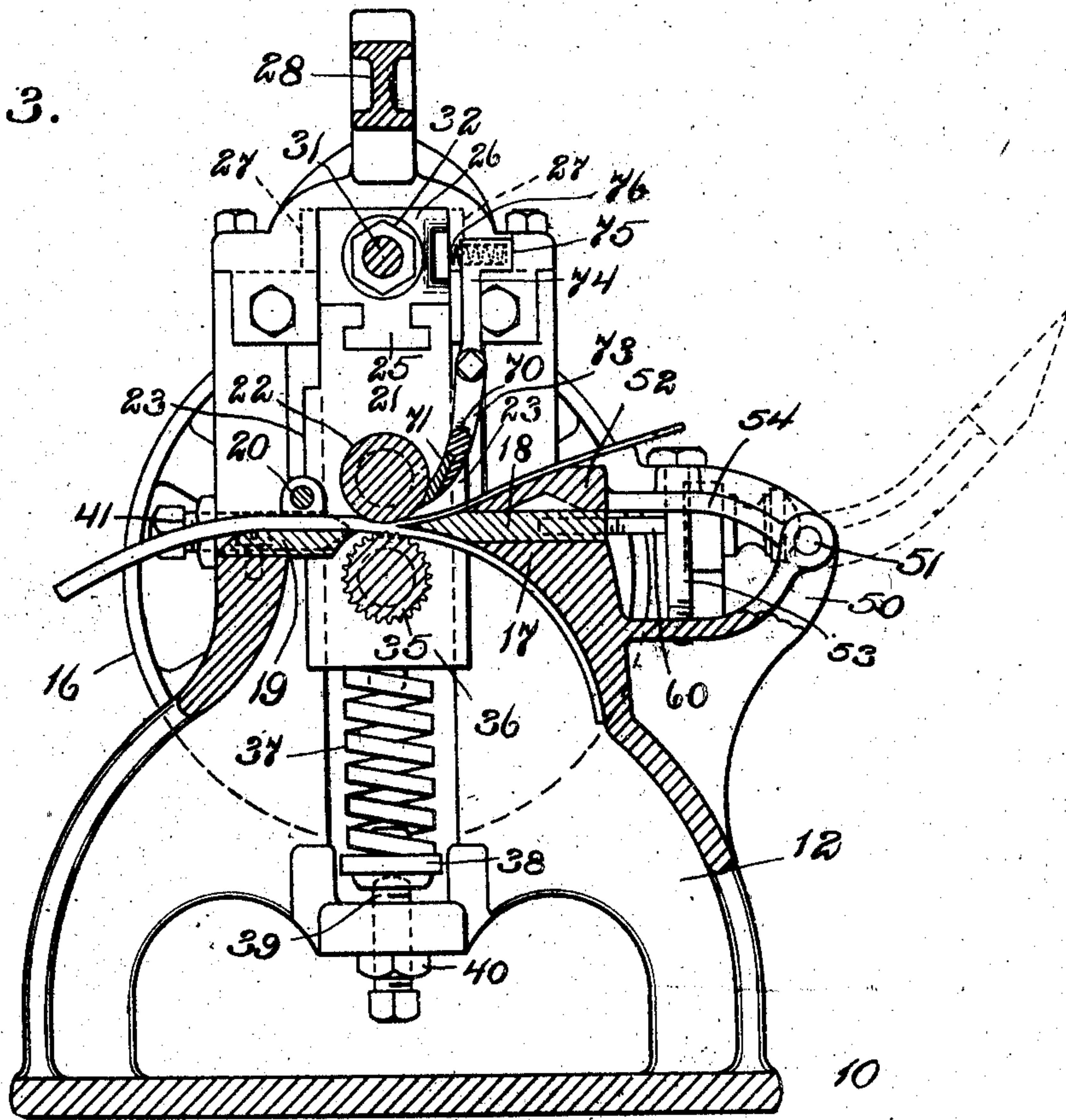


Fig. 4.

Witnesses:  
Walter L. Bell  
J. M. Buzzetti

Inventor;  
J. J. Heys  
By Wm. B. Brown Attorney



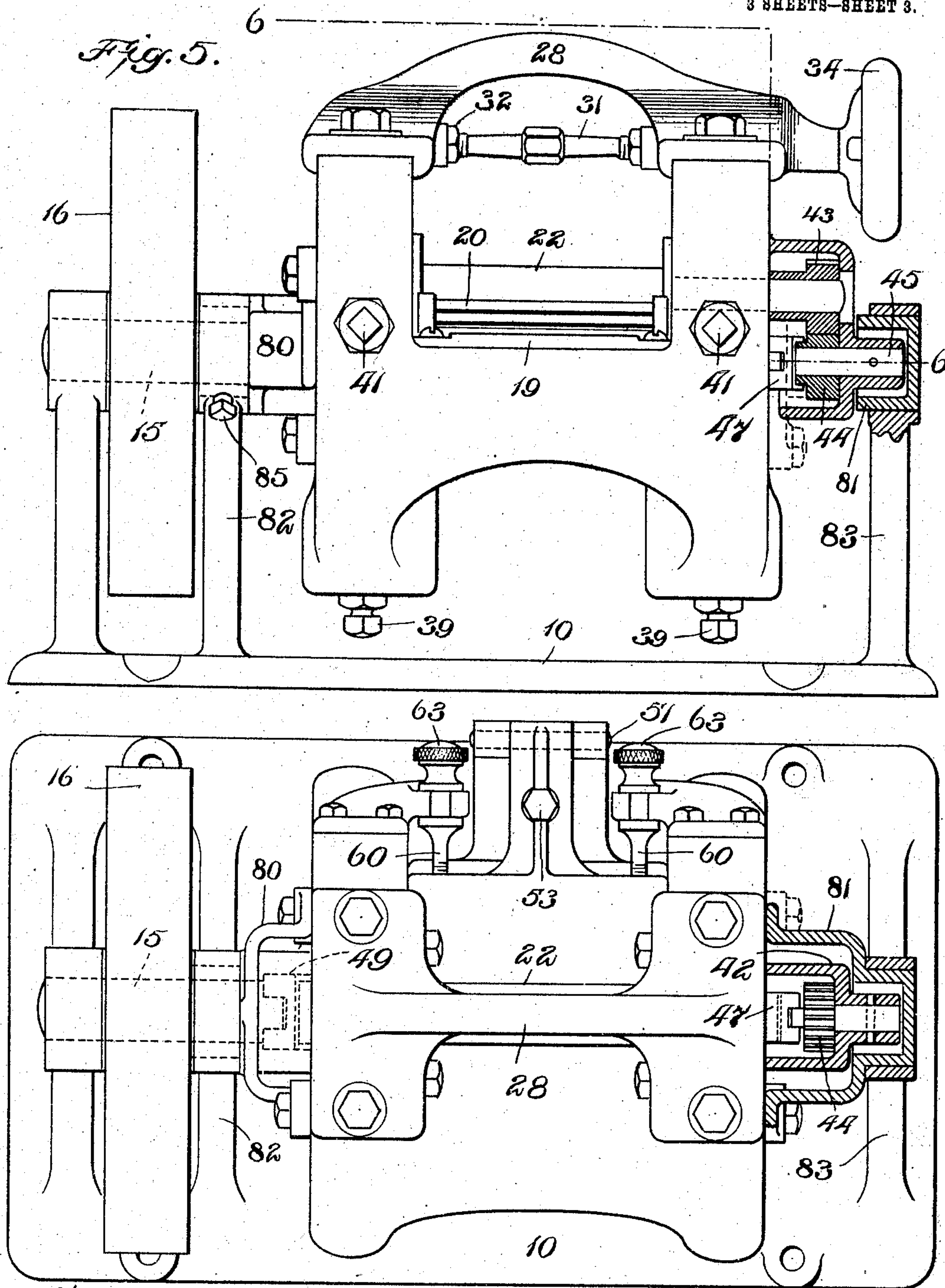
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3 SHEETS—SHEET 3.



Witnesses:  
Walter L. Shell.  
P. M. Duggan.

Fig. 6.

Inventor:  
J. J. Heys  
By H. J. Brown & Son  
Attorneys



# UNITED STATES PATENT OFFICE.

JOHN J. HEYS, OF LYNN, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO  
MAURICE V. BRESNAHAN, OF LYNN, MASSACHUSETTS.

## LEATHER-SPLITTING MACHINE.

No. 844,128.

Specification of Letters Patent.

Patented Feb. 12, 1907.

Application filed October 17, 1902. Serial No. 127,691.

*To all whom it may concern:*

Be it known that I, JOHN J. HEYS, of Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Leather-Splitting Machines, of which the following is a specification.

This invention has relation to machines for splitting leather.

The object of the invention is to provide a machine of the character described by means of which the leather may be split into any desired thickness, whether it be employed for soles, shoe-linings, or the like, with the greatest possible accuracy; to simplify the mechanism so as to do away with much of the gearing and shafting that has been hitherto considered necessary in the construction of such machines; to so construct the machine as to provide for the free delivery of the stock after it has been split by the knife without injury to the said product, and to eliminate the springs for supporting the top roll and to make the top roll adjustably rigid at any point to which it may be adjusted, whereby it may be secured in perfect parallelism to the knife-edge at any distance therefrom without a springing of the parts and a consequent maladjustment of the roll and knife.

The invention has likewise for its object to provide a machine in which when the knife and rolls are in any predetermined adjustment they may be swung bodily so that the knife will be either parallel to or at any desired angle relatively to the horizontal. This is highly desirable in certain classes of work, as it enables the operator to feed the stock to the machine in the way most convenient to him.

The invention has further for its object to provide other improvements for rendering the machine more highly efficient, more compact in construction, and more accurate in operation than heretofore.

The manner in which I attain the objects above referred to and in what the invention particularly consists will be hereinafter set forth in detail.

On the accompanying drawings there is illustrated a machine which embodies the invention, but to the details of construction of which it will be understood the invention

is in no wise limited. In this connection I desire to state that the phraseology which I employ in the following specification and claims is intended for the purpose of description and not of limitation, and, further, that various mechanical equivalents may be substituted for the mechanism which I have illustrated and subsequently described without departing from the spirit and scope of the invention.

On the said drawings, Figure 1 represents in plan view a leather-splitting machine. Fig. 2 represents a section on the line 2 2 of Fig. 1. Fig. 3 represents a section on the line 3 3 of Fig. 2 looking in the direction of the arrow *a*. Fig. 4 represents one of the boxes for the top roll and its adjustable support. Figs. 5 and 6 represents that embodiment of the invention in which the rolls and knife may be swung bodily about the axis of the driving-shaft.

Referring first to Figs. 1 to 4, inclusive, the machine therein illustrated is provided with a base 10, an upright or pedestal 11, and a frame consisting of end standards 12 13 of the shape shown in Figs. 2 and 3. To the end standard 13 is secured a bracket 14, which, together with the pedestal 11, affords a bearing for a driving-shaft 15. The said shaft is provided with a pulley 16, which may be either keyed thereto or provided with clutching mechanism of any ordinary kind, so that it may be engaged with and disengaged from the shaft, according to requirements. The frame, including the end standards 12 and 13, is provided for the reception of the knife 18 and the rolls 22 35. The end standards are connected by suitable webs for the formation of a flat table 17, upon which the knife 18 may rest, as shown in Fig. 3. At the front of the machine there is a support 19 for the work, said support being attached to the frame, as indicated, and being provided with a guard 20 to prevent the operative from getting his fingers caught in the rolls, as will be subsequently explained. The end standards are provided with slots or guideways to receive the boxes for the rolls. The boxes 21 21 for the top or smooth roll 22 are adapted to slide vertically in the said guideways and are held against longitudinal movement by lips or ribs 23. The top of each box 21 is sharply beveled longitudinally of the



roll and is provided with an undercut groove 24 for the reception of a complementary tongue 25, formed on the beveled under face of a support 26. said tongue and groove forming a locked sliding connection. Each support consists of a block fitted in the guideway and having forwardly and rearwardly projecting flanges 27 to rest upon the top of the end standard in which it is located. These supports or blocks are held against vertical movement, while permitted to slide longitudinally, by the brace 28, which is secured upon the tops of end standards to connect them together, as clearly shown upon the drawings. The tongue and groove at one end of the roll are parallel to the tongue and groove at the other end of the same, so that when the blocks or supports are caused to move longitudinally the boxes 21 are raised and lowered simultaneously to the same extent. The supports are adjustably connected together by a bar 31, whose ends are provided with right and left threads and are screwed into internally-threaded apertures in said supports. The said bar is of wrench-retaining formation, so that it may be turned either in one direction or the other to draw said supports together or separate them, as the case may be, for adjusting the boxes in opposite directions. Locking-nuts 32 are provided to hold the bar against rotation when the supports have been adjusted to proper position. To adjust or slide the two supports longitudinally simultaneously in the same direction, the shaft 33 is journaled in a suitable bearing afforded by the end of the brace 28 and is threaded on its end, so as to take into a threaded aperture in the adjacent support, being also provided with a hand-wheel, by means of which it may be rotated. The rotation of the shaft 33 will effect a longitudinal movement of the two supports 26 and a consequent transverse adjustment of the top roll 22 relatively to the knife 18. The supports 26 not only perform the function of supporting the boxes 21, but also operate as wedges to positively move the boxes in any direction at right angles to the axis of the roll 22. The supports themselves while permitted to slide longitudinally yet are held rigidly against movement transversely of the roll 22, so that there is afforded a rigid abutment for the roll 22, whereby it is incapable of yielding relatively to the knife-edge, and consequently after the roll has been once arranged in parallelism with the knife by means of the screw-bar 31 the said roll may be freely adjusted relatively to the knife to provide for the product being delivered in any thickness without danger of the said roll yielding or getting out of parallelism with the knife. For coaction with the top roll there is a feed-roll 35, which is of the same diameter and which is corrugated to suit the character of the material which is

being split. This roll has to be so mounted as to slide up and down and yield against the pressure of the tension-springs upon which it is supported. According to the work, which frequently varies in thickness, one end of the roll will yield to a greater extent than the other, and consequently this roll cannot be rigidly connected to the driving-shaft. The two rolls are geared together, whereby they may be rotated in peripheral unison, and yet the construction must be such that the top roll may be adjusted to govern the thickness of the product and the bottom roll yield in accordance with the thickness of the stock without varying the rotative relation of the two rolls. If the rolls were connected together by gears movable toward and from each other, they would become unmeshed or permit a greater lost motion than would be desirable. Hence in this present instance I so connect the rolls that they are capable of the adjustment described without changing the relation or pitch-line of the gears from which power is imparted from one to the other. The axes of the two rolls are located in a plane which is at substantially an angle of ninety degrees to the median plane of the knife, and the last-mentioned plane intersects the first-mentioned plane along a line between the peripheries of the two rolls. As the machine is built, both the rolls and the knife may be adjusted without varying their described relation. The roll 35 is mounted in boxes 36, which are adapted to slide in the guideways formed in the end standards, each box being supported upon a spring 37 at the ends of the frame. Each spring rests upon a washer 38, supported by an adjusting-screw 39, which is adapted to be locked in place by a nut 40. By adjusting the screw 39 the tension of the spring supported thereby may be varied. For the purpose of limiting the upward movement of the boxes 36 there are provided screws 41, the conical ends of which bear against tapered sockets in the upper faces of the boxes, as shown in dotted lines in Fig. 3.

It will be observed from Fig. 2 that the box 21 at the right-hand end of the machine is provided with a housing 42. The trunnion of the top roll 22 projects into the housing and is provided with a gear 43, which is in constant intermeshed relation with a gear 44 of the same diameter pinned on a shaft 45, journaled in the housing. Between the trunnion 46 of the driving-roll 35 and the pinion 44 there is a coupling 47. This coupling consists of a disk having a slot in each face, the slot in one face being at a right angle to the slot in the other face. The trunnion 46 and the gear 44 are each provided with a tongue to extend into the slot or groove. By means of this coupling the gear 44 may be driven by the shaft 35, even though the latter be not in axial alinement



therewith, and consequently the two rolls 32 and 35 may be adjusted relatively to each other without affecting the rotative relation of one to the other. The provision of this coupling also permits the roll 35 to be moved to an angle to the roll 22 or out of parallelism therewith without affecting the relation of the gears or the transfer of power from the roll 35 to the roll 32.

Between the shaft 15 and the trunnion 48 of the roll 35 there is placed a coupling 49 similar to that at 47. In thus constructing the machine so that the roll 35 is driven directly from the shaft 15 and so that there is but a single pair of gears between the two rolls I am enabled to obviate the employment of the usual power-transmitting shaft located either in front or in the rear of the machine, whereby I greatly simplify the machine and effect a direct transmission of power from one roll to the other and at the same time secure a free space for the ready introduction of stock to the rolls and the delivery of the product therefrom without interruption. This is an important feature in a machine of this character and will be recognized as highly desirable.

I have stated that the knife 18 is located in the rear of the rolls and rests upon the flat table 17, and I shall now describe the clamp for securing the knife in place and the means whereby its edge may be engaged with relation to the rolls.

The front edge of the knife is double beveled, as shown, so as to project as far as possible between the peripheries of the two rolls. The frame is provided with a rearwardly-extending bracket 50, and pivoted to said bracket on a pintle 51 there is the rearwardly-extending arm 54 of a clamp 52. This clamp is substantially of length equal to that of the knife and is adapted to rest thereupon, as shown in Fig. 3 in full lines, or to be swung backward, as shown in dotted lines, to free the knife. A screw 53 is passed through the clamp and tapped into the bracket 50, so as to draw the clamp down solidly upon the knife and hold it securely in place. It will be observed that the clamp is beveled at the top and that it lies upon the knife, to the rear of the beveled portion thereof, so that there is no obstruction to the passage of the product over the knife.

Into the rear edge of the knife are passed two screws 60 60, having two shoulders 61 62, respectively, and a milled head 63 for rotating it. The reduced portion of the screw between the shoulders 61 62 is adapted to be placed in a socket 64, formed in the brackets 65. (See Figs. 1 and 3.) The sockets or slots 64 are open to permit the ready removal of the screws and the consequent displacement of the knife. At the same time the sockets serve as a gage to locate the front edge of the knife. After the knife has been

once adjusted by rotating the screws 60 said knife and screws may be removed from the machine and again replaced in exactly the same position by the provision of the sockets 64.

The under side of the table 17, which supports the knife, is curved rearwardly and downward in an easy curve, so as to guide the lower half of the split stock downward toward the base. The said surface therefore forms a guide for the product and by its formation prevents the cramping, bending, or breaking of the stock and insures its delivery in perfect condition. This is desirable where leather is supplied to provide a thin lining and a thicker piece of stock for the formation of soles.

In addition to the features thus described I provide a stripper for preventing a thin strip of split leather from wrapping or coiling about the top roll. Said stripper consists of a bar 70, shod with a strip 71 of wood or other non-metallic substance and supported by two arms 72 73, pivoted on the standards. The arm 73 has an upward extension 74, with a socket 75 for a spring 76, bearing against the brace 28 to hold the stripper lightly against the roll 22.

In Figs. 5 and 6 I have illustrated the machine constructed to provide for a bodily rotation of the frame, together with the rolls and the knife, upon the axis of the shaft 15. In this case it will be seen that the frame does not rest upon the plate 10, but that it is provided with trunnions 80 81, which extend into pedestals 82 83, arising from said plate. The trunnion 81 is hollow to receive the shaft 15, which is journaled therein. The bearing-caps on the pedestals 82 83 when in place operate to pinch the trunnions 80 81 and hold them against rotation; but any other contrivance may be employed for accomplishing this purpose, such as set-screws 85 passed through the caps. By constructing the machine in this manner the whole frame may be swung about the axis of the trunnions so that the plane of the axes of the rolls may be either vertical or at an angle to the vertical, as may best suit the convenience or requirements of the operator.

Having thus explained the nature of the said invention and described a way of constructing and using the same, although without attempting to set forth all of the forms in which it may be made or all of the modes of its use, I declare that what is claimed is—

1. A leather-splitting machine comprising a rigidly-mounted knife, coaxing feed-rolls between which is arranged the cutting edge of said knife, and which consist of a yielding lower roll, and a rigidly-supported top roll adjustable relatively to the knife, means for adjusting said top roll to vary the thickness of the slice, and gears invariably spaced and in constant intermeshed relation for trans-



mitting power from one roll to the other, and means for connecting said gears to said rolls respectively.

2. A leather-splitting machine comprising  
5 a knife, coacting feed-rolls comprising a yielding corrugated lower roll, a rigidly-supported smooth top roll adjustable with relation to the knife and the lower roll, means for adjusting said top roll to vary the thickness of  
10 the slice, gears invariably spaced and in constant intermeshed relation for transmitting power from one roll to the other, and a differential coupling interposed between one of said gears and its roll to compensate for  
15 varying distance between the axes of said roll and its gear.

3. A leather-splitting machine comprising a knife, coacting feed-rolls comprising a yielding corrugated lower roll, a rigidly-supported  
20 smooth top roll adapted to be adjusted toward and from the knife and lower roll, and to be moved into and out of parallelism with said lower roll, means for adjusting said top roll to vary the thickness of the slice, a single  
25 pair of gears in constant inseparable intermeshed relation, and means connecting said gears to said rolls, for transmitting power from one roll to the other.

4. A leather-splitting machine comprising  
30 a knife, a top roll, rigid supports for said top roll, a yieldingly-supported lower roll, means for adjusting said supports to adjust said top roll toward and from the knife, invariably-spaced gears, and a compensating coupling for connecting said rolls and gears and  
35 for compensating for variable distance between said rolls.

5. A leather-splitting machine comprising coacting top and bottom rolls, yielding boxes  
40 for the bottom roll, adjustable boxes for the top roll, wedges having an interlocked relation with said last-mentioned boxes for rigidly supporting and adjusting them, a driving-shaft coupled directly to one of said rolls,  
45 and a single pair of coacting gears in constant intermeshed relation for connecting said rolls.

6. A leather-splitting machine, comprising a frame, a knife rigidly mounted thereon, a  
50 driving-shaft journaled in fixed bearings, a top roll, a lower roll, yielding bearings for the lower roll, rigid bearings on the frame for the top roll, a pair of invariably-spaced intermeshing gears, one of said gears being fast to  
55 the top roll, a differential coupling interposed between said lower roll and the other of said gears, and a differential coupling interposed between said lower roll and said shaft.

7. A leather-splitting machine, comprising  
60 a frame, a knife rigidly mounted thereon, a driving-shaft mounted in fixed bearings, coacting feed-rolls consisting of a top roll and a lower roll, yielding bearings for said lower

roll, rigid simultaneously-adjustable bearings for the top roll, a pair of intermeshing  
65 gears, one of said gears being fast on the top roll, and the other of said gears being supported by and movable with one of said rigid adjustable bearings, and rotary differential  
70 couplings interposed between the shaft and the lower roll, and between the lower roll and the second-mentioned gear to compensate for the yielding of the first-mentioned bearings.

8. A leather-splitting machine comprising a frame, a knife rigidly mounted thereon, a  
75 top roll, rigid bearings in the frame for the top roll, a gear fast to the top roll, a complementary gear secured in positive intermeshing relation to the first-mentioned gear, a driving-shaft mounted in fixed bearings in ap-  
80 proximate alinement with the axis of the latter gear, a lower roll interposed between said driving-shaft and said latter gear and in approximate alinement therewith, and coacting  
85 with the top roll, yielding bearings for the lower roll, and two differential couplings, one interposed between the latter gear and the lower roll, and the other coupling between  
90 the lower roll and the driving-shaft, both of which couplings transmit power from the driving-shaft to the lower and top rolls and consist of relatively movable members, the relative movement of which compensates for any displacement of the lower roll.

9. A leather-splitting machine comprising  
95 a knife, coacting feed-rolls, and provisions for swinging said knife and feed-rolls bodily about an axis longitudinal of said rolls.

10. A leather-splitting machine comprising a knife, coacting feed-rolls, and provisions for  
100 bodily adjusting said knife and rolls without disturbing their relation, to locate the knife horizontally or at an angle to the horizontal.

11. A leather-splitting machine comprising a frame, a knife and feed-rolls mounted on  
105 said frame, and supports on which said frame is rotatively mounted.

12. A leather-splitting machine comprising a frame, a knife and feed-rolls mounted on  
110 said frame, stationary supports, and trunnions secured to said frame and journaled in said supports.

13. A leather-splitting machine comprising a frame, a knife and feed-rolls mounted on  
115 said frame, stationary supports, trunnions secured to said frame, and mounted in said supports, one of said trunnions being hollow, and a driving-shaft for the feed-rolls passed through said hollow trunnion.

In testimony whereof I have affixed my  
signature in presence of two witnesses.

JOHN J. HEYS.

Witnesses:

M. B. MAY,

C. C. STECHER.