

(No Model.)

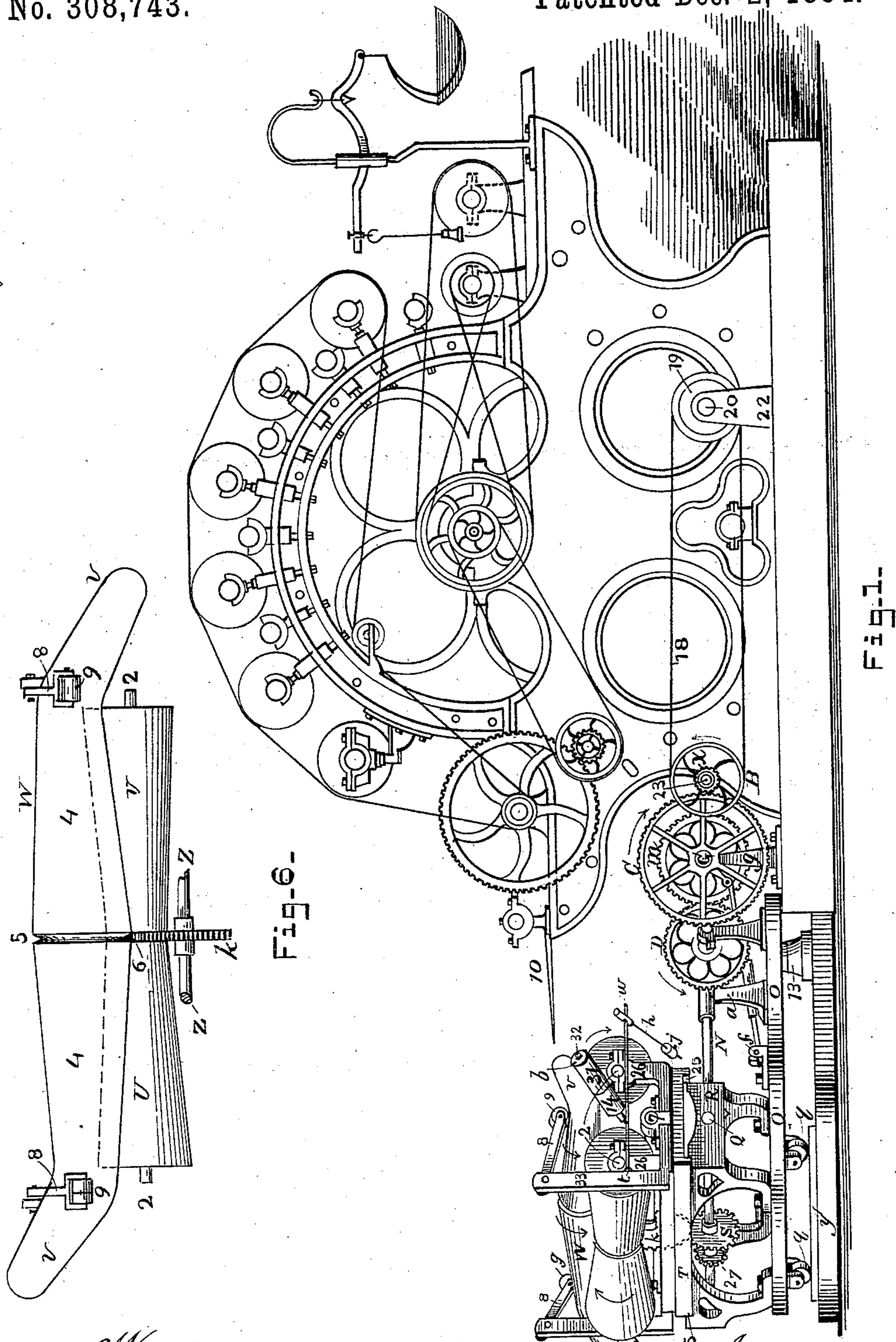
3 Sheets—Sheet 1.

J. BRANDY.

MACHINE FOR MAKING FELT BOOTS, SHOES, AND STOCKINGS.

No. 308,743.

Patented Dec. 2, 1884.



Witnesses:
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L. J. White

Inventor
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(No Model.)

3 Sheets—Sheet 2.

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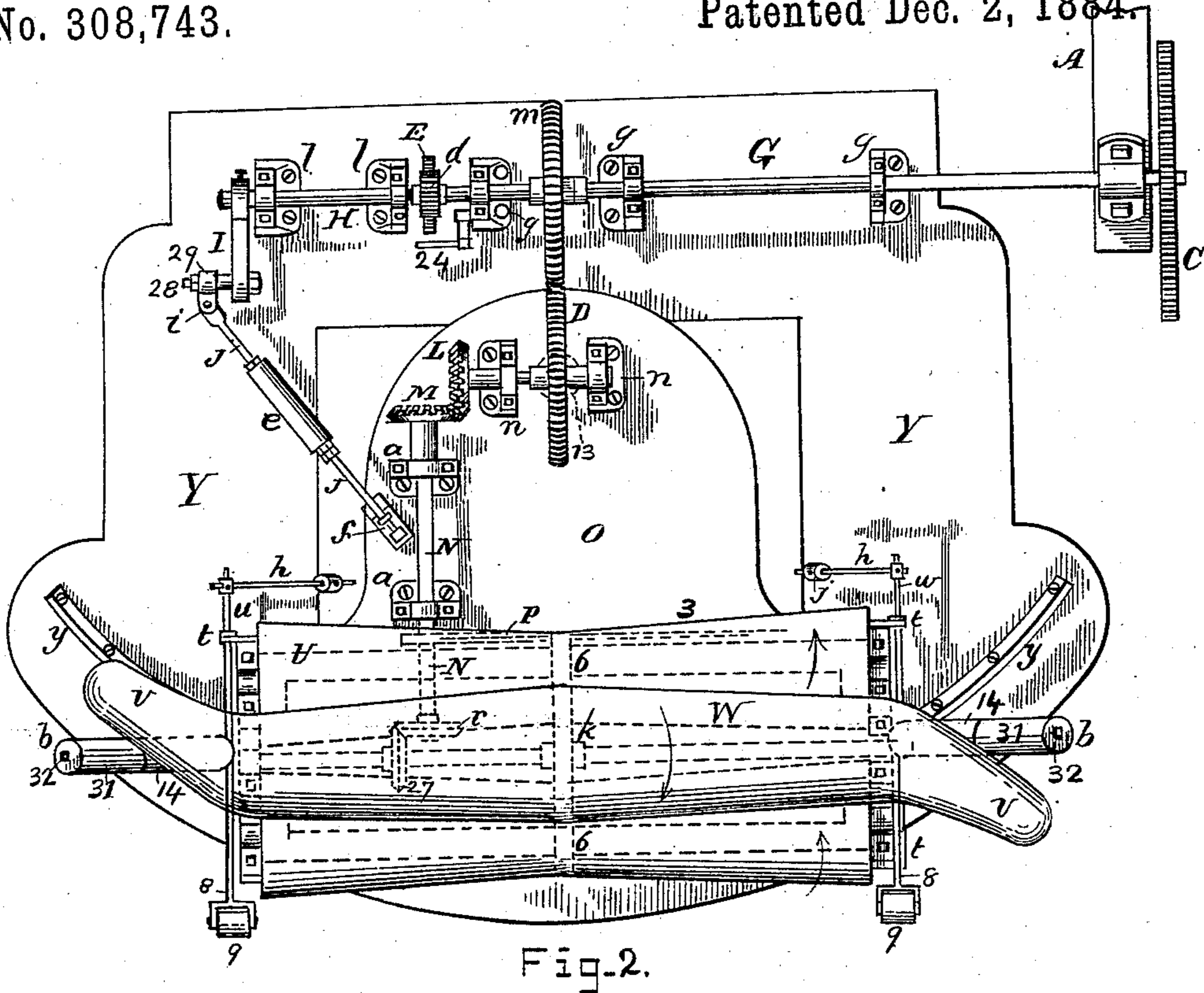


Fig. 2.

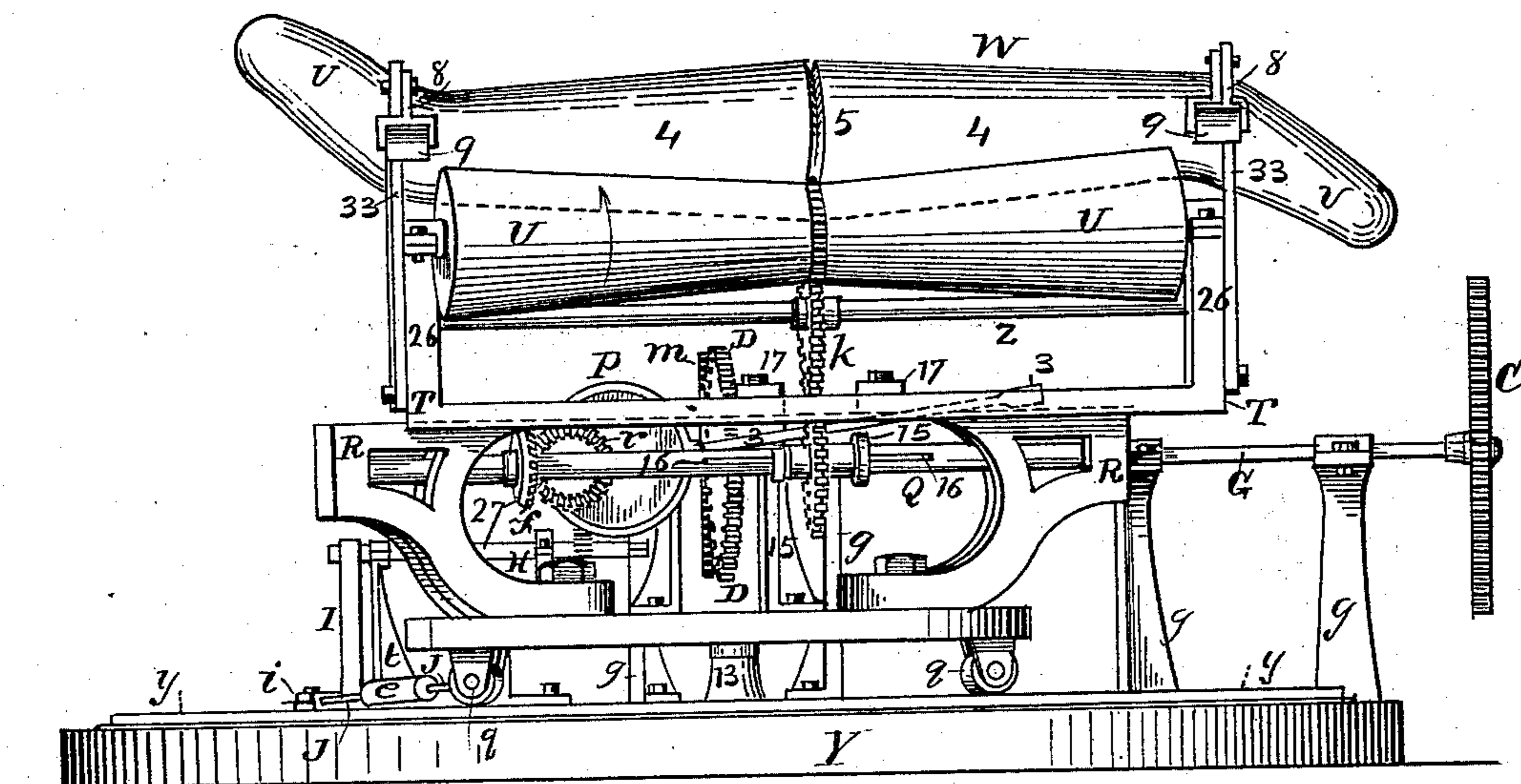


Fig. 3.

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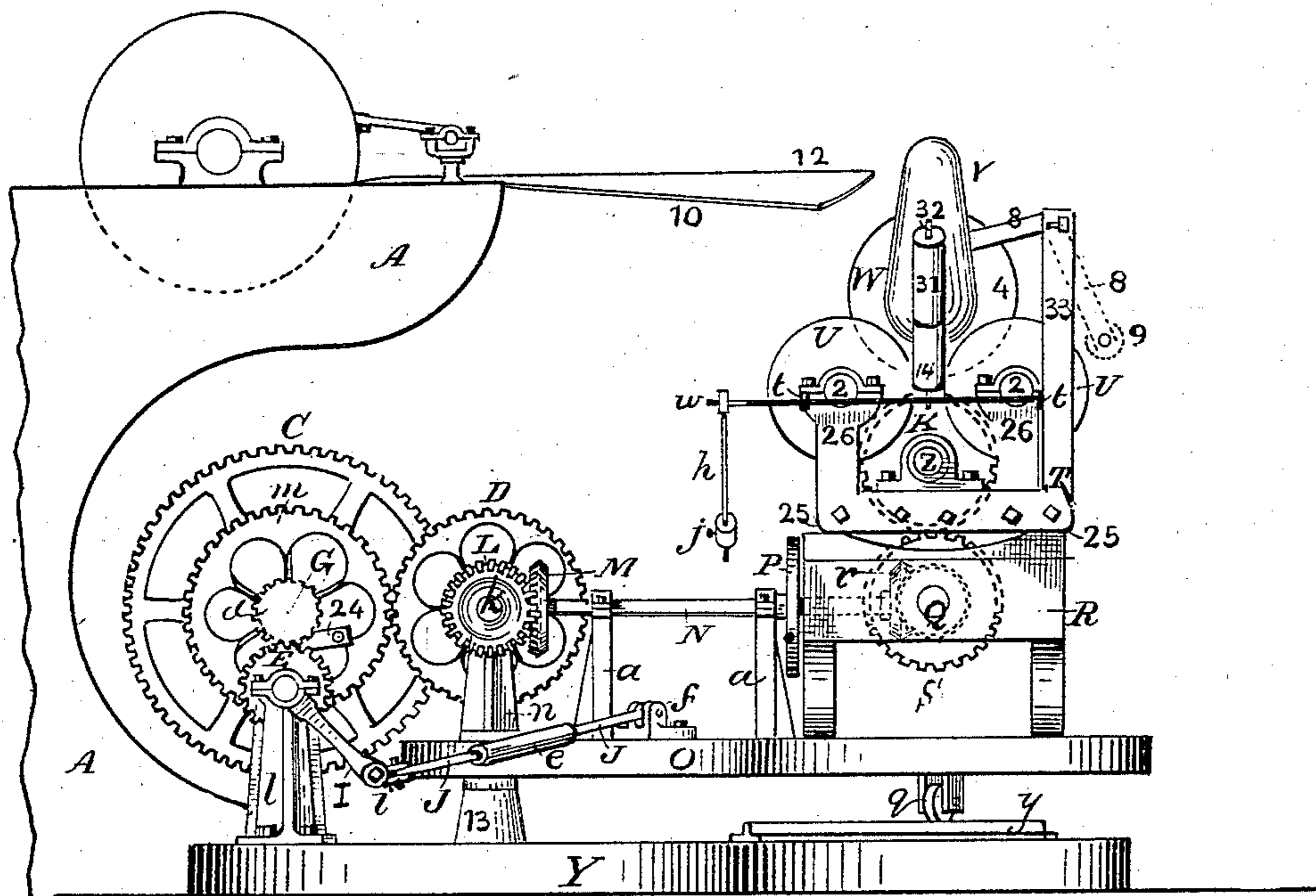


Fig. 4.

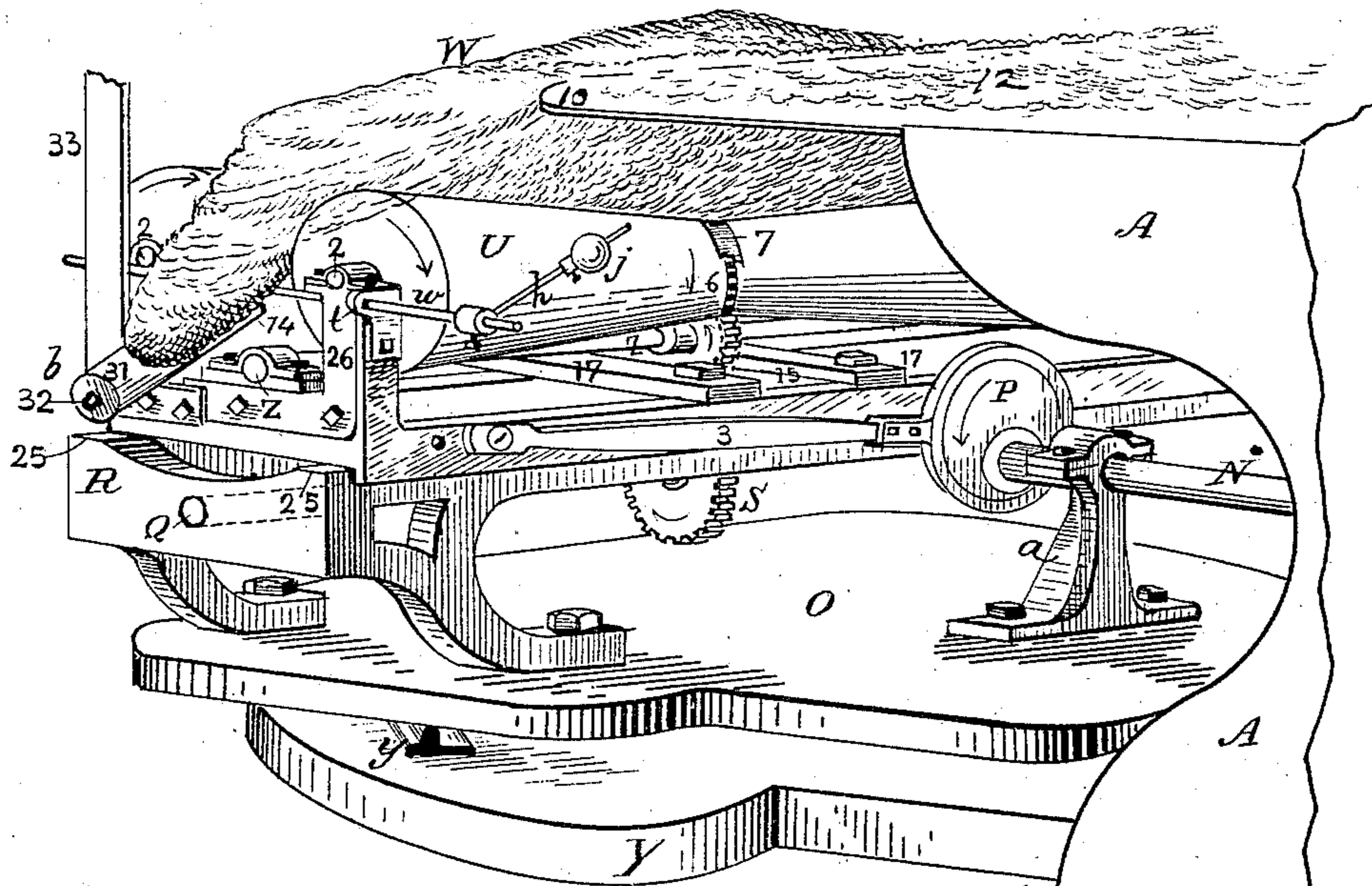


Fig. 5.

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UNITED STATES PATENT OFFICE.

JAMES BRANDY, OF LAWRENCE, MASSACHUSETTS.

MACHINE FOR MAKING FELT BOOTS, SHOES, AND STOCKINGS.

SPECIFICATION forming part of Letters Patent No. 308,743, dated December 2, 1884.

Application filed April 21, 1884. (No model.)

To all whom it may concern:

Be it known that I, JAMES BRANDY, of Lawrence, in the county of Essex, State of Massachusetts, have invented a certain new and useful Improvement in Machines for Making Felt Boots, Shoes, or Stockings, of which the following is a description sufficiently full, clear, and exact to enable any person skilled in the art or science to which said invention

appertains to make and use the same, reference being had to the accompanying drawings, forming a part of this specification, in which—
Figure 1 is an isometrical perspective view representing my improved machine in use, or as attached to the card, the card being shown inside elevation; Fig. 2, a top plan view; Fig. 3, a front elevation; Fig. 4, a side elevation; Fig. 5, an isometrical perspective view taken from the side of the machine opposite to that shown in Fig. 4; and Fig. 6, a view of the cone or former and its supporting or operative rolls, a portion of these parts being shown in section.

Like letters and figures of reference indicate corresponding parts in the different figures of the drawings.

My invention relates to that class of felt boot, shoe, or stocking machines in which the cone or former and its supporting or operative rolls are mounted on a carriage or table and moved back and forth horizontally through the arc of a circle in front of the card from which the sliver of wool or felting material is received in forming the bat; and it consists in a novel construction and arrangement of the parts, as hereinafter more fully set forth and claimed, by which a more effective device of this character is produced than is now in ordinary use.

The nature and operation of the improvement will be readily understood by all conversant with such matters from the following explanation.

In the drawings, A represents the card by which the sliver of wool or other felting material is produced, and from which the bat is formed; but as this is of the ordinary construction, except as hereinafter set forth, it is not deemed essential to describe the same more fully. Mounted horizontally near one end of the card, in the standards 22, there is a shaft, 20, provided with a pulley, 19, and also at its

opposite end with a driving-pulley, (not shown,) the driving-pulley being properly connected to the main driving-shaft of the card. Disposed at the opposite end of the card there is a horizontal shaft, 23, arranged on a plane with the shaft 20, and provided with a pulley, B, and pinion *x*, the pulleys 19 and B being connected by the belt 18. A shaft, G, is journaled horizontally in the supports *g*, one of these supports being attached to the bed-piece or frame-work of the card A, and the others to the bed-piece Y of the machine. A gear, C, is disposed at the outer end of the shaft, a pinion, *d*, at its inner end, and a gear, *m*, near its inner end, the gear C intermeshing with the pinion *x* on the shaft 23. A shaft, H, supported in the standards 1, is journaled in parallelism with the shaft G, but on a lower plane, and is provided at its inner end with the gear E and at its outer end with the crank I, the gear E intermeshing with the pinion *d* on the shaft G. A table, O, has its inner end pivoted at 13 to the bed-piece Y, its outer end being supported on trucks *q*, which run on the curved track *y*, resting on said bed-piece. A head-stock, R, provided with ways 25, is mounted transversely on the outer end of the table O, and arranged to slide longitudinally on said ways there is a carriage, T. Mounted on said carriage, and journaled on the shafts 2 in the standards 26, there are two rolls, U U, respectively provided near their centers with a gear, 6. These rolls are of the same size and form, and are arranged in parallelism on the same plane in such a manner that their ends are nearly in contact. They are also larger or of greater diameter at their ends than at their centers, each roll consisting of two conical frustums of equal dimensions, joined at their apices. A shaft, K, is journaled horizontally at the inner end of the table O, being supported in the standards *n* and provided near its center with the gear D and at one end with the bevel-gear L, the gear D intermeshing with the gear *m* on the shaft G, and both of the latter gears having teeth curved or rounded at their outer ends to permit the table to swing freely on the pivot 13. A shaft, N, supported in the standards *a*, is horizontally journaled at right angles to the shaft K on the table O, and provided at its inner end with the bevel-gear M and at its outer end with the bevel-

gear *r*, the gear *M* intermeshing with the gear *L* on the shaft *K*.

5 Journaled longitudinally and horizontally in the carriage *R* there is a shaft, *Q*, provided with the spline 16, gear *S*, and bevel-gear 27, the gear *S* being adapted to slide longitudinally on said shaft, but prevented from turning thereon by the spline, the gear 27 intermeshing with the gear *r* on the shaft *N*.

10 Disposed in the carriage *T*, and journaled horizontally therein in parallelism with the shaft *Q*, there is a shaft, *z*, provided with the gear *k*, which intermeshes with the sliding gear *S*, and also with both of the gears 6 at the center of the rolls *U*.

15 Projecting downwardly from cross-bars 17 on the carriage *T* there are two arms, 15, one on either side of the gear *S*, and adapted to slide said gear on the shaft *Q* as the carriage moves back and forth on the head-stock *R*, and thereby keep it in engagement with the gear *k* on the shaft *z*. A pitman-rod, *J*, is jointed at *f* to the table *O*, and at *i* to the col-
20 let 29 on the crank-pin 28 of the crank *I*, the collet being adapted to turn on the pin, thereby forming a "slack joint" to prevent the crank from getting caught or stopping on either of its dead-centers. The rod is also loosely connected to the table at the joint *f*
25 for the same purpose, and is made adjustable longitudinally by the sleeve *e*, the body of the rod being in two pieces and screwed into the sleeve.

35 Disposed on the shaft *N* near the head-stock *R* there is a fixed cam or eccentric, *P*, around which passes a strap or annulus, 29, within which the eccentric revolves, said strap being connected to one end of the pitman-rod 3 and the opposite end of said rod jointed to the
40 carriage *T* at 30. The cone or former *W* is so shaped that when laid upon the rolls *U* its body will be in close contact therewith nearly its entire length, being largest at the center and gradually tapering toward either end, or
45 consisting of two leg-pieces, 4, each provided with a foot-piece, *v*, the leg-pieces being united at their tops and the foot-pieces projecting in opposite directions to balance the cone, as best shown in Figs. 3 and 6. The cone is also pro-
50 vided at its center with an annular groove, 5, which acts as a guide for the shears in cutting the bat prior to its removal therefrom. A guard, 7, consisting of a thin strip of sheet metal, is placed around each of the rolls *U*
55 immediately over the gears 6, to prevent the bat on the cone from being caught in said gears as the rolls revolve, the guard being supported at either end by the carriage *T* and bent down at the center between the rolls, so as not to
60 interfere with the action of the cone. (One end of the guard, broken away to expose the gear 6, is shown in Fig. 5.) A rocker-shaft, *w*, is journaled in the standards 26 at either end of the carriage *T*, said shaft being pro-
65 vided at one end with an arm, *h*, and counter-balance *j*, and on the opposite side, near its center, midway between the rolls *U*, with the

arm 32. This arm is provided with a compressor, *b*, composed of two cylinders, 14 and 31, preferably constructed of sheet metal, and adapted to revolve independently on the arm. This compressor should be somewhat longer than the foot-piece *v*, and may consist of one or more cylinders, as desired, although I deem two preferable to a greater number.

75 Projecting upwardly from either end of the carriage *T* there is a standard, 33, which rises above the cone *W* when said cone is mounted on its rolls *U*. A bifurcated arm, 8, is jointed to the upper end of each of these standards, and provided with a horizontally-journaled auxiliary compressor, consisting of a short cylinder, 9, made in two sections.

85 In the use of my improvement the cone or former *W* is placed on the rolls *U* and power applied to the shaft 20, thereby causing the table *O* to be moved back and forth through the arc of a circle past the end of the card *A* with regular reciprocating movements, and the rolls and cone to be revolved in the direction indicated by the arrows. The sliver 12 as it comes from the card is then carried over the cone, and its end passed between the cone and rolls, the cone continuing to revolve and the bat being produced in a manner which will be readily obvious without a more explicit description. In forming a bat in this manner it has been found difficult for the workmen tending the machine to so manipulate or guide the sliver onto the foot-pieces *v*, and also the ankle portions of the cone, as to prevent the bat from being wrinkled and uneven at these points. To obviate this difficulty I make use of the compressors *b* and auxiliary compressors 9 to roll down or even the sliver as it is delivered to the cone, other compressors of a similar character being used when required at other sections of the cone. As the foot-piece stands at an angle, or is inclined to the longitudinal axial line of the cone, the toe of the foot-piece, as it revolves, passes through a larger circle than those portions of the same which are nearer the ankle, and consequently it has to travel at a greater speed. It is therefore necessary, in order to prevent the compressor *b* from dragging and have it perform its work in the best manner, to divide it into sections, which revolve independently and at different rates of speed, according to their locality, that at the outer end of the arm 32 revolving with greater velocity than the one nearest the shaft *w*. It is also necessary, in order to keep the compressor *b* in constant contact with the bat on the foot-piece *v* as the cone revolves, that it should be raised or lowered continually, as the case may be, and to accomplish this I attach the arm 32, on which the compressor is journaled, to the rocker-shaft *w*, and make use of the arm *h* and counter-balance *j*, by means of which the compressor is automatically kept in contact with the bat on the foot-piece at all points of its revolution, the pressure of the compressor on the bat being governed by mov-

ing the counter-balance on the arm *h*. The auxiliary compressors 9 are used whenever desired by merely turning the arms 8 into such a position as to permit their cylinders to rest up on the bat, and when not required are thrown back or out of contact with the bat, as shown by the dotted lines in Fig. 4. These compressors are also divided into two or more sections for the same reason that the compressors *b* are divided. As the table *O* traverses back and forth through the arc of a circle the layers of the sliver will be crossed and recrossed, thus greatly strengthening the fabric of the bat, and also of the boot, shoe, or stocking formed therefrom. When the table nears either end of its course, its speed is gradually retarded until it comes to a full stop, and its movement is reversed by the crank *I* passing the center, after which it is gradually increased until it attains its full speed again, and hence, as the cone continues to revolve with uniform speed at all times, it is necessary to provide means for preventing the sliver from being wound unevenly onto the cone by reason of the stoppages of the table and its variable movements at the ends of its course, as described. To obviate this difficulty the superposed carriage *T* is employed, which, while traversing back and forth through the arc of a circle with the table, also has independent or differential movements imparted to it by the eccentric *P* and pitman 3, the eccentric being so constructed and arranged on the shaft *N*, in connection with the other operative mechanism described, as to cause the carriage to continue to move for a short distance longitudinally after the table has stopped and its movement has been reversed. For instance, if the table is moving from right to left, carrying the carriage with it, the carriage will also be moved independently in the same direction but at a greater speed than the table; and when the table stops at this end of its course, and is turned back from left to right, the carriage will keep on in its course and override or pass beyond the table a short distance toward the left before its movement is changed; and when the movement of the carriage is reversed by the revolving eccentric *P*, or changed from left to right, as it traverses with greater speed than the table, it will overtake it, so to speak, and when the table stops at the right-hand end of its course and is turned back the carriage will keep on in its course and override or pass beyond the table a short distance toward the right before its movement is changed, the movements of the carriage in respect to the table being the same at both ends of its course. By varying the size of the eccentric *P* and its position on the shaft *N*, the movements of the carriage may be correspondingly varied. In some machines of this character heretofore constructed the gears for turning the rolls *U* have been placed at the ends of said rolls; but in that position they were more liable to interfere with the bat than when located at the centers, as shown at 6 in Fig. 5, and provided

with a proper guard. The carriage has also sometimes been provided with a rack and operated by means of two pinions adapted to engage the rack at regular intervals; but this form of construction is objectionable, as it necessitates the employment of a long train of mechanism, and renders the working of the machine more irregular and uncertain than when the carriage is operated by means of the eccentric *P* and pitman 3, as described. The carriage rolls and cone are all driven through the medium of the shafts *G* *K* *N*, and hence their speed does not vary, or is in one sense uniform at all times with that of the card; but the speed of the table may be varied, as desired, by using a loose intermediate gear on the stub shaft 24 and other gears to intermesh therewith in place of the gears *d* *E*.

I do not confine myself to using the specific train of mechanism described to produce the reciprocating vibratory movements of the table, as other means may be employed for that purpose, if desired; nor to the use of the eccentric *P*, as a crank may be substituted therefor, if preferred; nor to the use of the counter-balance *j*, as a spring may be employed to keep the compressor *b* in contact with the bat; nor to connecting the eccentric to the carriage by the pitman-rod 3; nor to the use of two slack-joints with the rod *j*; nor to the use of revolving compressors, as they may be fast on their supporting-arms, if desired, and of any other suitable form; but,

Having thus explained my invention, what I claim is—

1. In a machine for making felt boots, shoes, or stockings, substantially such as described, the shaft *w*, arm *h*, counter-balance *j*, arm 32, and compressor *b*, combined and arranged to operate substantially as set forth.

2. In a machine for making felt boots, shoes, or stockings, substantially such as described, the rolls *U*, provided with the gears 6, disposed at or near their centers, in combination with the gear *k*, shaft *z*, carriage *T*, and operative mechanism therefor, substantially as set forth.

3. In a machine for making felt boots, shoes, or stockings, substantially such as described, the guard 7, in combination with the gears 6 and rolls *U*, disposed at the center of said rolls, substantially as and for the purpose specified.

4. In a machine for making felt boots, shoes, or stockings, substantially such as described, the shaft *N*, provided with the gear *r*, in combination with the gear 27, shaft *Q*, table *O*, carriage *T*, rolls *U*, and operative mechanism, substantially as set forth.

5. In a machine for making felt boots, shoes, or stockings, substantially such as described, the shaft *N*, provided with the eccentric *P*, in combination with the carriage *T*, table *O*, means for connecting said eccentric with said carriage, and operative mechanism, substantially as specified.

6. In a machine for making felt boots, shoes, or stockings, substantially such as described,

the shaft N, provided with the gears M *n*, and the shaft K, provided with the gears L D, arranged on the table O, in combination with the carriage T, rolls U, and operative mechanism, substantially as specified.

7. In a machine for making felt boots, shoes, or stockings, substantially such as described, the shaft H, provided with the gear E and crank I, in combination with the pitman J, table O, carriage T, rolls U, gear *d*, shaft G, and operative mechanism, substantially as set forth.

8. In a machine for making felt boots, shoes, or stockings, substantially such as described, the shaft G, provided with the gears *d* C *m*, the shaft H, provided with the gear E and crank I, the shaft K, provided with gears D L, the shaft N, provided with the gears M *n* and eccentric P, the pitmen J, table O, carriage T, and rolls U, in combination with the card A,

and operative mechanism, substantially as specified.

9. In a machine for making felt boots, shoes, or stockings, substantially such as described, the pinion *a*, pulley B, shaft 20, and pulley 19, in combination with the card A, for communicating motion to the shaft G, table O, carriage T, and rolls U, substantially as set forth.

10. In a machine for making felt boots, shoes, or stockings, substantially such as described, the stub-shaft 24, for receiving an intermediate gear, in combination with the shafts G H, gears *d* E, table O, pitman J, carriage T, rolls U, and operative mechanism, substantially as specified.

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