

No. 885,378.

PATENTED APR. 21, 1908.

E. P. RICHARDSON.

TREADLE MECHANISM FOR SHOE SEWING MACHINES.

APPLICATION FILED MAR. 27, 1905.

4 SHEETS—SHEET 1.

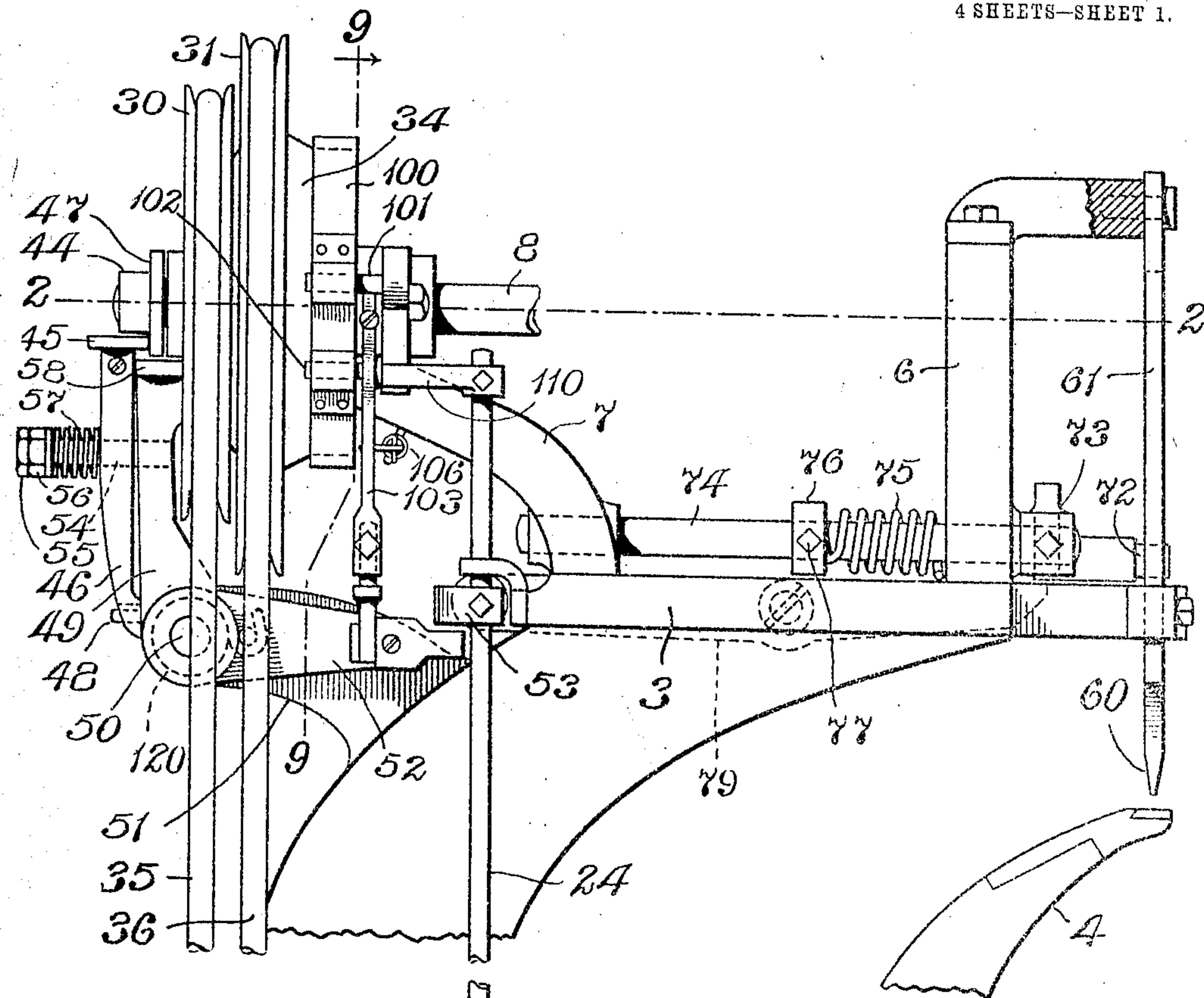
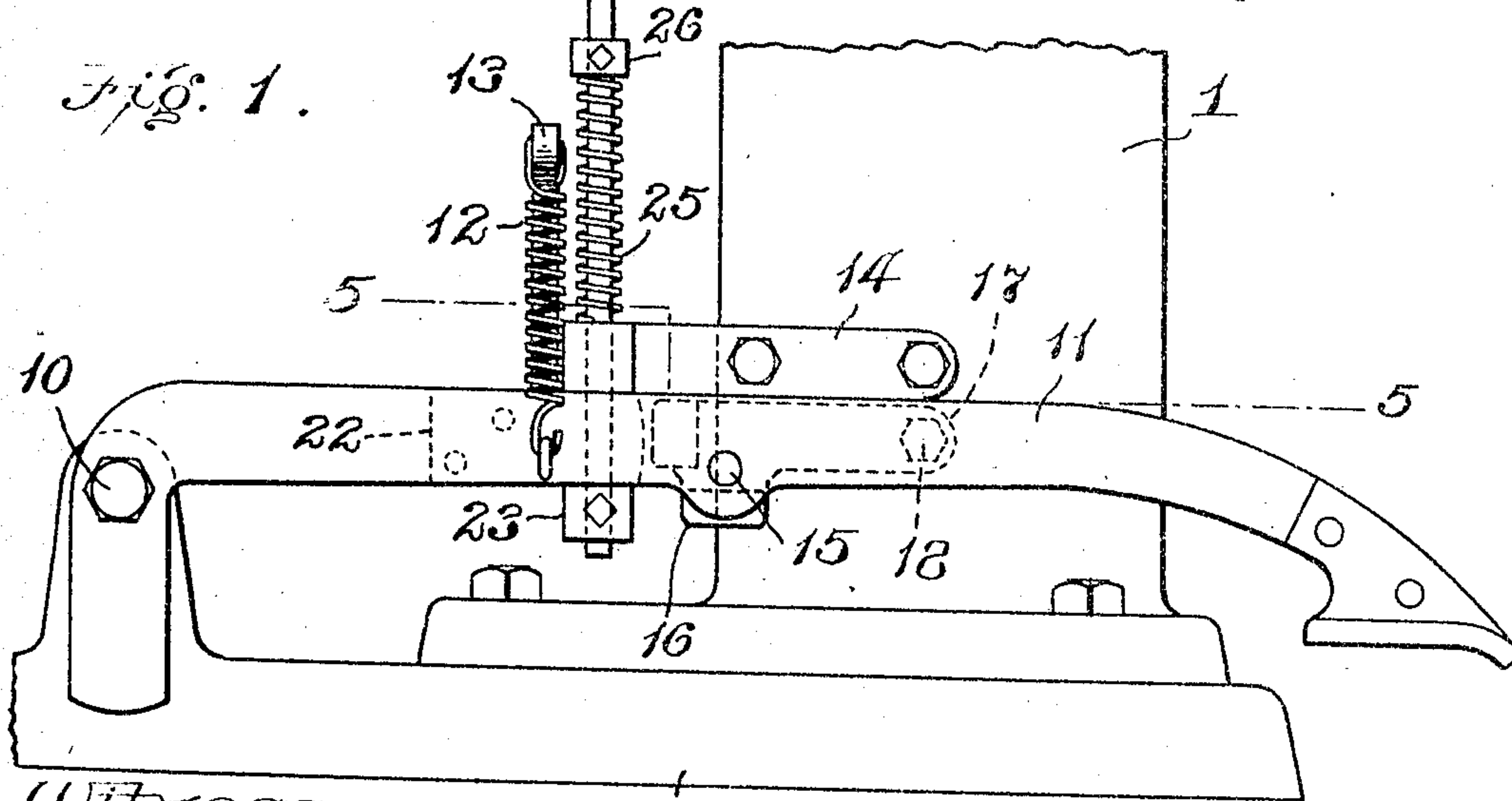


Fig. 1.



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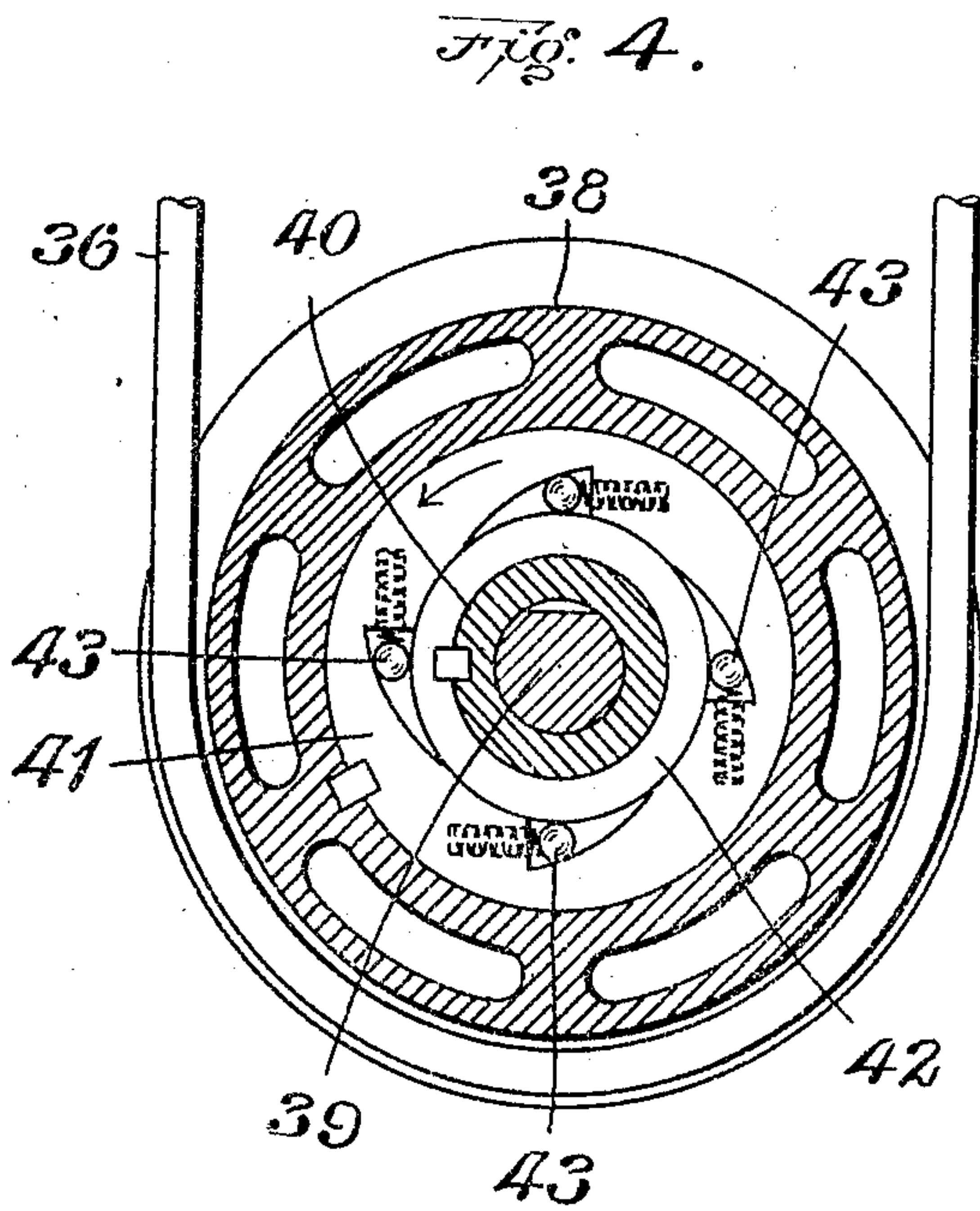
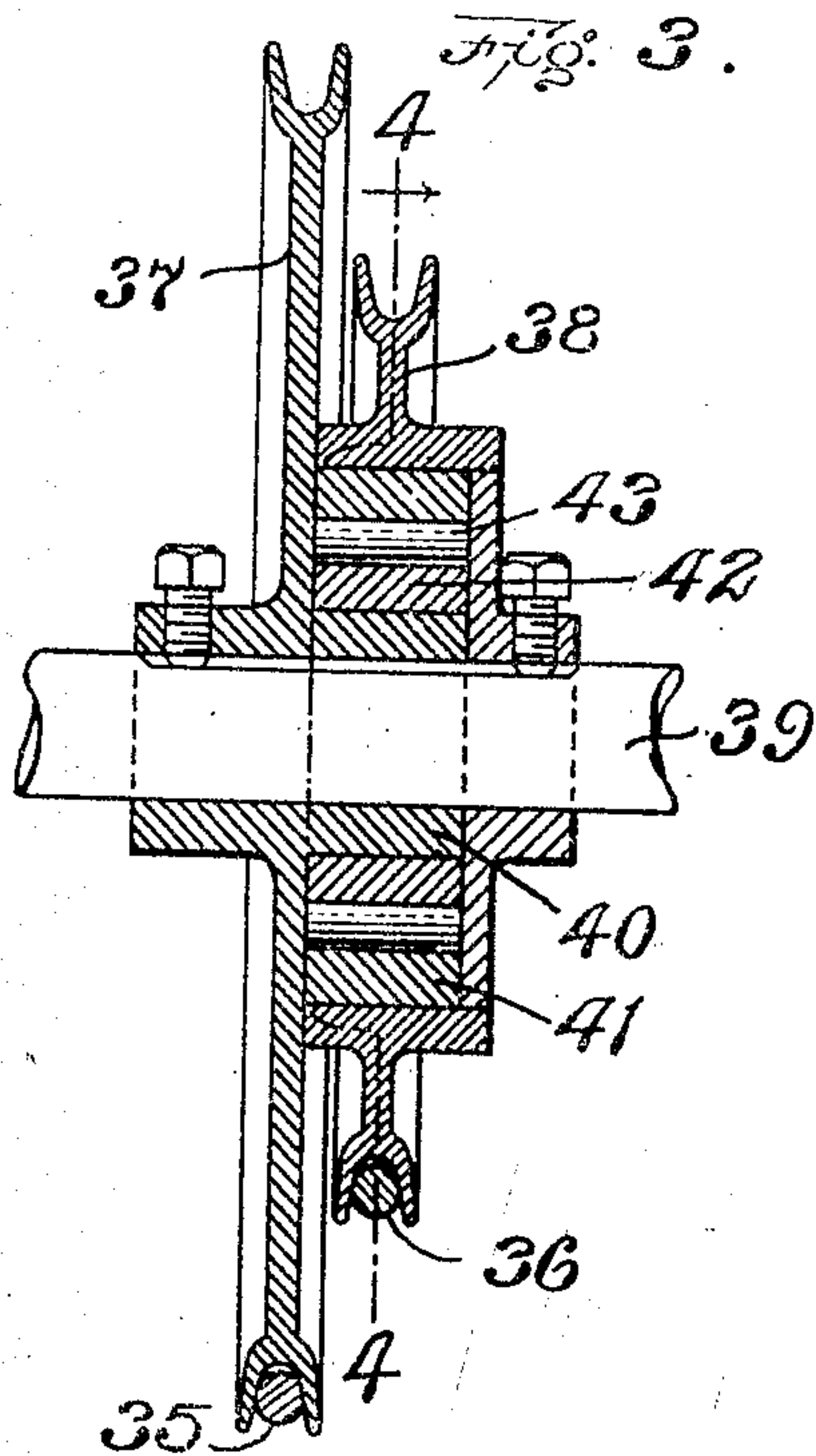
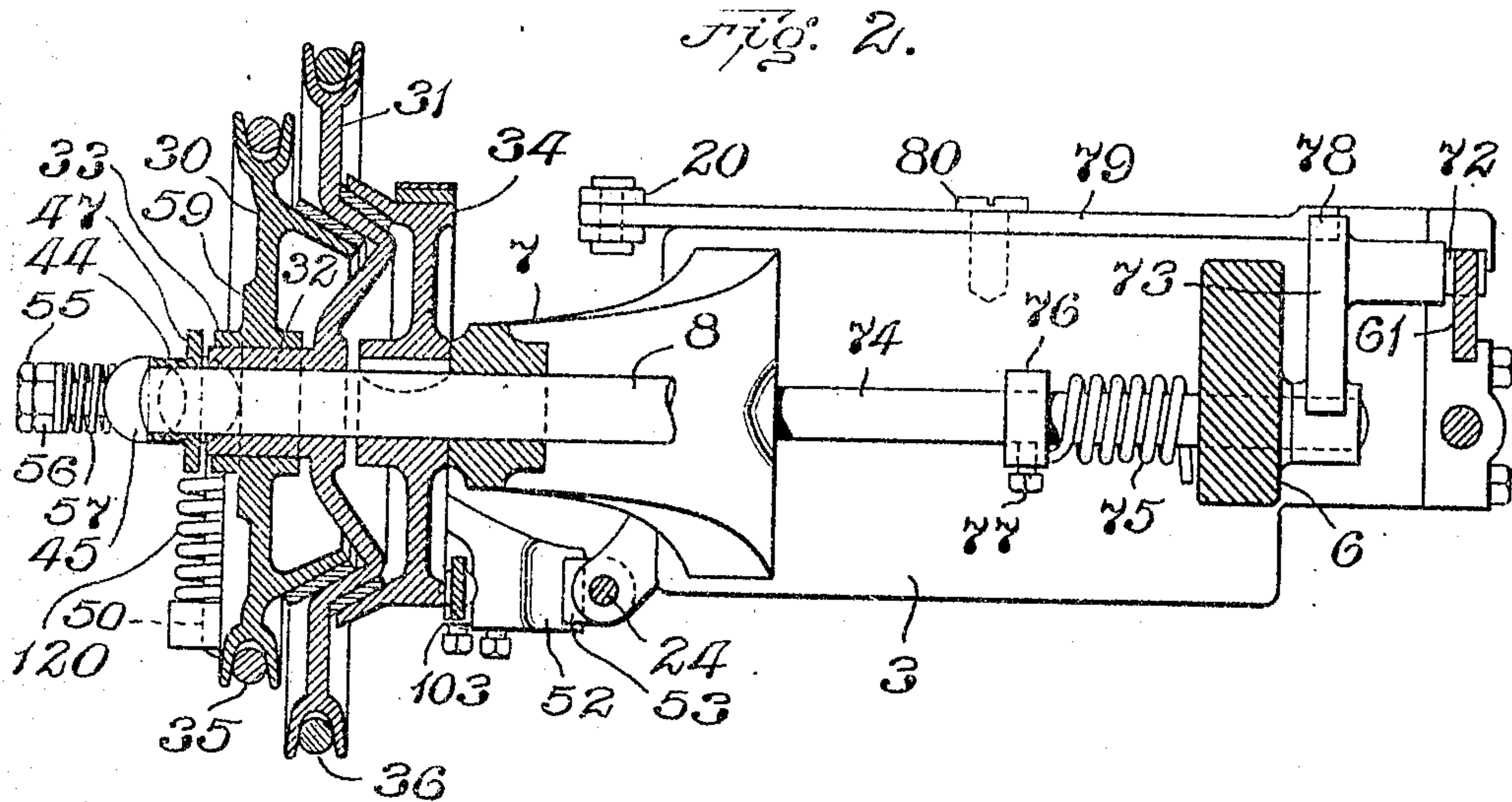
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4 SHEETS—SHEET 2.



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4 SHEETS—SHEET 3.

Fig. 5.

Fig. 6.

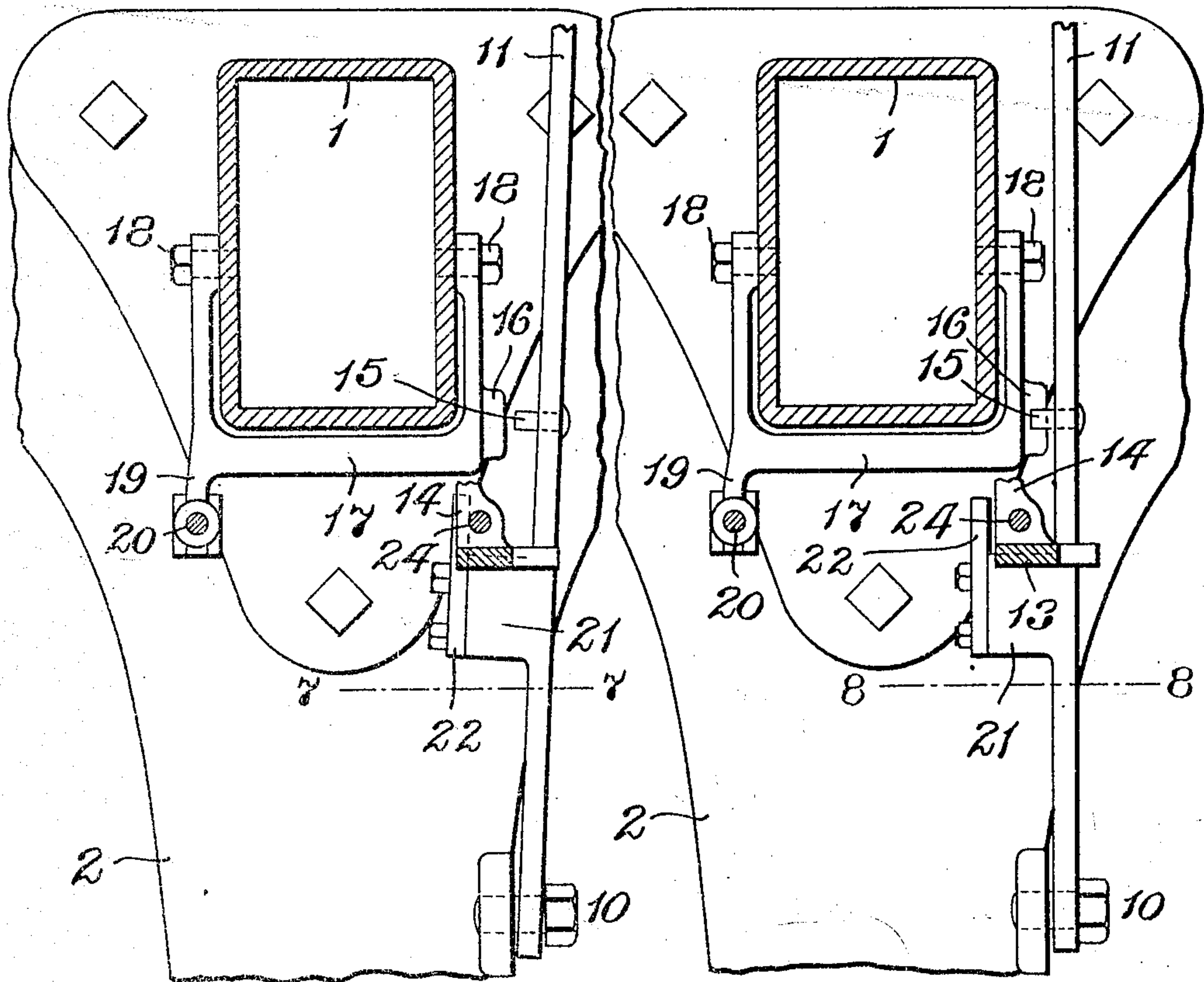
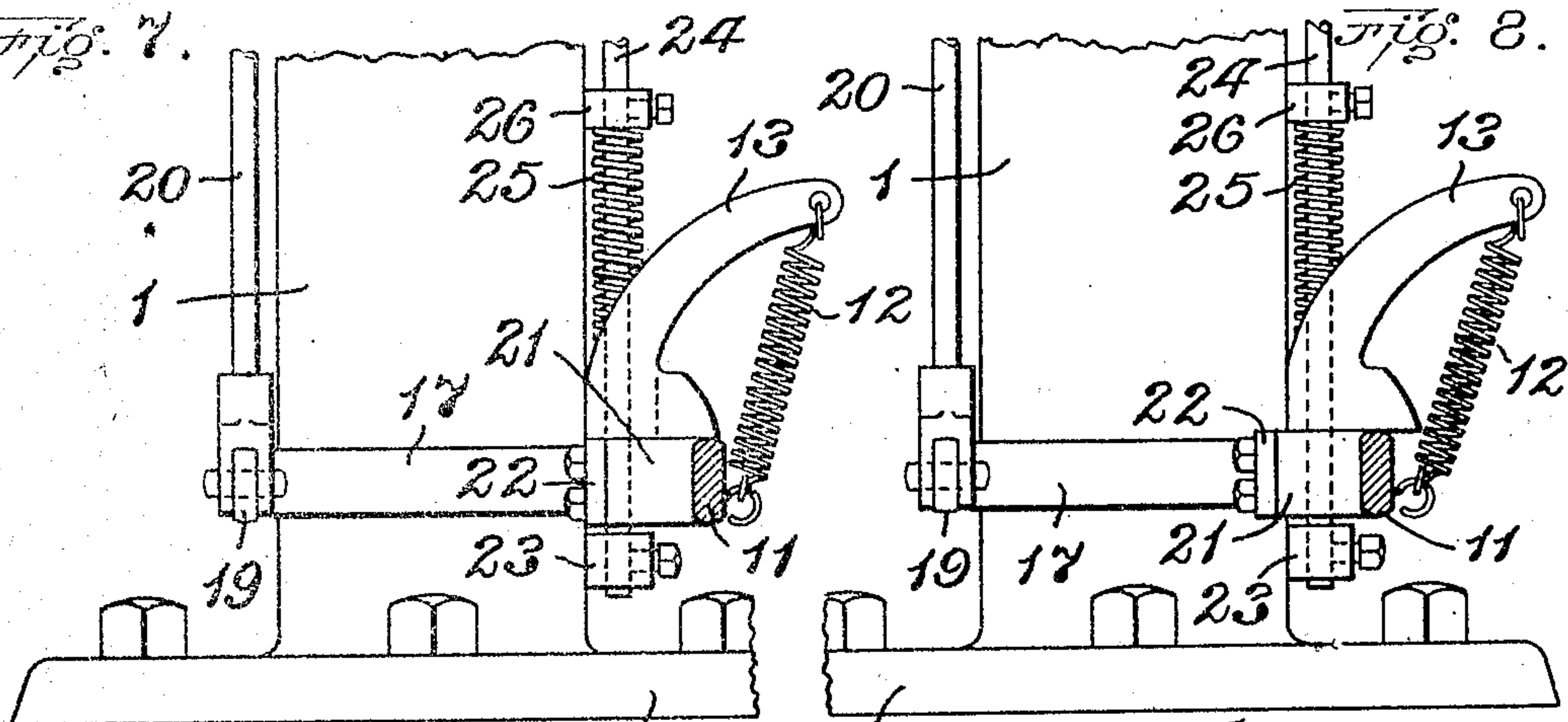


Fig. 7.

Fig. 8.



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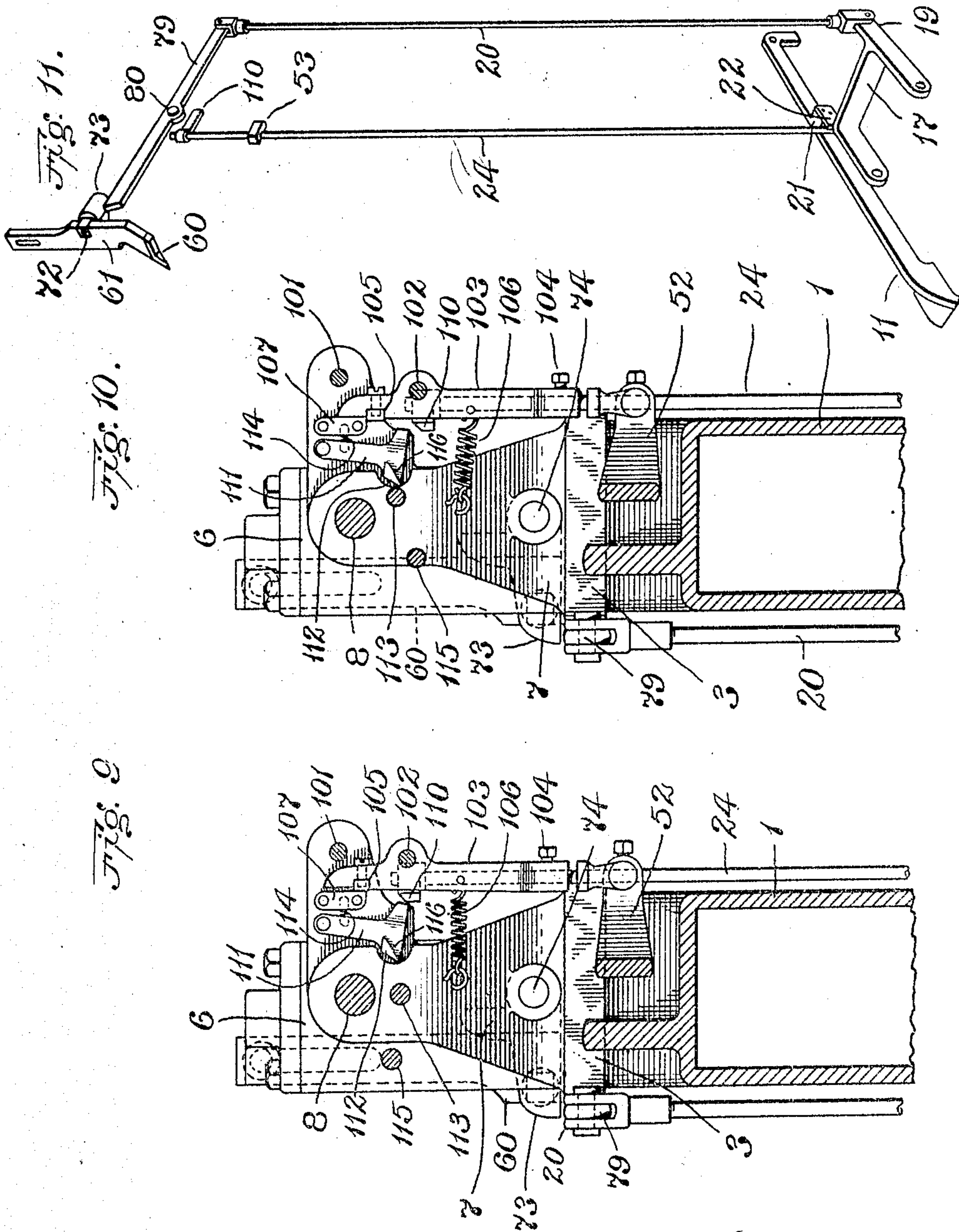
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# TREADLE MECHANISM FOR SHOE SEWING MACHINES.

APPLICATION FILED MAR. 27, 1905.

4 SHEETS--SHEET 4..



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# UNITED STATES PATENT OFFICE.

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## TREADLE MECHANISM FOR SHOE-SEWING MACHINES.

No. 885,378

Specification of Letters Patent.

Patented April 21, 1908.

Application filed March 27, 1905. Serial No. 252,128.

*To all whom it may concern:*

Be it known that I, EVERETT P. RICHARDSON, of Lawrence, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Treadle Mechanism for Shoe-Sewing Machines, of which the following is a specification.

This invention has relation to sewing machines, and while it is particularly adapted for that class of such machines known as "McKay sewing machines," yet it is applicable for sewing machines of other types.

The present invention is designed, however, as an improvement upon the mechanism illustrated in my prior patents, Numbers 710,612 and 710,613, dated October 7th, 1902. By reference to said patents, it will be observed that they illustrate a sewing-machine in which the sewing mechanism is adapted to be driven at either of two speeds, means being manually controlled by the operator by which the mechanism may be driven at either of two speeds at will. Said patents also show a presser-foot with mechanism for locking the presser-foot in operative position in combination with a stop mechanism for the power shaft, and means whereby when the stop-motion is actuated to stop the machine, the presser-foot is automatically released, so that it may be manually raised by the operator. According to the present invention, I accomplish substantially the same ends, but provide a simpler, more compact, and more durable mechanism and reduce the number of parts used in my previous machine. In said patents I provided two manually operable treadles, one for controlling the stop-motion and the two-speed mechanism, and the other for raising the presser-foot. Although the two treadles were arranged a slight distance apart, yet it was necessary in my machine for the operator to move his foot from one treadle to the other in operating the machine. In the present machine, however, I have reduced the number of treadles to one, and have provided mechanism by means of which it may be caused to raise the presser-foot and to control the stop-mechanism and also the two-speed mechanism.

Referring to the accompanying drawings, which illustrate one embodiment of the invention,—Figure 1 represents a portion of a McKay sewing machine in which the general

features are similar to those illustrated in my said patents, but which is provided with the novel mechanism which forms the subject-matter of the present invention. In this figure the standard is shown as broken away. Fig. 2 represents a section on the line 2—2 of Fig. 1. Fig. 3 represents a section through the pulleys which are mounted upon the countershaft. Fig. 4 represents a section on the line 4—4 of Fig. 1. Fig. 5 represents a section on the line 5—5 of Fig. 1, and illustrates the treadle as being engaged with the rod which controls the stop-motion and the two-speed mechanism. Fig. 6 represents a similar section and shows the treadle engaged with the mechanism by means of which the presser-foot is raised. Fig. 7 represents a section on the line 7—7 of Fig. 5. Fig. 8 represents a section on the line 8—8 of Fig. 6. Figs. 9 and 10 illustrate a portion of the stop-motion mechanism being sections on the lines 9—9 of Fig. 1. Fig. 11 is a perspective view of the treadle and some of the parts controlled thereby.

Referring to the accompanying drawings,—1 indicates the standard having a suitable base 2. The machine has the usual rotatable horn 4 and suitable stitch-forming or sewing mechanism, the details of which can be obtained from the Letters Patent hereinbefore referred to. The head comprises the base-plate 3 and the uprights 6 and 7, in which is journaled the power or needle-driving shaft 8.

60 indicates the presser-foot, and 61 the bar which carries it. The pin 72 is located between two shoulders on the presser-foot bar and projects forwardly from an arm 73, which is rigidly secured to shaft 74, journaled in bearings afforded by the uprights of the head. A spring 75 is coiled about the shaft 74 with one end secured to a collar 76 affixed to the shaft by a set-screw 77, and with the other end resting against the top of the bed-plate 3, said spring normally holding the presser-foot downward, so as to rest upon the shoe on the horn. The arm 73 has a projection in the path of a lever 79, centrally fulcrumed upon a screw 80 passed into the bed-plate 3.

As thus far described, the mechanism does not differ from that illustrated in my said patents, and it will be observed that I have used the same numerals in designating the parts as were therein used.



I will now proceed to describe the novel features which form the subject-matter of the present invention.

Referring to Fig. 1, it will be seen that  
 5 loosely pivoted upon a stud 10 supported by the base 2 is a treadle 11, the forward end of which is formed to receive the foot of the operator. This treadle is adapted to be moved both vertically and horizontally, the  
 10 aperture through which the stud 10 passes being large enough to permit the said lateral movement. The treadle is held normally raised by a spring 12, the lower end of which is attached to the treadle and the upper end  
 15 of which is attached to an arm 13 secured to a bracket 14 which is shown in Fig. 1 as being bolted to the standard 1. The treadle is provided with a stud 15, (see Figs. 5 and 6) adapted to engage a projection 16 on a yoke  
 20 17, fulcrumed at 18 on screws passed into the standard 1. The yoke has an arm 19 which is pivoted to the lower end of a rod 20, the upper end of which is pivoted to the lever 79 as shown in Fig. 2.

25 When the operator stands in front of the machine, he may throw the treadle 11 to the left, as shown in Fig. 6, and by then depressing it, may draw down the rod 20 and swing the lever 79 about its fulcrum to raise the  
 30 presser-foot. The treadle 11 is also provided with an offset portion 21 which carries a plate 22. This plate is adapted to be moved into alinement with a collar 23 on a rod 24 which is passed through the bracket  
 35 14. The plate 22 and the stud 15 are so located with respect to each other and to the projection 16 and the collar 23 that when the treadle is moved to the position in Fig. 5, the stud 15 will be disengaged from the projec-  
 40 tion 16 and the plate 22 will be caused to register with the collar 23 so that by depressing the treadle when it is in the position shown in Fig. 5, the rod 24 will be depressed or drawn downward for a purpose to be ex-  
 45 plained. It may be stated that the rod 24 is normally held in a raised position by a spring 25 which encircles it, one end of the spring bearing against the bracket 14 and the other against a collar 26 adjustably secured  
 50 to the rod, as shown in Figs. 7 and 8. The rod 24 controls the stop-mechanism and the two-speed mechanism which will now be explained.

Referring to Figs. 1 and 2, it will be ob-  
 55 served that upon the needle or power shaft 8 there are two loose pulleys or drivers 30 and 31 of different diameters, the pulley 30 being relatively small and driven at a high speed, and the pulley 31 being relatively large, and  
 60 driven at a slow speed. The pulley 31 has an elongated hub 32 which is mounted to revolve loosely upon the shaft 8. The pulley 30 has its hub 33 mounted to rotate upon the hub 32. Fixed upon the shaft 30, to rotate  
 65 therewith, is a brake-wheel 34. The wheel

34 and the pulley 31 have complementary clutching faces which are frusto-conical, as shown, so that by moving the pulley 31 to the right, it may be clutched to the wheel 34 to drive the shaft 8 at a relatively slow speed, 70 and the pulley 31 and the pulley 30 have complementary clutching faces so that by moving both pulleys to the right, the wheel 34, the pulley 31, and the pulley 30 may be all caused to rotate in unison to drive the 75 shaft 8 at a predetermined high speed. The two pulleys 30 and 31 receive their power from two endless belts or bands 35 36, to which power is imparted through pulleys 37 38 on a countershaft 39. This countershaft 80 is located conveniently above the machine if desired. The larger pulley 37 is illustrated as pinned to the shaft 39 and it has an elongated hub 40. Between the pulley 38 and the hub 40 is placed a Horton ratchet clutch, 85 so called, or any other suitable form of clutch, so that the pulley 38 may run faster than the pulley 37 but cannot run slower.

In Fig. 4, the clutch mechanism is conventionally shown as comprising a ring 41, upon 90 which the hub of the pulley 38 is keyed. On the hub 40 is keyed a collar 42. The ring 41 is provided with sockets to receive rolls 43. The sockets are wedge-shaped so that when the pulley 38 is rotating in the direction of 95 the arrow, more rapidly than the pulley 37, the rolls are inactive, this occurring when the needle-bar is rotated at a high speed, as when the pulleys 30 and 31 and the wheel 34 are all clutched together. When the slow-speed 100 pulley 31 is clutched to the wheel 34, and the high-speed pulley 30 is running loose, the rotation of the shaft 39 in the direction of the arrow in Fig. 4 wedges the rolls against the ring 41 and causes the pulley 38 to be driven 105 synchronously with the shaft 39.

On the projecting end of the shaft 8 is a collar 44 which is adapted to engage the end of the hub 32 which projects beyond the end of the hub 33. A roll 45, journaled in the 110 end of an arm 46 rests against the flange 47 of the collar 44. The arm 46 is loosely pivoted by a pivot 48 extending from an arm 49 of a bell-crank lever. This bell-crank lever is fulcrumed upon a stud 50 projecting from a 115 bracket 51 on the standard, and it has an arm 52 which projects underneath an adjustable collar 53 on the rod 24. A spring 120 is coiled about the axis of the fulcrum 50, one end being secured to the arm 52 and the 120 other end to the bracket 51, the function of this spring being to maintain the arm 52 in an elevated position and clamp the brake-band subsequently described about the brake-wheel. 125

A rod 54 projects laterally from the arm 49 through an aperture in the arm 46 and is provided on its end with adjustable lock nuts 55 56, between which and the arm 46 is placed a spring 57. Now it will be observed that by 130



drawing the rod 24 downward, a short distance, so as to rock the bell-crank about its fulcrum, the roll 45 will be caused to yieldingly move the hub 32 and the pulley 31 into frictional engagement with the wheel 34, so as to cause the needle or power shaft 8 to be driven at a relatively low speed, so long as the foot of the operator continuously depresses the treadle 11. For the purpose, however, of causing the needle driving shaft 8 to be driven at a high speed, it will be observed that the pulley has near its hub a flat face 59, and that journaled on the end of the arm 49 is a collar 58. Hence by still further depressing the foot treadle 11, the bell-crank may be moved still further about its fulcrum to cause the roller 58 to force the pulley 30 into frictional engagement with the pulley 31, the increased tension of the spring 57 maintaining the pulley 31 in frictional engagement with the wheel 34. When the parts are in this position, with the pulleys 30 and 31 and the wheel 34 all clutched together, the shaft 8 will be driven at a predetermined high speed, the driving pulley 38 now running loose and being speeded ahead of the pulley 37. So long as the operator continues to depress the treadle to its lowest point, the sewing mechanism will be driven at a higher speed.

I will now explain the stop-motion by which, upon releasing the treadle, the mechanism will be stopped with the needle-bar raised and with the presser-foot released.

Loosely encircling the brake-wheel 34 is a band-brake 100. One end of the band-brake is attached to a pin 101, secured to the upright 7. The other end of the band-brake is secured to a pin 102, which is attached to a connecting rod 103, the lower end of which is pivoted to the bell-crank arm 52. This connecting rod 103 is formed in two telescoping parts, and is longitudinally expansible and contractile, and having a set-screw 104 for rigidly securing the two telescoping parts together. When the rod 24 is depressed to swing the bell-crank arm 52 downward, the connecting-rod 103 is drawn downward so as to loosen the brake-band 100 around the wheel 34, but when the said arm 52 moves upward, the brake-band is immediately drawn taut about said wheel to stop the operation of the sewing mechanism. To the upper end of the connecting rod 103 is secured a stop 105 which, when the connecting rod is drawn downward, is caused by a spring 106 to slip under a stationary abutment 107 on the upright 7. Hence when the treadle 11 is depressed to cause the low-speed pulley to be clutched to the power shaft 8, the collar 53 forces downward the arm 52, which draws downward the connecting rod 103 to loosen the brake-band and to permit the stop 105 to slip under and engage the abutment 107. The pulley will thus be clutched to the shaft

so long as the connecting rod remains in this position, which is shown in Fig. 10.

In order to unclutch the pulley from the shaft and to cause the brake-band to automatically engage the brake-wheel 34, so as to stop the sewing mechanism at a point when the needle-bar is raised and the presser-foot is unlocked, I provide the following devices:— Upon the end of the rod 24 is a finger 110 which is bent at its end to project by the edge of the connecting rod 103. This finger forms a trip to disengage the stop 105 from the abutment 107. Pivoted to the upright 7 is a feeler 111. This feeler has an inclined face 112, which is adapted to be engaged once during each revolution of the brake-wheel by a pin 113 carried by said brake-wheel. The feeler is held in position to be engaged by said pin by a spring 114, interposed between it and the abutment 107. The movement of the feeler when engaged by the pin is so slight that it will not impinge upon the connecting rod 103 but when the finger or trip 110 is permitted by the operator to rise to a point shown in Fig. 9, so as to lie between the feeler and the connecting rod, the outward movement of the feeler, when impinged upon by the pin 113, will move the said trip and the connecting rod 103 to the left, to disengage the stop 105 from the abutment 107 and permit said connecting rod to rise, whereupon the brake-band will immediately effect a cessation of rotation of the brake-wheel and consequently of the shaft 8. So long as the operator maintains a pressure upon the treadle, the trip 110 will be in inactive position, but as soon as he removes his foot from the treadle or relieves the treadle from pressure, the rod 24 will rise to carry the trip into active position, so that when the brake-wheel reaches a predetermined point in its rotation, the pin 113 will through the feeler 111 disengage the stop 105 from the abutment 107, as described. To prevent a failure of the spring 114 to operate, the brake-wheel carries another pin 115 at a greater radial distance from the axis of the shaft 8 than the pin 113 which will as said brake wheel rotates engage a face 116 on the feeler to move the feeler to the left in Fig. 9.

The operation of the mechanism will be readily understood from the foregoing description, but it may be briefly reviewed as follows:—Assuming that the shaft 39 is rotating at a predetermined speed, and that the two pulleys 30 and 31 are therefore being driven at a relatively high speed and a relatively low speed, and that the power shaft 8 is at rest, the operator places a shoe in the machine and depresses the foot treadle 11 far enough to clutch the low-speed pulley to the shaft 8. As he does so, the connecting rod 103 is moved downward to permit the stop 105 to engage the abutment 107 and re-



main there locked with the brake-band released from the brake-wheel. The power shaft will now be driven at a slow speed, so long as the operator continues his pressure upon the treadle. It should be stated that, before the operator depressed the treadle, he moved it to the position shown in Fig. 5, so that the plate 22 could engage the collar 23 on the rod 24. If the operator desires that the sewing be now accomplished at a high speed, he depresses the treadle still further to cause the high speed pulley to be clutched to the shaft 8. Before the machine can be stopped, however, by the operator's releasing the pressure upon the treadle, it will be understood that the first upward movement of the treadle will cause the unclutching of the high-speed pulley from the shaft 8. A continued upward movement of the treadle will cause the movement of the trip 110 into operative or active position, so that when the brake-wheel reaches a position where the needle is out of the work and the presser-foot is unlocked, the pin 113 engages the feeler and drops the rod 103, so that the brake-band immediately clamps the brake-wheel and stops the rotation of the shaft 8, from which the low speed pulley is now released.

From the foregoing description of the machine and the operation thereof, it will be apparent to those skilled in the art to which the invention relates, that said invention possesses numerous advantages. The location of the drivers and the clutch mechanism on the head of the machine enables the machine to be operated with a single flat belt from the overhead shaft, thereby reducing the danger to the operatives that is attendant upon the employment of a plurality of rapidly moving belts driven from the overhead shaft. The machine therefore takes less floor space and may be made more compact than where the clutch mechanism is located at the base of the machine. Again the utilization of a single treadle adapted to raise the presser-foot and control the stop motion and two speed mechanism greatly reduces the number of parts in the machine and reduces the labor of the operative.

Having thus explained the nature of the 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 I claim is:—

1. A sewing machine having a power or needle driving shaft in the head thereof, drivers loose on said shaft and actuated at different speeds and manually operated means for clutching said drivers to said shaft to cause it to be rotated at either of two different speeds.

2. A sewing machine having a power or needle-driving shaft in the head thereof, differently speeded drivers loose on said shaft,

clutching means interposed between said drivers and said shaft, and manually operated means for controlling said clutching means to cause said shaft to be rotated by either of said differently speeded drivers.

3. The combination with a shaft rotatable at a predetermined speed and two pulleys of different diameters therein, of a sewing machine having a power or needle driving shaft in the head thereof, two pulleys loose on said last-mentioned shaft and driven at different speeds by said first-mentioned pulleys, and clutching means for clutching to the needle-driving shaft to rotate it either of the pulleys thereon.

4. The combination with a shaft rotatable at a predetermined speed and a sewing machine having a power shaft in the head thereof, of two pairs of complementary pulleys on said shafts, belts connecting the pulleys of each pair, said pulleys being of such diameter that one pulley on the power shaft is rotated at a high speed and the other at a low speed, and the pulleys on the power shaft being loose thereon, and manually controlled clutch-mechanism between the last-mentioned pulleys and the power-shaft for causing said shaft to be driven by either of the pulleys thereon at will.

5. The combination with a shaft rotatable at a predetermined speed and a sewing machine having a power shaft, of two pairs of complementary pulleys on said shafts, belts connecting the pulleys of each pair, said pulleys being of such diameter that one pulley on the power shaft is rotated at a high speed and the other at a low speed, and the pulleys on the power shaft being loose thereon, manually controlled clutch mechanism between the last-mentioned pulleys and the power shaft for causing said shaft to be driven by either of the pulleys thereon at will, and stop-mechanism for automatically stopping the rotation of said power shaft when both pulleys are released therefrom.

6. The combination with a driving shaft rotatable at a predetermined speed, and a sewing machine having in its head a power shaft, of two pairs of pulleys on said shafts, of belts connecting the pulleys of each pair, said pulleys being of such diameter that one pulley on the power shaft is driven at a high speed and the other at a low speed, one of the pulleys on the driving shaft being fast thereon, a ratchet clutch interposed between the other pulley and the said driving shaft, the two pulleys on the power shaft being loose thereon, and means for clutching one or both of said last-mentioned pulleys to said power shaft.

7. A sewing machine having a power or needle driving shaft, two differently speeded drivers loose thereon, a stop-motion for said shaft, clutch mechanism for causing said shaft to be driven by said pulleys at different

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speeds, and a treadle adapted to control the operation of both the stop-motion and the clutch-mechanism.

8. A sewing machine having a power or 5 needle driving shaft, two differently speeded drivers loose thereon, complementary clutch members on said drivers, complementary mem- 10 bers on one of said drivers and said shaft, and manually operated means for causing said last-mentioned clutch members to be 15 engaged to effect the rotation of said shaft at one speed, and while so engaged to cause the clutch-members on said drivers to be engaged to effect the rotation of the shaft at another speed.

9. A sewing machine having a power shaft, differently speeded drivers loose thereon, clutch mechanism for causing the shaft to be 20 driven at either of two different speeds by said drivers, an automatic stopping device for said shaft, a treadle, and connections between said treadle, said clutch-mechanism and said stopping device to cause the stop- 25 ping device to release the shaft and to clutch the low-speed driver to the shaft upon the initial depression of the lever, to clutch the high-speed driver to the shaft upon a further depression of the treadle, and upon a release 30 of the treadle to cause the unclutching of said drivers from the shaft and permit the stopping device to operate to stop the shaft.

10. A sewing machine having a power shaft, differently speeded drivers loose there- 35 on, clutching means for causing the shaft to be driven at either of two different speeds by said drivers, a lever and connections be- 40 tween said clutching means and said lever to cause said shaft to be driven by the low speed driver upon the first part of a move- 45 ment of said lever in one direction and to cause said shaft to be driven by the high speed driver on a further movement of said lever in the same direction.

11. A sewing-machine comprising a nee- 45 dle-driving shaft, a presser-foot, means for lifting the presser-foot, a driver on the needle-driving shaft, a clutch for connecting the driver to the needle-driving shaft, means for operating said clutch, and a treadle 50 pivoted to swing up and down and laterally

and constructed and arranged to be engaged with either of said means at will for operat- ing them.

12. A sewing machine comprising stitch- 55 forming mechanism, a clutch controlling the operation of said mechanism, mechanism for operating the clutch, a presser-foot, mechanism for lifting said presser-foot, said clutch- 60 operating mechanism and said presser-foot- lifting mechanism having projections or en- gaging portions, and a treadle having its 65 front end free, said treadle being movable laterally and thereby adapted to be separately engaged with said projections or en- gaging portions.

13. A sewing machine comprising a nee- 70 dle-driving shaft, a presser-foot, mechanism for lifting the presser-foot, two speed driving mechanism, mechanism for connecting the two speed driving mechanism to the needle- 75 driving shaft, and a treadle fulcrumed to swing laterally and up and down so as to be operatively engaged with either of said mechanisms at will for effecting its operation.

14. In a sewing machine, stitch-forming 75 mechanism including a clutch, clutch-operat- ing mechanism, a presser-foot, presser-foot- lifting mechanism, each of said mechanisms comprising a rod having an engaging portion, 80 and a laterally movable depressible treadle adapted to be engaged with either of said engaging portions.

15. A sewing machine comprising sewing 85 mechanism; presser-foot-lifting mechanism, driving mechanism, means for connecting the driving mechanism with the sewing 90 mechanism, a treadle disconnected from said presser-foot-lifting mechanism, and said connecting means, and adapted to opera- tively engage with either of them at will, 95 and a fulcrum for the rear end of said treadle adapted to permit lateral movement of said treadle.

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

EVERETT P. RICHARDSON.

Witnesses:

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