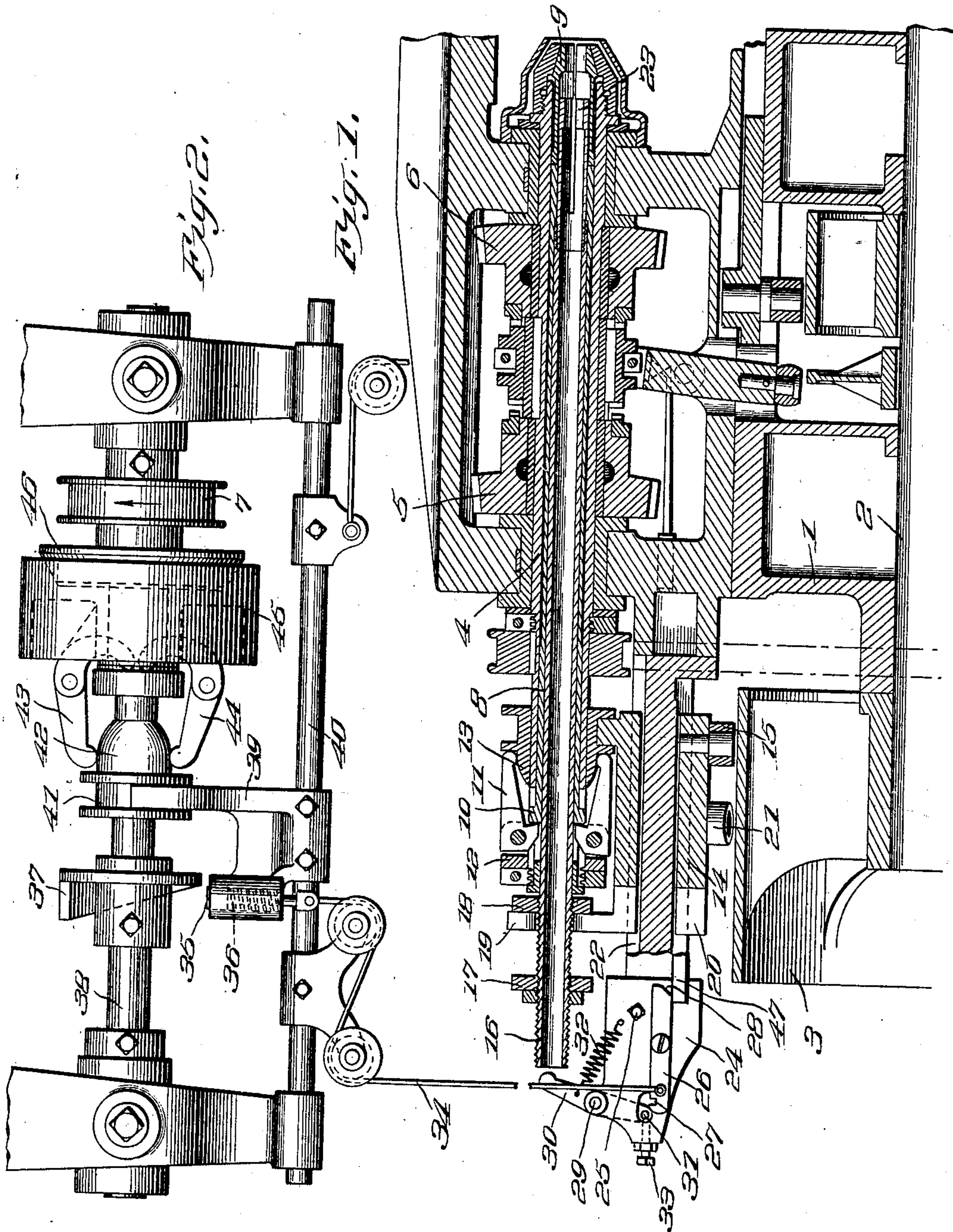


E. R. SEWARD.
STOP MOTION FOR METAL WORKING MACHINES.
APPLICATION FILED MAY 6, 1907.

925,041.

Patented June 15, 1909.
2 SHEETS—SHEET 1.



WITNESSES:

J. V. Millward.
N. D. Beal

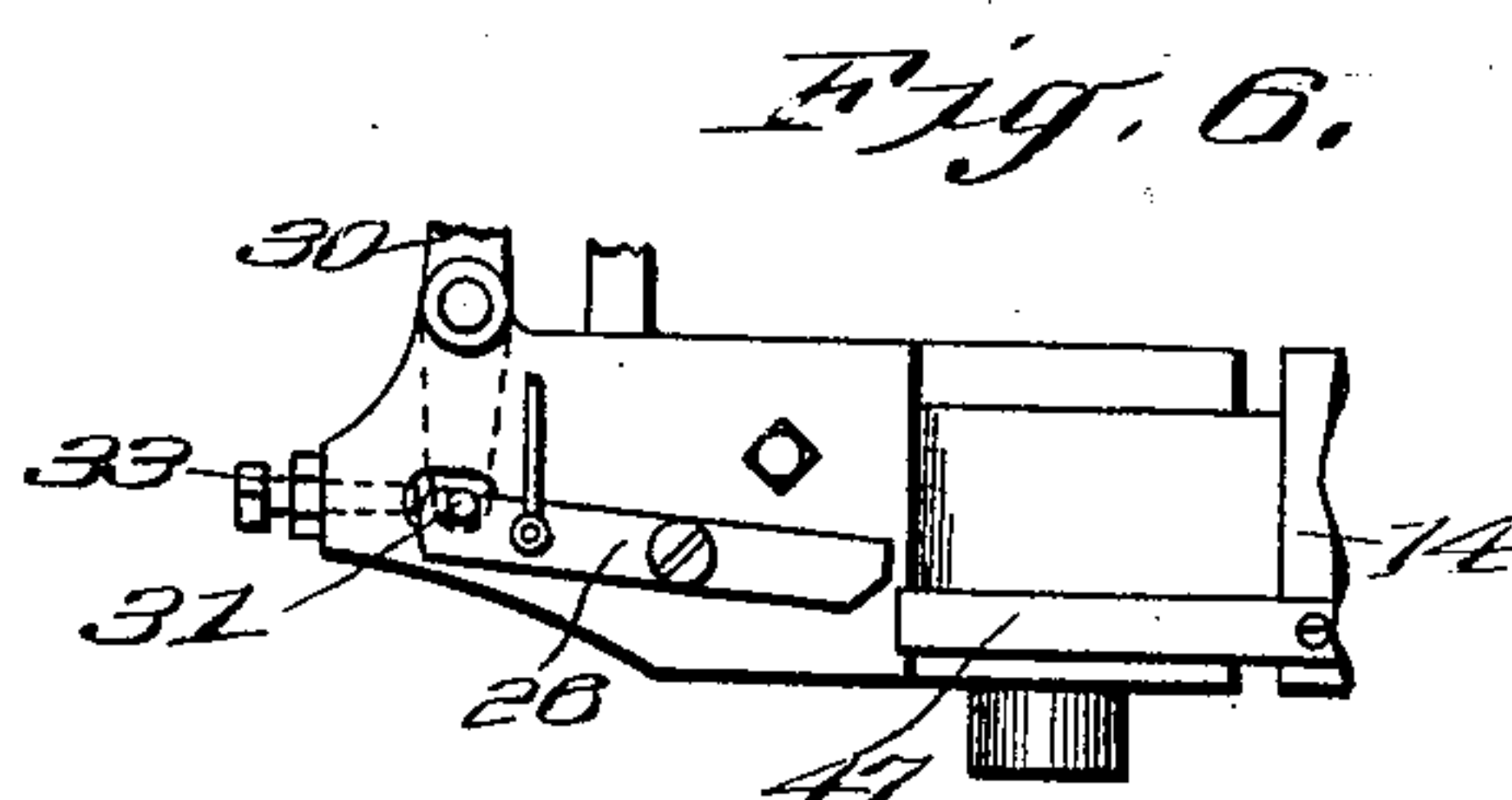
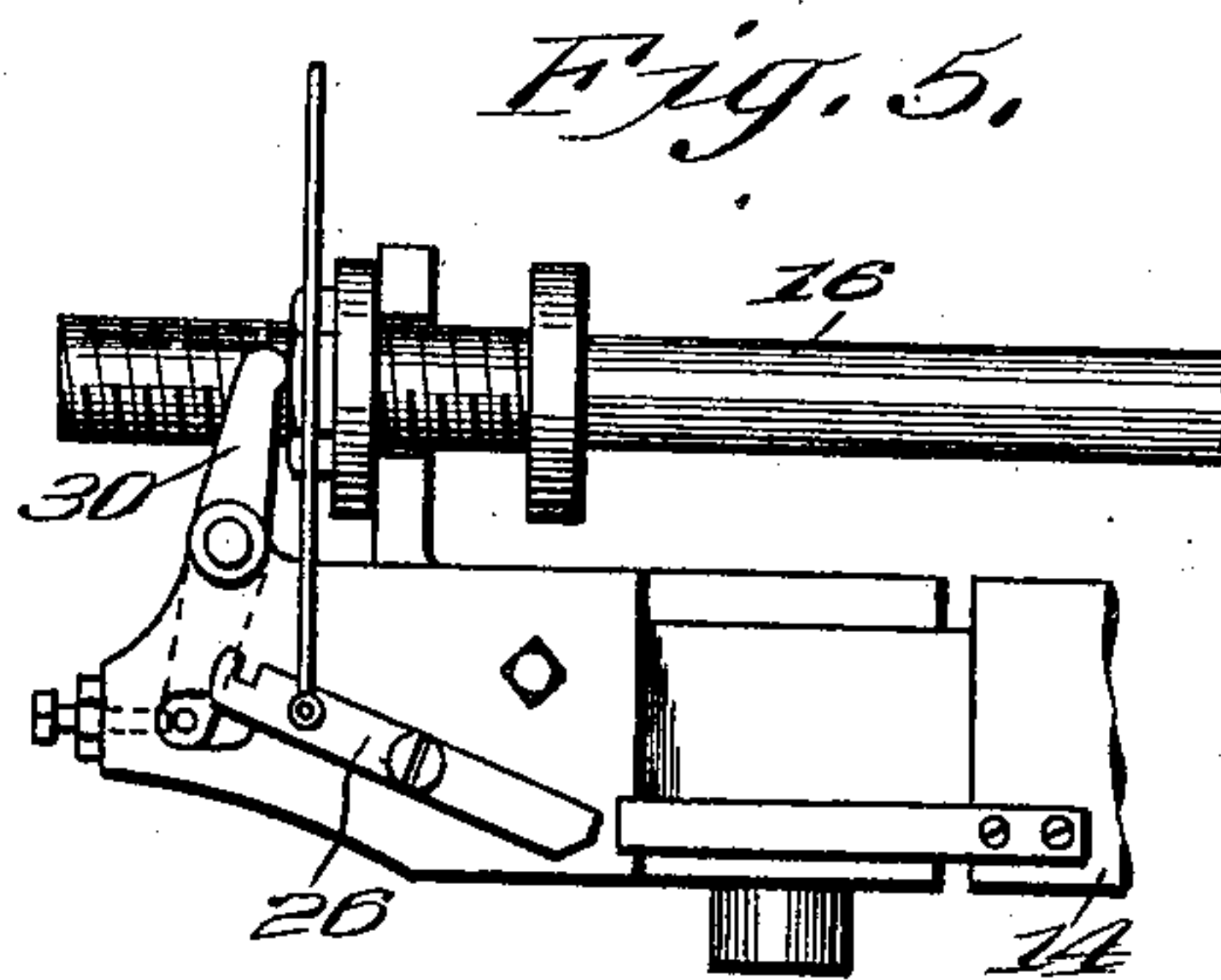
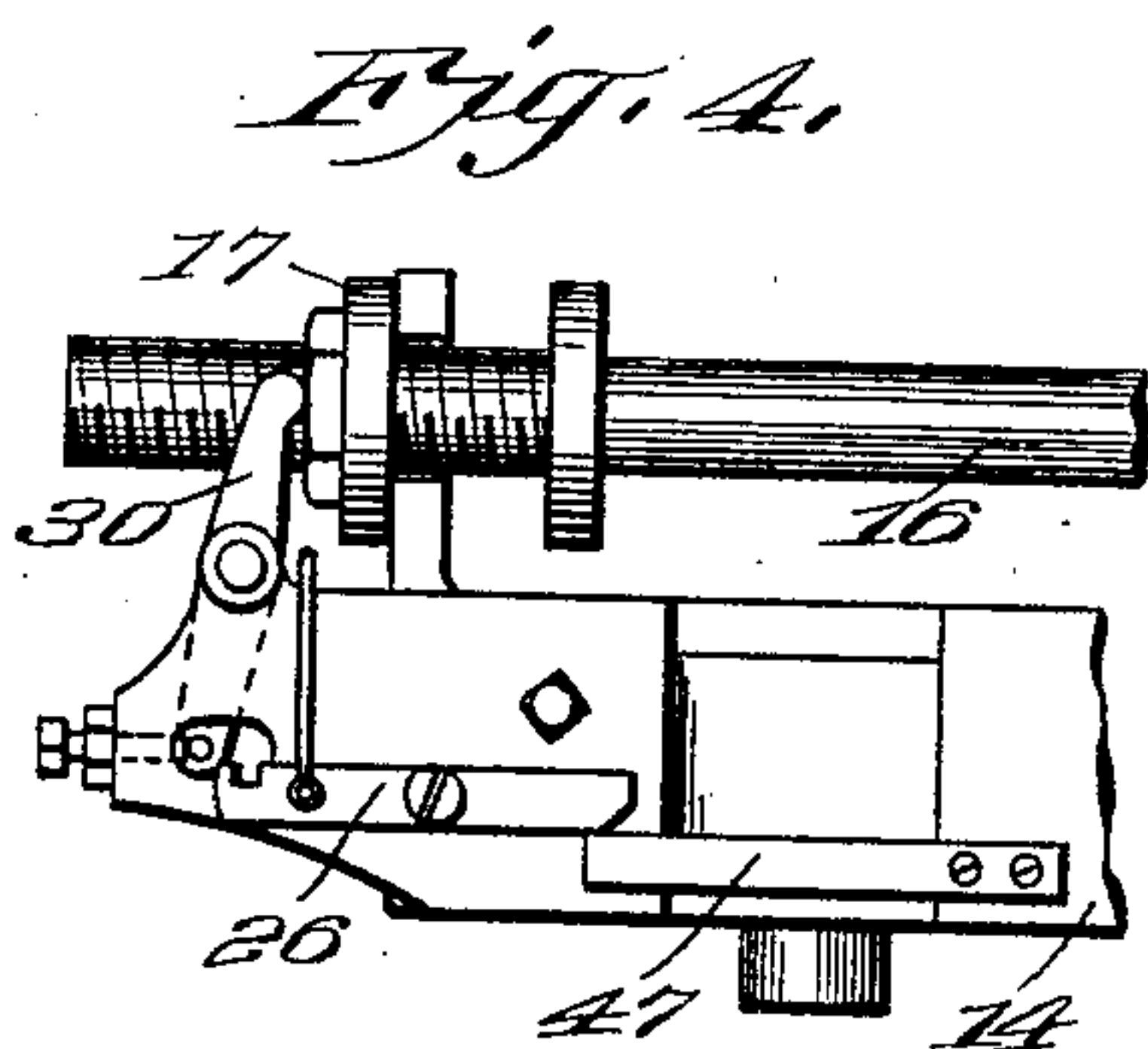
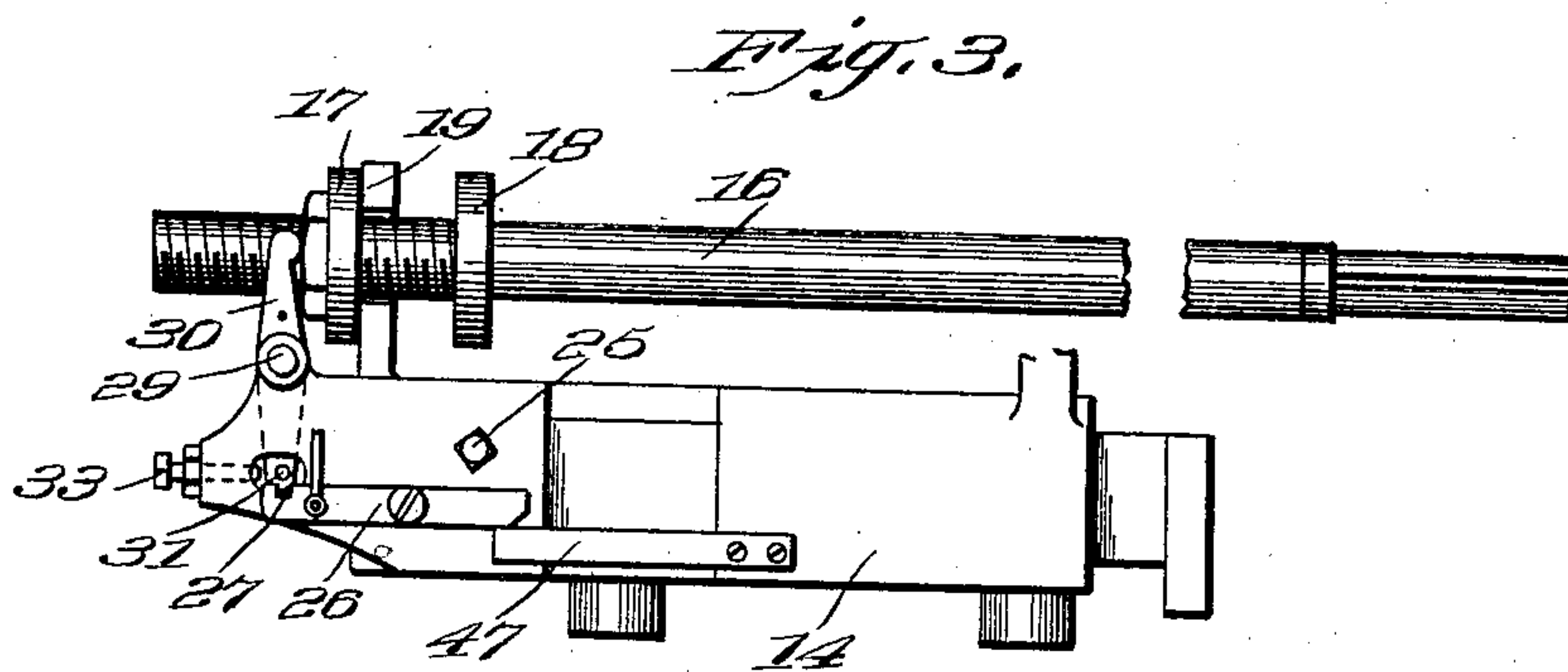
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2 SHEETS—SHEET 2.



WITNESSES:

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UNITED STATES PATENT OFFICE.

ERNEST R. SEWARD, OF HARTFORD, CONNECTICUT, ASSIGNOR TO THE HARTFORD MACHINE SCREW COMPANY, OF HARTFORD, CONNECTICUT, A CORPORATION OF CONNECTICUT.

STOP-MOTION FOR METAL-WORKING MACHINES.

No. 925,041.

Specification of Letters Patent.

Patented June 15, 1909.

Original application filed August 27, 1904, Serial No. 222,410. Divided and this application filed May 6, 1907.
Serial No. 371,959.

To all whom it may concern:

Be it known that I, ERNEST R. SEWARD, a citizen of the United States, and a resident of Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Stop-Motions for Metal-Working Machines, of which the following is a specification.

The invention relates primarily to metal working machines and more particularly to machines of this type in which a portion of the various parts is entirely automatic. It applies particularly to metal working machines in which the "stock" to be operated upon is periodically fed forward to the tools, and is of course applicable to various types of automatic machines.

The object of the invention is to provide a stop motion that will automatically stop the driving shaft and driving elements of the machine upon certain predetermined conditions, as for instance, when the "stock" or material fed to the machine is exhausted.

Referring to the drawings—Figure 1 is a longitudinal sectional view through the spindle and appurtenant parts of a metal working machine, showing the application of the automatic stop device. Fig. 2 is a view in side elevation of a counter shaft on a large scale as compared with Fig. 1, illustrating the shaft elements of the stop device. Fig. 3 is a detailed view of the feed tube of the metal working machine illustrated in Fig. 1 and the stop mechanism, the feed tube being shown at the rearward limit of its play. Fig. 4 is a view similar to that shown in Fig. 3, illustrating the position of the parts when there is no stock in the feed tube. Fig. 5 is an illustrative view similar to Fig. 4, showing the release of the stop motion trip. Fig. 6 is an illustrative view showing the manner in which the trip lever of the stop motion is held during the movements of the feed slide and the chuck slide when there is a normal operation with stock in the feed tube.

As already defined, the device relates to stop motions and more particularly to such a device which is dependent for its operative and effective movements upon the conditions existing with reference to the material which is being put through the machine.

In the accompanying drawings it is illustrated in connection with a metal working machine of the automatic type especially

designed for forming set screws or cap screws from a bar of metal. Only so much of the machine is described as pertains to the stock feeding and chucking mechanism.

In the accompanying drawings numeral 1 denotes the base or support provided with suitable bearings for a cam shaft 2 which bears a cam drum 3 provided with suitable cams for operating the chucking apparatus and the feeding apparatus.

Upon the base or support 1 are mounted the several driving parts for the main spindle 4 which may be driven in any well known manner through a system of gearing partially illustrated at 5—5, and which in turn is driven from a counter shaft pulley or sprocket 7. Within the main spindle 4 is arranged a chuck tube 8 having at its forward end chuck jaws 9 adapted to grip and hold the material during its rotation and while subject to the action of certain forming tools. At its rear end it is provided with shoulders 10 which are engaged by chuck levers 11 pivoted to a collar 12 and actuated by a cam 13, which in turn is connected with slide 14 arranged to be reciprocated by suitable cams upon the cam drum 3 through the medium of roll 15.

Within the chucking tube 8 is a feed tube 16 provided with adjustable stop collars 17—18 and between which is arranged a projection 19 which extends from the feed slide 20. This feed slide is reciprocated by suitable cams located upon the cam drum 3, through the medium of a roll 21. Both the feed slide and chuck slide are mounted upon opposite sides of a slide-way 22, which extends over the cam drum 3 and bears the several parts of the stop mechanism hereinafter described.

The feed tube 16 is provided at its forward end, with split jaws 23 arranged to provide a frictional grasp upon the stock and this frictional grasp of the feed tube has an important function with respect to the operation of the stop motion mechanism.

When there is stock in the machine, said stock is clutched by the chuck jaws appurtenant to the chuck slide while the tools are operating, and while so clutched, the feed tube 16 is positively moved backward by the projection 19, which engages the stop 17 of the feed tube. During this operation and movement of the feed tube, the split jaws 23

slip along the stock against the gripping resistance of the jaws with reference to said stock. As the chuck jaws are released, the feed tube is ordinarily moved forward with a positive movement by the projection 19 coming in contact with the collar 18, forcing the feed tube with the stock forward through the chucking jaws. It will be noted that there is a lost movement between the collars 17, 18 and the projection 19. It therefore follows that when the projection 19 has moved the collar 17 and the feed tube to the rearward limit of its play, and said projection 19, again moves forward, said feed tube may be moved by other than the positive mechanism including the projection 19.

Ordinarily when the chuck jaws are released the feed tube is moved forward by the positive engagement of the projection 19 with the collar 18, provided said feed tube is gripping the stock to be fed. If the stock becomes exhausted and the feed tube in its rearward movement releases its grasp thereon, said tube may, from its rearward movement, be freely moved as soon as the projection 19 moves forward and away from the collar 17 to engage the collar 18. The rearward movement of the feed tube causes it, as shown herein, to engage through the collar 17 with a spring lever 30, normally forced forward by a spring 32, the tension of which is sufficient to move the feed tube, provided it is not carrying stock. This lever 30, determines the operation of the stop motion and its actuating spring 32, is so balanced that it permits movement of the lever 30 due to the positive back camming of the feed tube, but is capable of forcing said feed tube forward whenever it is free from the stock.

The stop motion hereinafter described is to prevent accidental operation of the machine, such for instance, as would occur when the stock is exhausted. When the stock carried in the feed tube 16 is nearly exhausted, there is always the liability of its feeding in such manner as to be improperly advanced to the tools. The result of such improper feeding is unavoidable breakage of the operating parts. To obviate and insure against such action, an arrangement is provided for automatically disconnecting the main driving pulley or driving means of the machine. As shown herein, the stop motion is arranged to disconnect the main driving pulley of the counter shaft from which the machine is driven.

On the outer end of the slideway 22 which forms the support and slideway for the chucking slide 14 and the feeding slide 20 is arranged a block 24 which fits over the end of the slideway 22 and may be adjusted longitudinally thereof and may be locked in any desired position as by a set screw 25. This block 24 has pivotally mounted upon one side a trigger or latch 26 provided at one end

with a notch 27 and at its opposite end with a cam face 28. Pivoted to the block 24, as at 29, is a lever 30, the upper end of which lies in the line and path of movement of the stop 17 of the feed tube 16, and the lower end of which is provided with a pin 31 which extends transversely from the lever to overlie the pivoted latch lever 26. This lever 30 is normally pulled forward by a stiff spring 32 with the pin 31 resting against an adjustable stop 33. The tension of the spring 32 is sufficient to hold the lever 30 firmly against its stop and the rearward impulse of the feed tube, when said feed tube is positively moved by its cam. It is also sufficient to move the feed tube forward provided said tube is not in engagement with the stock operated upon. The latch or trigger 26 is connected by a cord or other suitable connecting means 34, with a spring pressed plug 35 arranged, when released, to be forced forward by its spring 36 to project in front of and be engaged by a cam 37 fast upon the counter shaft 38.

The plug 35 is borne in a socket formed upon one end of a yoke member 39, secured to and moving with, a slide rod 40. The yoke 39 extends into a groove 41 of a clutch cam 42. The arrangement between the block 35 and the cam 37 is such that when the plug 35 is projected into the path of movement of the cam 37, the latter forces the yoke 39 and cam 42, away from the clutch levers 43—44. The clutch levers control the clutch drum 45 and thus disconnect the mating cone 46 cooperating therewith. This causes a release between the driving member 45 and cooperating clutch member 46 and stops the machine which is driven from the sprocket or sprocket drum 7.

Arranged upon the chucking slide 14 is a bar or detent 47, and during the normal operation of the machine with stock in the feed tube, this slide 14 and bar 47 are retracted to such a position that the latter underlies the forward end of the trigger or latch 26, while the feed slide 20 is moving backward to secure a new feeding grip upon the stock. As the feed slide reaches the rearward limit of its play, the adjustable collar 17 upon the feed tube 16, engages the upper end of the lever 30 and throws the pin 31 into position to overlie and be engaged by the notch 27 of the trigger 26 to lock the latch or trigger 26 while the chucking slide 14 moves forward as illustrated in Fig. 6. It is of course understood that the chucking slide is at the limit of its play with the chuck jaws gripping the stock while the feed tube moves rearwardly to secure a new feeding grip upon said stock.

If the stock should be exhausted or nearly exhausted, as illustrated in Fig. 3, and the feed tube 16 should be retracted, the frictional grasp of said tube upon the stock

would be lost as its jaws were withdrawn from the end thereof, and thereupon, the stop 17 would come into engagement with the lever 30, forcing it back against the tension of the spring 32. There being no stock in the feed tube 16 with the parts in this position, the spring 32 will re-act as soon as the cam of the feed slide begins its forward movement, and thereupon the feed tube will be forced forward by the strong spring 32, permitting the lever 30 to assume the position shown in Fig. 4. With the parts in this position, the moment the chucking slide moves forward to unchuck the stock, carrying with it the detent bar 47, the trigger 26 is released and the spring plug 35, assumes a position to be engaged by the cam 37, thus releasing the clutch and stopping the counter shaft and machine. It will be seen from the above that the chucking slide is always forward with the stock unchucked when the stop motion acts to shut down the machine, and therefore there is no difficulty in inserting a new bar of stock.

Attention is called to the effective principle of operation of the stop motion which acts upon the principle of differential resistances. When stock is in the feed tube, the spring 32 does not have the requisite power to move the feed tube 16, but as soon as the jaws of said tube are released from the stock by being withdrawn from its end, the spring 32 readily moves the tube 16 and its slide, forward, to prevent the locking of the lever 30 by its trigger 26.

Obviously the details of the device might be varied to a considerable extent without departing from the spirit or intent of the invention, and various forms of clutch devices might be employed in lieu of the particular form shown upon the counter shaft, one of the essential features of the invention being the release of a mechanism for stopping the machine as soon as the stock being operated upon is nearly exhausted.

The metal working machine shown herein in connection with the stop motion is not described in detail, it forming no part of this present invention which is a division of a co-pending application filed August 27, 1904, Serial Number 222,410.

What I claim as my invention and desire to secure by Letters Patent is:

1. In combination with means for engaging and disengaging the connection between two shafts, means for operating said engaging and disengaging means, a latch connected with said means, a lever to engage and hold said latch, a reciprocating member adapted to engage and hold said latch disengaged from the lever, a reciprocating member adapted to engage and hold said lever in position of engagement with the latch and resilient means adapted to move said lever and

the reciprocating member whereby the lever and latch may be disengaged.

2. In a stop motion device in combination with means for engaging and disengaging the connection between two shafts, means for actuating said connection, a latch in operative connection with said operating means, a reciprocating member for holding and releasing said latch, a resiliently actuated lever for holding said latch upon the release thereof by its reciprocating member and a reciprocating member adapted to actuate said lever and to be actuated thereby dependent upon the resistance offered by said reciprocating member, whereby the lever holds or releases the latch.

3. In a stop motion device, in combination with means for engaging and disengaging the connection between two shafts, means for actuating the engaging and disengaging means, operative means for holding or releasing said actuating means including a reciprocating chuck actuator and a reciprocating feed tube, said chuck actuator and feed tube coöperating to lock the actuating means against movement with the chucking device in chucking position and releasing same only when the chuck is open.

4. In a stop motion device in combination with means for engaging and disengaging the connection between two shafts, means for operating said connection including a pivoted latch, a lever operatively mounted with relation thereto for locking and releasing movements, a reciprocating member positively moved to control the latch, a second reciprocating member positively moved to engage the lever and with a lost movement whereby it may be moved thereby, means for moving the reciprocating members and resilient means connected with the lever for moving said reciprocating member after its positive movement.

5. In a stop motion device in combination with means for engaging and disengaging the connection between two shafts, means for operating said connection, a latch lever connected with said means, a locking lever adapted for engagement with or disengagement from the latch lever, a reciprocating member adapted to move and to be moved by the latch lever, means for moving said latch lever and reciprocating member under predetermined conditions, and a reciprocating member for locking the latch and releasing said latch after the latch lever and its reciprocating member have been moved by the operating means of said latch lever.

6. In combination with means for engaging and disengaging connection between two shafts, a spring pressed lever, a reciprocating member arranged to engage and move said lever against the action of its spring, and normally having a resistance greater than the action of said spring, a trigger appurtenant

to said lever and connected with engaging and disengaging means of the shafts, and means for holding said trigger in a predetermined position during the normal movements of the reciprocating member.

7. In a stop motion device, a sectional shaft and means for engaging and disengaging said sections, said means including a connection with a pivoted latch, a reciprocating member adapted to hold and release said latch, a pivoted lever adapted to be engaged by said latch, and a reciprocating member adapted to move said lever to cause engagement thereof with the latch and to be moved by said lever to permit disengagement thereof with the latch, and a spring for moving said lever.

8. In a stop motion device in combination with means for engaging and disengaging the connection between two shafts, means for actuating said connection including a latch, a spring controlled lever cooperating with said latch and having interengaging connections therewith for holding the latch, a reciprocating feed tube operatively arranged to engage the spring controlled lever and move same into interengaging position with the latch, a chuck member operatively arranged with reference to the reciprocating member and adapted for gripping and releasing actions with reference to the material carried by the reciprocating feed member, a reciprocating member for engaging and releasing the trip lever whereby the spring controlled lever is

held by the trip until released by the opening movement of the chuck actuator.

9. In a stop motion device in combination with means for engaging and disengaging the connection between two shafts, means for actuating said connection including a latch, a reciprocating chuck actuator adapted for engaging and disengaging movements with reference to the latch, a lever adapted to be engaged and held by the latch, a reciprocating feed tube operatively arranged with reference to the chucking device and adapted to move said lever into engaging position with the latch, said feed tube and chuck actuating device cooperating to release the lever and latch with the chuck open.

10. In a stop motion device in combination with means for connecting and disconnecting two shafts, means for operating the connecting means, a latch connected with the operating means, a lever to engage and hold said latch, a reciprocating member to engage and hold the latch disengaged from the lever, a feed tube to engage said lever and hold it in position to engage the latch and means connected with the lever to force it and the feed tube forward when disengaged from the stock but insufficient to cause such movement with said feed tube engaged with the stock.

ERNEST R. SEWARD.

Witnesses:

GEORGE E. WITHERELL,
EDWARD J. MCGINN.