

No. 686,376.

Patented Nov. 12, 1901.

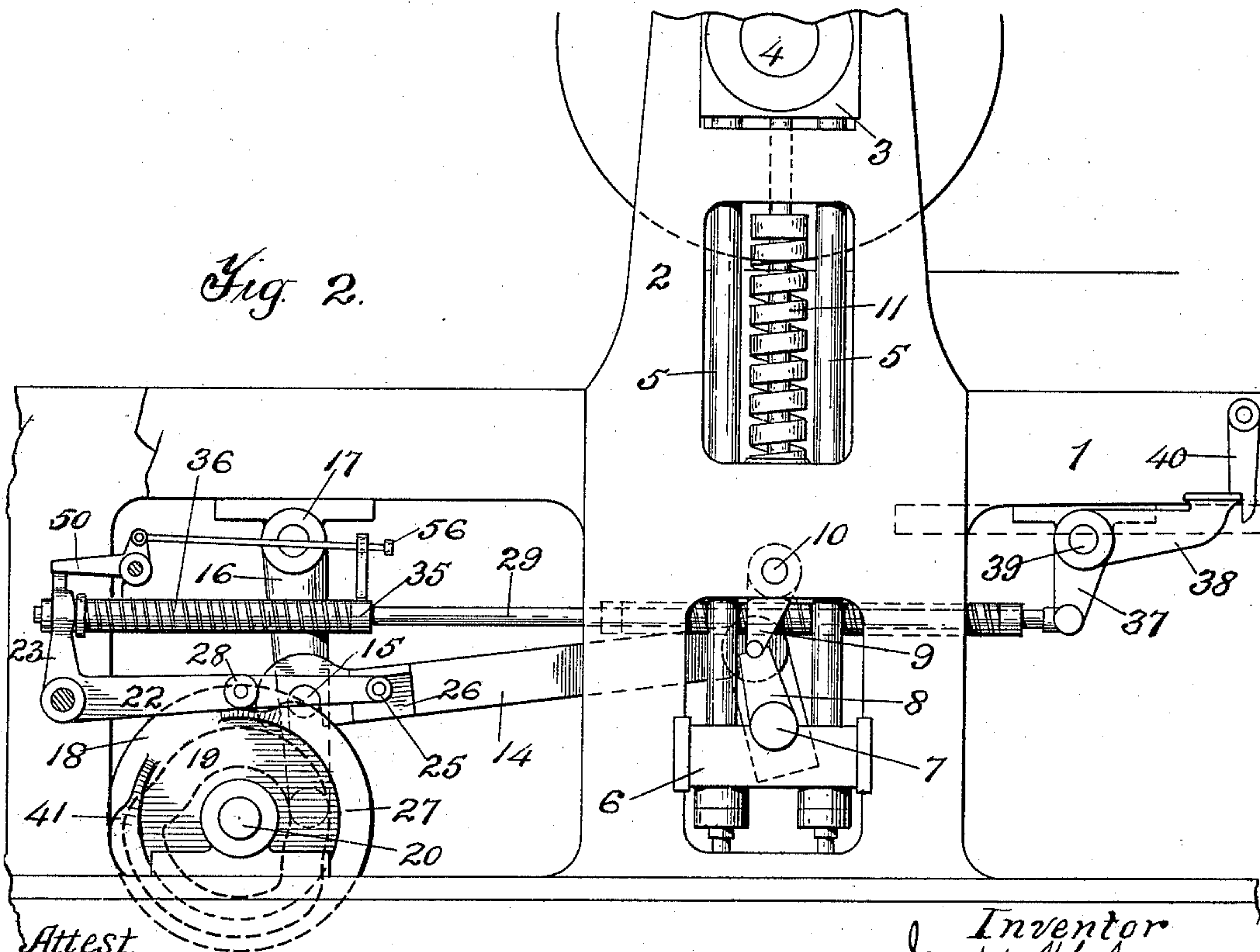
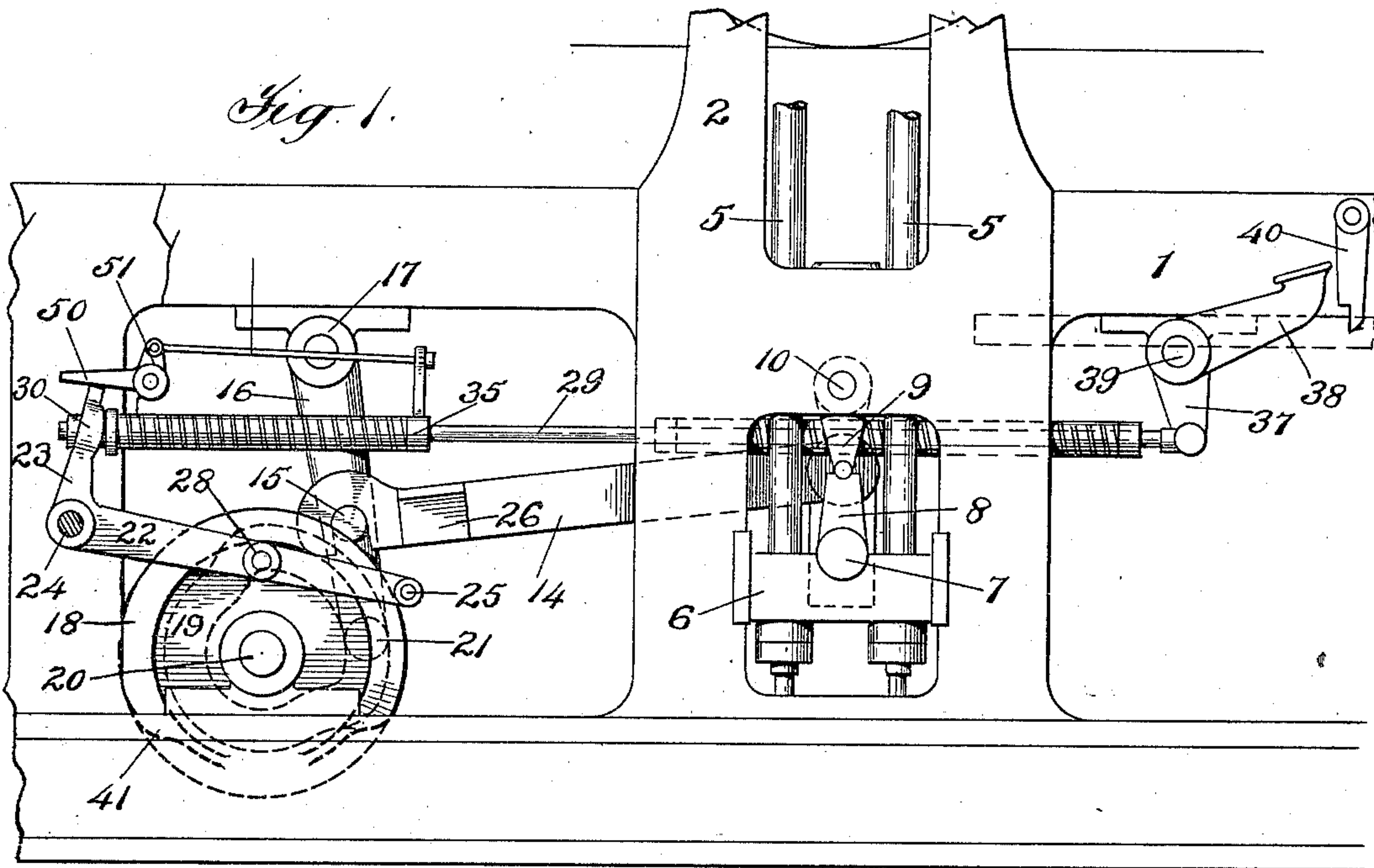
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TRIPPING MECHANISM FOR CYLINDER PRINTING MACHINES.

(Application filed Dec. 14, 1900.)

(No Model.)

3 Sheets—Sheet 1.



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3 Sheets—Sheet 2.

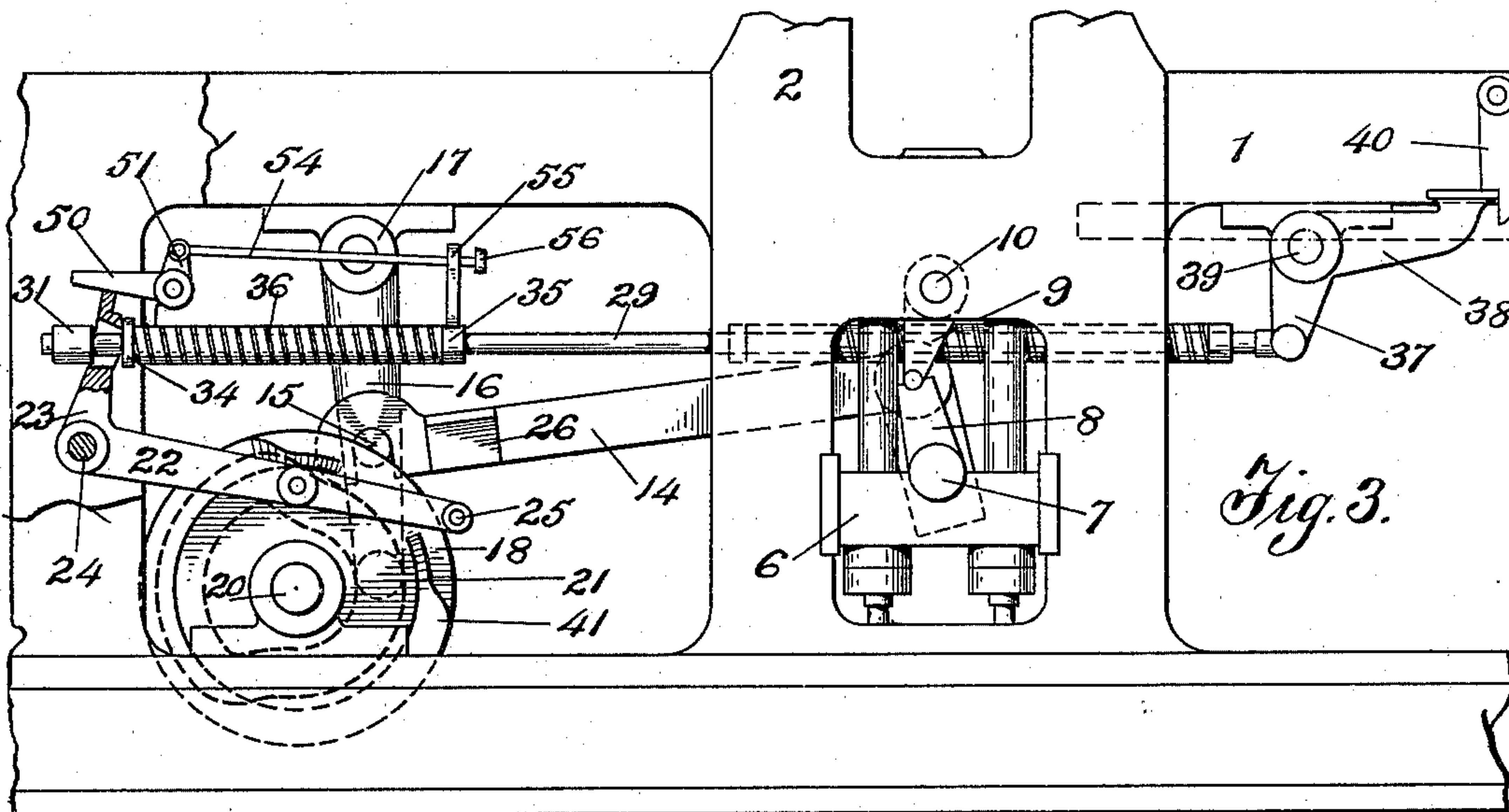
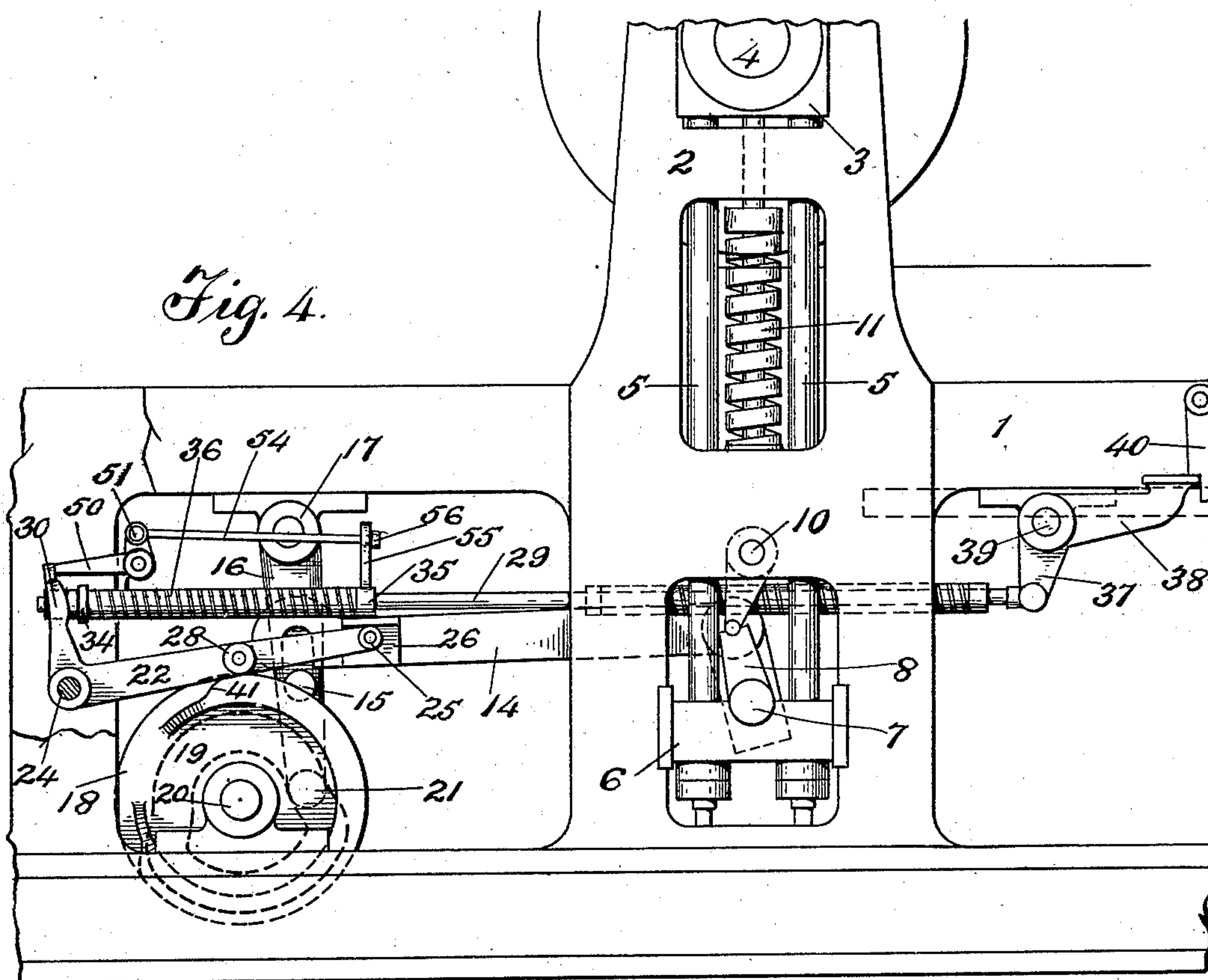


Fig. 4.



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# UNITED STATES PATENT OFFICE.

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## TRIPPING MECHANISM FOR CYLINDER PRINTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 686,376, dated November 12, 1901.

Application filed December 14, 1900. Serial No. 39,815. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH WHITE, a citizen of the United States, residing at New York, county of New York, and State of New York, have invented certain new and useful Improvements in Tripping Mechanism for Bed-and-Cylinder Printing-Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to certain improvements in tripping mechanism for printing-machines.

Printing-machines as now ordinarily constructed are usually provided with mechanisms which so position one of the members of the printing-couple as to prevent it from coöperating with the other member under certain conditions, this positioning taking place without interfering with the operation of the machine as a whole. In rotary machines and in certain machines of the bed-and-cylindertype—as, for instance, machines employing multirevolution-cylinders and in certain classes of stop-cylinder machines—the positioning devices operate to move one of the members of the couple, usually the impression-cylinder, away from its coöperating member. In another class of bed-and-cylinder machines, which includes the stop-cylinder machines, in which the impression-cylinder has a low side or a properly-arranged gap, the positioning devices operate to bring the cylinder to a stop with its low side or its gap, as the case may be, opposite the bed, so that the form on the bed may pass under the cylinder without touching it. In rotary machines the positioning devices are usually employed during the time of inking up or when an emergency occurs—such, for instance, as failure to properly feed a sheet—and are inoperative at other times. In the bed-and-cylinder type of machines the positioning devices usually operate once during each cycle of operations of the machine, and their operation is intermitted when the cylinder is out of printing relation with the bed in order to keep the cylinder in this position. In all these types of machines the positioning devices are controlled through a tripping mechanism. In the rotary type of machines this

tripping mechanism throws the positioning devices into operation; but in the bed-and-cylinder type of machines the tripping mechanism suspends the operation of the positioning devices. These tripping devices as ordinarily constructed embody connections which are engaged or disengaged, as the case may be, and the work incident to the tripping operation is performed entirely by the operator or pressman. Furthermore, the tripping operation should only be effected at certain specified times in the operation of the machine—that is, in bed-and-cylinder machines, for instance, when the bed has passed out from under the cylinder, since to bring the bed and cylinder into printing position at any other time would cause breakage of the machine or unnecessary strain on its parts. In the best constructions, therefore, means are provided which absolutely prevent the operation of the tripping mechanism except when the bed and cylinder are in proper position. It follows, therefore, that the time during which the tripping can be effected is a limited one, and it will sometimes happen that the operator is unable to succeed in completing the movement of the tripping mechanism within this time, so that breakage of the machine results.

In certain classes of machines it has been proposed to employ a mechanism by which the operator can set the tripping mechanism, leaving the actual work of tripping to be effected by the machine. These mechanisms, however, have not included a mechanism for preventing the operation of the tripping devices except at specified times and are objectionable for that reason.

It is one of the objects of this invention to produce an improved means for controlling the positioning devices of printing-machines in which the tripping operation shall be effected by the machine and in which the tripping devices cannot be operated except at specified times.

A further object of the invention is to produce an improved tripping mechanism in which breakage shall be prevented in case of any failure to complete the movement of the tripping devices within the time allowed for their operation.



With these and other objects in view the invention consists in certain constructions and in certain parts, improvements, and combinations, as will be hereinafter fully described and then specifically set forth in the claims hereunto appended.

In the accompanying drawings, which form a part of this specification, and in which like characters of reference indicate the same parts, Figure 1 is a detail side elevation of so much of a bed-and-cylinder printing-machine as is necessary to illustrate the invention. Figs. 2, 3, and 4 are views similar to Fig. 1, but showing the parts of the mechanism in different positions. Fig. 5 is a view of a part of the mechanism shown in Fig. 1, on an enlarged scale, the view being partly in section and showing the parts in a still different position from those of the other figures. Fig. 6 is a horizontal section on the line 6 6 of Fig. 2. Fig. 7 is a horizontal section on the line 7 7 of Fig. 5.

Referring to the drawings, the invention is shown as applied to a bed-and-cylinder machine of the type in which the positioning devices operate to move the cylinder toward and away from the bed for each reciprocation of the bed. The frame of the machine, which may be of any usual or desired construction, is indicated at 1. The frame (see Fig. 2) is provided with the usual standards 2, in which are mounted the boxes 3, which support the cylinder-shaft 4. While any usual or desired type of positioning devices may be employed, in the construction shown the boxes have connected to them rods 5, which at their lower ends carry cross-bars 6. A shaft 7, which extends across the machine, rests in bearings in these cross-bars, said shaft being provided on each side of the machine with toggle-arms 8, which cooperate with similar arms 9, journaled on studs 10, mounted in the sides of the frame. Springs 11, which rest against the boxes and against suitable bearings in the frame, are provided, which act in opposition to the toggles before referred to. In this type of positioning devices, which is a common one, when the toggles are broken the springs lift the boxes and carry the cylinder away from the bed. When, on the other hand, the toggles are straightened, the cylinder is brought down into printing position against the stress of the springs. While any suitable means may be provided for breaking and straightening the toggles, in the construction shown the shaft 7 is provided with arms 12, to which is secured, by means of a pin 13 or in any other suitable manner, a gab-hook 14. This hook engages a pin 15, which is carried on a rock-arm 16, journaled in a bearing 17, secured to the machine-frame. It is apparent that by rocking the arm a reciprocating movement of the gab-hook will be produced, which movement will make and break the toggles.

The means for rocking the arm 16 in the form of construction selected to illustrate the

invention consists of a disk 18, provided with a cam-groove 19, said disk being mounted on a shaft 20, which is suitably located in bearings in the frame. This shaft is so geared as to make one revolution for each complete reciprocation of the bed, or, if the cylinder be a two-revolution cylinder, one revolution for each two revolutions of the cylinder. The rock-arm 16 is provided with a bowl 21, which engages the cam-groove 19, before referred to.

The construction so far described is a common and ordinary form of operating mechanism. When the gab-hook is engaging the stud 15, it is obvious that the positioning devices will be operated once for each complete revolution of the shaft 20. When, as in the present instance, the positioning devices are raising and lowering devices and the shaft 20 is arranged to make a revolution for each reciprocation of the bed, the cylinder will be raised and lowered once for each such reciprocation. Normally, therefore, when the present class of positioning devices is employed the cylinder will be regularly raised and lowered.

In order to interrupt the normal condition of the positioning devices, a controlling mechanism is employed which may be variously constructed and which will vary in its operation according to the particular function to be discharged by it. When positioning devices such as have been before described and which normally operate to raise and lower the cylinder are employed, the controlling mechanism will be arranged to interrupt the connections by which the positioning devices are operated. In the form of construction which has been chosen to illustrate the invention the controlling mechanism consists of a bell-crank lever having arms 22 23, said lever being pivoted at 24 to the frame of the machine. The arm 22 of the lever preferably carries a lifting-pin 25, said pin being arranged to lift the gab-hook. In the preferred form of the construction the gab-hook is provided with an angle wear-plate 26, which is bolted to the hook, the pin 25 taking under the edge of the plate. In constructions like the one which has been chosen to illustrate the invention the controller-lever will preferably be operated by a moving part of the machine and is normally positioned so as not to operate upon the connections leading to the positioning devices. Inasmuch, furthermore, as it is important that the controller-lever should not operate except at specified times in the operation of the machine, means are provided which will prevent the movement of the lever except at the time when the positioning devices may be safely operated. The means for preventing the movement of the lever except at specified times may be varied widely in form. In the present construction, however, the disk 18 is provided with an annular guard 27, a space being left between the ends of this guard. The arm 22 of the controller-lever is provided with a roller 28, and the parts are



so arranged that when the controller-lever is in its inoperative position the roller 28 will run on the inner or under side of the guard 27, so that the lever cannot be moved except at the time when the roller 28 is opposite the opening between the ends of the guard. This opening in the guard, when the positioning devices are raising and lowering devices, will be so arranged that it comes opposite the roller 28 at about the time when the cylinder is reaching or has reached its upward position under the action of the raising and lowering devices. Furthermore, it will be noted that when the roller 28 passes out of the annular guard it cannot return to its normal position until the disk 18 has made a complete revolution or until the parts of the machine have resumed substantially the position which they occupied when the controller-lever was moved.

The controller-lever may be variously operated in order to move it in the manner described. In the construction shown, however, a setting mechanism is employed which in the present construction includes a rod 29, which passes through an opening 30 in the arm 23 of the controller-lever. The rod 29 is provided with a nut or collar 31, which is secured to it on one side of the arm 23, and on the other side of the arm the rod carries a washer 34, which is loose thereon. A collar 35 is rigidly secured to the shaft, and between the collar 35 and the washer 34 is arranged a spring 36. With this construction it will be seen that if the rod 29 is given a longitudinal movement at the time when the roller 28 on the controller-lever is opposite the opening in the annular guard the lever will be rocked on its pivot from the position shown in Fig. 1 to the position shown in Fig. 2. If, however, the rod is given a longitudinal movement at the time when the roller 28 is not opposite the opening in the guard, it will slip through the opening 30, thus compressing or loading the spring. If the rod be held in its forward position, it will be seen that the spring will raise the controller as soon as the opening in the guard comes opposite the roller 28. Any suitable means may be provided for operating the rod 29.

In the construction shown, however, the rod is connected to one of the arms 37 of a bell-crank 37 38, which is pivoted at 39 to the machine-frame. The arm 38 will preferably be located so that it can be actuated by the foot of the operator. A latch 40 is preferably provided which takes over the end of the arm 38 of the bell-crank, so as to hold the rod in its forward position whenever it is desired that the machine remain tripped for any considerable length of time.

In the present construction, as has been before indicated, the actual work of disengaging the connections is performed by the machine itself. In other words, the setting mechanism so far described simply operates to place the controller-lever in position to be operated, after which its operation is effected

by other means. The means by which the actuation of the controller-lever is effected may be varied widely. In the present construction, however, this means consists of a cam 41, which, as shown, is integral with the disk 18 and the annular guard 27. This cam 41 comes in contact with the roll 28 of the controller-lever after the lever has been raised by the spring 36 and raises the lever, and with it the gab-hook, thus disconnecting the hook from the pin 15 on the lever 16, the parts being shown in their raised position in Fig. 4. The connection between the lever 16 and the hook being thus broken, the lever moves idly without affecting the operation of the positioning devices. An annular guard similar to that which has just been described has been heretofore used in the best classes of constructions coöperating with a stud mounted directly on the gab-hook, the gab-hook being raised by a mechanism actuated directly by the operator. With this construction it was found, however, that should the operator not start to move the gab-hook at precisely the right time he might not succeed in moving the hook far enough to cause the roller when it was opposite the opening between the ends of the guard to move completely out of the opening. When this happened, the end of the guard would strike the stud and breakage resulted. In the present construction the peculiar form of setting mechanism and the introduction of the controller obviates these difficulties to a considerable degree. In order, however, to positively insure against breakage in case the controller-lever is not moved with sufficient quickness to cause it to pass out of the opening in the annular guard, the mechanism is so constructed that one of the parts may yield should the controller-lever be struck by the lifting mechanism. The construction by which this yielding is effected may be varied widely in form. As shown, however, (see Fig. 7,) the roll 28 has connected to it a stem 42, and surrounding this stem is a spring 43, this spring being preferably located in the socket 44 in the lever 28. One of the ends of the guard 27 is preferably beveled or chamfered off, as indicated at 45. With this construction it will be seen that should the controller-lever fail to be operated at precisely the right time the beveled end 45 of the guard 27 striking the spring-mounted roller 28 will push it back against the stress of the spring and the guard will continue its rotation without breaking the stud or being itself broken, as sometimes happens in the constructions heretofore employed.

A locking mechanism is preferably employed which serves to hold the controller in the position it assumes after it has been operated by the cam 41. The construction of this locking mechanism may be varied within wide limits. In the construction shown, however, a locking-dog is employed, said dog consisting of a bell-crank lever having arms



50 51, said lever being pivoted to a bracket 52, suitably secured to the frame of the machine. This locking bell-crank lever is so arranged that when the controller-lever is in its inoperative position the arm 50 of the bell-crank rests upon the top of the arm 23 of the controller-lever. When, however, the controller-lever has been operated by the cam 41, the arm 50 drops in behind the arm 23 and holds the controller-lever in the position in which it is placed by the cam. It is apparent that the movement of the controller-lever which is produced by the cam causes its arm 23 to move away from the spring 36, the power of this spring being exhausted when it has raised the controller. Since, however, the arm 23 has moved away from the spring, there would be nothing to prevent the controller-lever from dropping when the low part of the cam comes under the roller 28 if this locking mechanism were not employed. Any suitable means may be employed for controlling the locking-lever. Preferably, however, the locking-lever will be controlled from the setting mechanism. As shown, the arm 51 of this lever has connected to it a rod 54, which passes loosely through an arm 55, suitably mounted on the rod 29 of the setting mechanism. The rod 54 has a nut 56 secured to the end thereof.

While the construction which has been described illustrates a preferred form of the invention, it is to be understood that the invention is not to be limited thereto, as the mechanism by which the various features are carried into effect may be widely varied. Furthermore, while the invention has been shown in connection with the positioning devices of a cylinder which is moved toward and away from the bed for each reciprocation of the bed it is not limited to use in such connection, but may be applied to the positioning devices of other cylinders.

What I claim is—

45 1. The combination with a cylinder, of positioning devices therefor, operating mechanism for said devices, controlling mechanism for said operating mechanism, means operated from a moving part of the machine for actuating the controlling mechanism, a setting mechanism for the controlling mechanism, and means for preventing the setting mechanism from operating on the controlling mechanism except at specified times, substantially as described.

2. The combination with a cylinder, of raising and lowering devices therefor, operating mechanism for said devices, controlling mechanism for said operating mechanism, means operated from a moving part of the machine for actuating the controlling mechanism, a setting mechanism for the controlling mechanism, and means for preventing the setting mechanism from operating on the controlling mechanism except at specified times, substantially as described.

3. The combination with a cylinder, of po-

sitioning devices therefor, a cam for operating said positioning devices, connections including separable parts between the cam and the positioning devices, a controlling mechanism for the connections, a setting mechanism for the controlling mechanism, and means for preventing the setting mechanism from operating on the controlling mechanism except at specified times, substantially as described.

4. The combination with a cylinder, of raising and lowering devices therefor, a cam for operating said raising and lowering devices, connections including separable parts between the cam and the raising and lowering devices, a controlling mechanism for the connections, a setting mechanism for the controlling mechanism, and means for preventing the setting mechanism from operating on the controlling mechanism except at specified times, substantially as described.

5. The combination with a cylinder, of raising and lowering devices therefor, a cam for operating said raising and lowering devices, connections including separable parts between the cam and the raising and lowering devices, a controlling mechanism for the connections, means operated from a moving part of the machine for actuating the controlling mechanism, a setting mechanism for the controlling mechanism, and means for preventing the setting mechanism from operating on the controlling mechanism except at specified times, substantially as described.

6. The combination with a cylinder, of positioning devices therefor, operating mechanism for said devices, a controlling mechanism for said operating mechanism, means for operating the controlling mechanism, a setting mechanism for the controlling mechanism, means for preventing the setting mechanism from operating the controlling mechanism except at specified times, and a locking device for retaining the controlling mechanism in position after it has been operated upon by the setting mechanism, substantially as described.

7. The combination with a cylinder, of positioning devices therefor, operating mechanism for said devices, a controlling mechanism for said operating mechanism, means operated from a moving part of the machine for actuating the controlling mechanism, a setting mechanism for the controlling mechanism, means for preventing the setting mechanism from operating the controlling mechanism except at specified times, and a locking device for retaining the controlling mechanism in position after it has been operated upon by the setting mechanism, substantially as described.

8. The combination with a cylinder, of raising and lowering devices therefor, operating mechanism for said devices, a controlling mechanism for said operating mechanism, means for operating the controlling mechanism, a setting mechanism for the controlling



5 mechanism in position after it has been operated upon by the setting mechanism, substantially as described.

10 mechanism for said devices, a controlling  
mechanism for said operating mechanism,  
means operated from a moving part of the ma-  
chine for actuating the controlling mechan-  
ism, a setting mechanism for the controlling  
15 mechanism, means for preventing the setting  
mechanism from operating the controlling  
mechanism except at specified times, and a  
locking device for retaining the controlling  
mechanism in position after it has been oper-  
20 ated upon by the setting mechanism, substan-  
tially as described.

25 ism for said operating mechanism, means for operating the controlling mechanism, a setting mechanism for the controlling mechanism, means for preventing the setting mechanism from operating the controlling mechanism except at specified times, and a locking device controlled by the setting mechanism for retaining the controlling mechanism in position after it has been operated upon by the setting mechanism, substantially as described.

40 operated from a moving part of the machine for actuating the controlling mechanism, a setting mechanism for the controlling mechanism, means for preventing the setting mechanism from operating the controlling mechanism  
45 except at specified times, and a locking device controlled by the setting mechanism for retaining the controlling mechanism in position after it has been operated upon by the setting mechanism, substantially as  
50 described.

ism, means for operating the controlling mechanism, a setting mechanism for the controlling mechanism, means for preventing the setting mechanism from operating the controlling mechanism except at specified times, and a locking device controlled by the setting mechanism for retaining the controlling mechanism in position after it has been operated upon by the setting mechanism, substantially as described.

65 13. The combination with a cylinder, of raising and lowering devices therefor, operating mechanism for said devices, a control-

ling mechanism for said operating mechanism, means operated from a moving part of the machine for actuating the controlling mechanism, a setting mechanism for the controlling mechanism, means for preventing the setting mechanism from operating the controlling mechanism except at specified times, and a locking device controlled by the setting mechanism for retaining the controlling mechanism in position after it has been operated upon by the setting mechanism, substantially as described.

14. The combination with a cylinder, of po- 80  
sitioning devices therefor, a cam for operat-  
ing said positioning devices, connections in-  
cluding separable parts between the cam and  
the positioning devices, a controller, a set-  
ting mechanism therefor, and a guard mov- 85  
ing with the cam for preventing the setting  
mechanism from operating the controller ex-  
cept at specified times, substantially as de-  
scribed.

15. The combination with a cylinder, of 90  
raising and lowering devices therefor, a cam  
for operating said devices, connections in-  
cluding separable parts between the cam and  
the raising and lowering devices, a controller,  
a setting mechanism therefor, and a guard 95  
moving with the cam for preventing the set-  
ting mechanism from operating the controller  
except at specified times, substantially as de-  
scribed.

16. The combination with a cylinder, of po- 100  
sitioning devices therefor, a cam for operat-  
ing said positioning devices, connections in-  
cluding separable parts between the cam and  
the positioning devices, a controller, a set-  
ting mechanism therefor, a guard moving 105  
with the cam for preventing the setting mech-  
anism from operating the controller except  
at specified times, and a locking device for  
retaining the controller in position after it  
has been operated upon by the setting mech- 110  
anism, substantially as described.

17. The combination with a cylinder, of raising and lowering devices therefor, a cam for operating said raising and lowering devices, connections including separable parts between the cam and the raising and lowering devices, a controller, a setting mechanism therefor, a guard moving with the cam for preventing the setting mechanism from operating the controller except at specified times, and a locking device for retaining the controller in position after it has been operated upon by the setting mechanism, substantially as described.

18. The combination with a cylinder, of positioning devices therefor, a cam for operating said positioning devices, connections including separable parts between the cam and the positioning devices, a controller, a setting mechanism therefor, a guard moving with the cam for preventing the setting mechanism from operating the controller except at specified times, and a locking device controlled by the setting mechanism for retaining the con-



troller in position after it has been operated upon by the setting mechanism, substantially as described.

19. The combination with a cylinder, of raising and lowering devices therefor, a cam for operating said raising and lowering devices, connections including separable parts between the cam and the raising and lowering devices, a controller, a setting mechanism therefor, a guard moving with the cam for preventing the setting mechanism from operating the controller except at specified times, and a locking device controlled by the setting mechanism for retaining the controller in position after it has been operated upon by the setting mechanism, substantially as described.

20. The combination with a cylinder, of positioning devices therefor, a cam for operating said positioning devices, connections including a rock-lever operated by the cam and a gab-hook between the cam and the positioning devices, a controller-lever for lifting the gab-hook, means actuated from a moving part of the machine for operating the controller-lever to lift the gab-hook, a setting mechanism for positioning said lever so as to be actuated by its operating means, and a guard for preventing the setting mechanism from acting upon the controller-lever except at specified times, substantially as described.

21. The combination with a cylinder, of raising and lowering devices therefor, a cam for operating said devices, connections including a rock-lever operated by the cam and a gab-hook between the cam and the raising and lowering devices, a controller-lever for lifting the gab-hook, means actuated from a moving part of the machine for operating the controller-lever to lift the gab-hook, a setting mechanism for positioning said lever so as to be actuated by its operating means, and a guard for preventing the setting mechanism from acting upon the controller-lever except at specified times, substantially as described.

22. The combination with a cylinder, of positioning devices therefor, a cam for operating said devices, connections including a rock-lever operated by the cam and a gab-hook between the cam and the positioning devices, a controller-lever for lifting the gab-hook, means actuated from a moving part of the machine for operating the controller-lever to lift the gab-hook, a setting mechanism for positioning said lever so as to be actuated by its operating means, a guard for preventing the setting mechanism from acting upon the controller-lever except at specified times, and a locking device for retaining the controller in position after it has been operated upon by the setting mechanism, substantially as described.

23. The combination with a cylinder, of raising and lowering devices therefor, a cam for operating said devices, connections including a rock-lever operated by the cam and a gab-hook between the cam and the raising

and lowering devices, a controller-lever for lifting the gab-hook, means actuated from a moving part of the machine for operating the controller-lever to lift the gab-hook, a setting mechanism for positioning said lever so as to be actuated by its operating means, a guard for preventing the setting mechanism from acting upon the controller-lever except at specified times, and a locking device for retaining the controller in position after it has been operated upon by the setting mechanism, substantially as described.

24. The combination with a cylinder, of positioning devices therefor, a cam for operating said devices, connections including a rock-lever operated by the cam and a gab-hook between the cam and the positioning devices, a controller-lever for lifting the gab-hook, means actuated from a moving part of the machine for operating the controller-lever to lift the gab-hook, a setting mechanism for positioning said lever so as to be actuated by its operating means, a guard for preventing the setting mechanism from acting upon the controller-lever except at specified times, and a locking device controlled by the setting mechanism for retaining the controller in position after it has been operated upon by the setting mechanism, substantially as described.

25. The combination with a cylinder, of raising and lowering devices therefor, a cam for operating said devices, connections including a rock-lever operated by the cam and a gab-hook between the cam and the raising and lowering devices, a controller-lever for lifting the gab-hook, means actuated from a moving part of the machine for operating the controller-lever to lift the gab-hook, a setting mechanism for positioning said lever so as to be actuated by its operating means, a guard for preventing the setting mechanism from acting upon the controller-lever except at specified times, and a locking device controlled by the setting mechanism for retaining the controller in position after it has been operated upon by the setting mechanism, substantially as described.

26. The combination with a cylinder, of positioning devices therefor, a rotating cam for operating said devices, connections including a lever and a gab-hook between the cam and the positioning devices, a controller-lever for lifting the gab-hook, a setting mechanism for said lever, a guard rotating with the cam for preventing said setting mechanism from operating on the controller-lever except at specified times, and a rotating cam for operating said controller-lever, substantially as described.

27. The combination with a cylinder, of raising and lowering devices therefor, a rotating cam for operating said devices, connections including a lever and a gab-hook between the cam and the raising and lowering devices, a controller-lever for lifting the gab-hook, a setting mechanism for said lever, a guard rotating with the cam for preventing said setting



mechanism from operating on the controller-lever except at specified times, and a rotating cam for operating said controller-lever, substantially as described.

5 28. The combination with a cylinder, of positioning devices therefor, a rotating cam for operating said devices, connections including a lever and a gab-hook between the cam and the positioning devices, a controller-lever for  
10 lifting the gab-hook, a setting mechanism for said lever, a guard rotating with the cam for preventing said setting mechanism from operating on the controller-lever except at specified times, a rotating cam for operating said  
15 controller-lever, and a locking device for retaining the controller in position after it has been operated upon by the setting mechanism, substantially as described.

29. The combination with a cylinder, of  
20 raising and lowering devices therefor, a rotating cam for operating said devices, connections including a lever and a gab-hook between the cam and the raising and lowering devices, a controller-lever for lifting the gab-hook, a setting mechanism for said lever, a guard rotating  
25 with the cam for preventing said setting mechanism from operating on the controller-lever except at specified times, a rotating cam for operating said controller-lever, and a locking  
30 device for retaining the controller in position after it has been operated upon by the setting mechanism, substantially as described.

30. The combination with a cylinder, of  
35 positioning devices therefor, a rotating cam for operating said devices, connections including a lever and a gab-hook between the cam and the positioning devices, a controller-lever for lifting the gab-hook, a setting mechanism for  
40 said lever, a guard rotating with the cam for preventing said setting mechanism from operating on the controller except at specified times, a rotating cam for operating said controller-lever, and a locking device controlled  
45 by the setting mechanism for retaining the controller in position after it has been operated upon by the setting mechanism, substantially as described.

31. The combination with a cylinder, of  
50 raising and lowering devices therefor, a rotating cam for operating said devices, connections including a lever and a gab-hook between the cam and the raising and lowering devices, a controller-lever for lifting the gab-hook, a  
55 setting mechanism for said lever, a guard rotating with the cam for preventing said setting mechanism from operating on the controller except at specified times, a rotating cam for operating said controller-lever, and  
60 a locking device controlled by the setting mechanism for retaining the controller in position after it has been operated upon by the setting mechanism, substantially as described.

32. The combination with a cylinder, of  
65 positioning devices therefor, an operating mechanism for said devices, devices for rendering said operating mechanism inoperative, a mov-

ing guard for preventing the operation of said last-named devices except at specified times, and means whereby a yielding action is permitted between the guard and said devices  
70 in case they come in contact, said means including a part which is capacitated to move at an angle to the plane containing the guard, substantially as described. 75

33. The combination with a cylinder, of raising and lowering devices therefor, an operating mechanism for said devices, devices for rendering said operating mechanism inoperative, a moving guard for preventing the  
80 operation of said last-named devices except at specified times, and means whereby a yielding action is permitted between the guard and said devices in case they come in contact, substantially as described. 85

34. The combination with a cylinder, of positioning devices therefor, an operating mechanism for said devices, a controlling mechanism for said operating mechanism, a moving  
90 guard for preventing the operation of said controlling mechanism except at specified times, and means whereby a yielding action is permitted between the guard and said controlling mechanism in case they come into  
95 contact, said means including a part which is capacitated to move at an angle to the plane of the guard, substantially as described.

35. The combination with a cylinder, of raising and lowering devices therefor, an operating mechanism for said devices, a controlling  
100 mechanism for said operating mechanism, a moving guard for preventing the operation of said controlling mechanism except at specified times, and means whereby a yielding action is permitted between the guard and said  
105 controlling mechanism in case they come into contact, substantially as described.

36. The combination with a cylinder, of positioning devices therefor, an operating mechanism for said devices, a controlling mechanism  
110 for said operating mechanism, a rotating guard for preventing the operation of said controlling mechanism except at specified times, and means whereby a yielding action is permitted between the guard and said controlling  
115 mechanism in case they come into contact, said means including a part which is capacitated to move at an angle to the plane of the guard, substantially as described.

37. The combination with a cylinder, of  
120 positioning devices therefor, an operating mechanism for said devices, a controlling mechanism for said operating mechanism, means operated from a moving part of the machine for actuating said controlling mechanism, a moving  
125 guard for preventing the operation of the controlling mechanism except at specified times; and means whereby a yielding action is permitted between the guard and said controlling mechanism in case they come into  
130 contact, substantially as described.

38. The combination with a cylinder, of positioning devices therefor, an operating mechanism for said devices, a controlling mechanism



ism for said operating mechanism, means operated from a moving part of the machine for actuating said controlling mechanism, a rotating guard for preventing the operation of the controlling mechanism except at specified times, and means whereby a yielding action is permitted between the guard and said controlling mechanism in case they come into contact, substantially as described.

39. The combination with a cylinder, of raising and lowering devices therefor, an operating mechanism for said devices, a controlling mechanism for said operating mechanism, a rotating guard for preventing the operation of said controlling mechanism except at specified times, and means whereby a yielding action is permitted between the guard and said controlling mechanism in case they come into contact, substantially as described.

40. The combination with a cylinder, of positioning devices therefor, a cam for operating said devices, connections including separable parts between the cam and the positioning devices, a controller, a setting mechanism therefor, a rotating guard for preventing the setting mechanism from operating on the controller except at specified times, and means whereby a yielding action is permitted between the guard and said controller in case they come into contact, said means including a part which is capacitated to move at an angle to the plane of the guard, substantially as described.

41. The combination with a cylinder, of raising and lowering devices therefor, a cam for operating said devices, connections including separable parts between the cam and the raising and lowering devices, a controller, a setting mechanism therefor, a rotating guard for preventing the setting mechanism from operating on the controller except at specified times, and means whereby a yielding action is permitted between the guard and said controller in case they come into contact, substantially as described.

42. The combination with a cylinder, of positioning devices therefor, a cam for operating said devices, connections including separable parts between the cam and the positioning devices, a controller, a setting mechanism therefor, a rotating guard for preventing the setting mechanism from operating the controller except at specified times, means for permitting a yielding action between the guard and the controller, and a locking device for retaining the controller in position after it has been operated upon by the setting mechanism, substantially as described.

43. The combination with a cylinder, of raising and lowering devices therefor, a cam for operating said devices, connections including separable parts between the cam and the raising and lowering devices, a controller, a setting mechanism therefor, a rotating guard for preventing the setting mechanism

from operating the controller except at specified times, means for permitting a yielding action between the guard and the controller, and a locking device for retaining the controller in position after it has been operated upon by the setting mechanism, substantially as described.

44. The combination with a cylinder, of positioning devices therefor, a cam for operating said devices, connections including separable parts between the cam and the positioning devices, a controller, means for operating said controller to separate the connections, a rotating guard for preventing the operation of the controller except at specified times, said controller carrying a yielding part upon which the guard operates, substantially as described.

45. The combination with a cylinder, of raising and lowering devices therefor, a cam for operating said devices, connections including separable parts between the cam and the raising and lowering devices, a controller, means for operating said controller to separate the connections, a rotating guard for preventing the operation of the controller except at specified times, said controller carrying a yielding part upon which the guard operates, substantially as described.

46. The combination with a cylinder, of positioning devices therefor, a cam for operating said positioning devices, connections including separable parts between the cam and the positioning devices, a controller-lever, a setting mechanism therefor, a rotating guard, and a yieldingly-mounted stud on the controller-lever with which the rotating guard coöperates, substantially as described.

47. The combination with a cylinder, of raising and lowering devices therefor, a cam for operating said raising and lowering devices, connections including separable parts between the cam and the raising and lowering devices, a controller-lever, a setting mechanism therefor, a rotating guard, and a yieldingly-mounted stud on the controller-lever with which the rotating guard coöperates, substantially as described.

48. The combination with a cylinder, of positioning devices therefor, a cam for operating said positioning devices, connections including separable parts between the cam and the positioning devices, a controller-lever, a setting mechanism therefor, an operating-cam for the lever, a rotating guard, and a yieldingly-mounted stud on the controller-lever with which the rotating guard coöperates, substantially as described.

49. The combination with a cylinder, of raising and lowering devices therefor, a cam for operating said raising and lowering devices, connections including separable parts between the cam and the raising and lowering devices, a controller-lever, a setting mechanism therefor, an operating-cam for the lever, a rotating guard, and a yieldingly-mounted



stud on the controller-lever with which the rotating guard coöperates, substantially as described.

50. The combination with a cylinder, of positioning devices therefor, a cam for operating said positioning devices, connections including separable parts between the cam and the positioning devices, a controller-lever, a setting mechanism therefor, an operating-cam for the lever, a rotating guard, a yielding-mounted stud on the controller-lever with which the rotating guard coöperates, and a locking device for the controller-lever controlled by the setting mechanism, substantially as described.

51. The combination with a cylinder, of raising and lowering devices therefor, a cam for operating said raising and lowering devices, connections including separable parts between the cam and the raising and lowering devices, a controller-lever, a setting mechanism therefor, an operating-cam for the lever, a rotating guard, a yielding-mounted stud on the controller-lever with which the rotating guard coöperates, and a locking device for the controller-lever controlled by the setting mechanism, substantially as described.

52. The combination with a cylinder, of positioning devices therefor, a cam for operating said devices, connections including separable parts between the cam and said positioning devices, a controller for said connections, a rotating guard for preventing the operation of the controller except at specified times, said guard having a beveled end, a yielding-mounted stud with which the guard coöperates, and means for operating the controller, substantially as described.

53. The combination with a cylinder, of positioning devices therefor, a cam for operating said devices, connections including separable parts between the cam and said positioning devices, a controller for said connections, a rotating guard for preventing the operation of the controller except at specified times, said guard having a beveled end, a yielding-mounted stud with which the guard coöperates, and a cam for operating the controller, substantially as described.

54. The combination with a cylinder, of positioning devices therefor, a cam for operating said devices, connections including separable parts between the cam and said positioning devices, a controller for said connections, a setting mechanism for the controller, a rotating guard for preventing the setting mechanism from operating the controller except at specified times, said guard having a beveled end, a yielding-mounted stud on the controller with which said guard coöperates, and means for operating the controller, substantially as described.

55. The combination with a cylinder, of positioning devices therefor, a cam for operating said devices, connections including separable parts between the cam and said positioning devices, a controller for said connections, a setting mechanism for the controller, a rotating guard for preventing the setting mechanism from operating the controller except at specified times, said guard having a beveled end, a yielding-mounted stud on the controller with which said guard coöperates, and a cam for operating the controller, substantially as described.

tions, a setting mechanism for the controller, a rotating guard for preventing the setting mechanism from operating the controller except at specified times, said guard having a beveled end, a yielding-mounted stud on the controller with which said guard coöperates, and a cam for operating the controller, substantially as described.

56. The combination with a cylinder, of positioning devices therefor, a rotating cam for operating said devices, connections including a lever and a gab-hook between the cam and said devices, a controller-lever for lifting the gab-hook, a setting mechanism for said lever, a rotating guard, and a yielding-mounted stud on the controller-lever with which the guard coöperates, substantially as described.

57. The combination with a cylinder, of positioning devices therefor, a rotating cam for operating said devices, connections including a lever and a gab-hook between the cam and said devices, a controller-lever for lifting the gab-hook, a setting mechanism for said lever, a rotating guard, a yielding-mounted stud on the controller-lever with which the guard coöperates, and a locking device for retaining the controller-lever in position after it has been operated upon by the setting mechanism, substantially as described.

58. The combination with a cylinder, of positioning devices therefor, an operating mechanism for said devices, a bell-crank controller-lever for said operating mechanism, means for operating said lever, and a pivoted dog operating to hold the controller-lever in position after it has been acted upon by its operating mechanism, substantially as described.

59. The combination with a cylinder, of positioning devices therefor, a cam for operating said devices, connections including a lever and gab-hook between the cam and positioning devices, a bell-crank controller-lever for operating the gab-hook, a setting mechanism for the controller-lever including a spring-rod, a pivoted locking-dog operating to hold the controller-lever in position after it has been acted upon by the setting mechanism, and connections between the dog and the rod, substantially as described.

60. The combination with a cylinder, of positioning devices therefor, a cam for operating said devices, connections including a lever and a gab-hook between the cam and the positioning devices, a bell-crank controller-lever for the gab-hook, a rotating cam for operating the lever, a rotating guard for preventing the operation of the lever except at specified times, a yielding-mounted stud on the lever with which the guard coöperates, a setting mechanism including a spring-mounted rod, a pivoted locking-dog for the controller-lever, and connections between the dog and the spring-rod, substantially as described.

61. The combination with a cylinder, of positioning devices therefor, a cam for operating said devices, connections including separable parts between the cam and said de-



vices, a controller-lever for said connections, a rotating cam for operating the lever, a setting mechanism including a spring-pressed rod for the lever, actuating devices for the  
5 rod, means for locking the rod in its operative position, and means for preventing it from operating on the controller-lever except at specified times, substantially as described.

62. The combination with a cylinder, of po-  
10 sitioning devices therefor, a cam for operating said devices, separable connections between the cam and said devices, a controller-lever, an operating-cam therefor, a setting mechanism including a spring-pressed rod,  
15 means for actuating the rod, a locking device for said actuating means, a rotating guard for preventing the actuation of the controller-lever except at specified times, and a yieldingly-mounted stud on the lever with which  
20 the guard coöperates, substantially as described.

63. The combination with a cylinder, of po-

sitioning devices therefor, a cam for operating said devices, separable connections between the cam and the positioning devices, a  
25 controller-lever for said connections, a cam for operating said lever, a setting mechanism for said lever, said mechanism including a spring-pressed rod, a rotating guard for preventing the operation of the lever except at  
30 specified times, a yieldingly-mounted stud with which the guard coöperates, means for actuating the rod, a locking device for said actuating means, and a locking device for  
35 said controller-lever, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOSEPH WHITE.

Witnesses:

F. W. H. CRANE,  
L. ROEHM.