

No. 648,424.

Patented May 1, 1900.

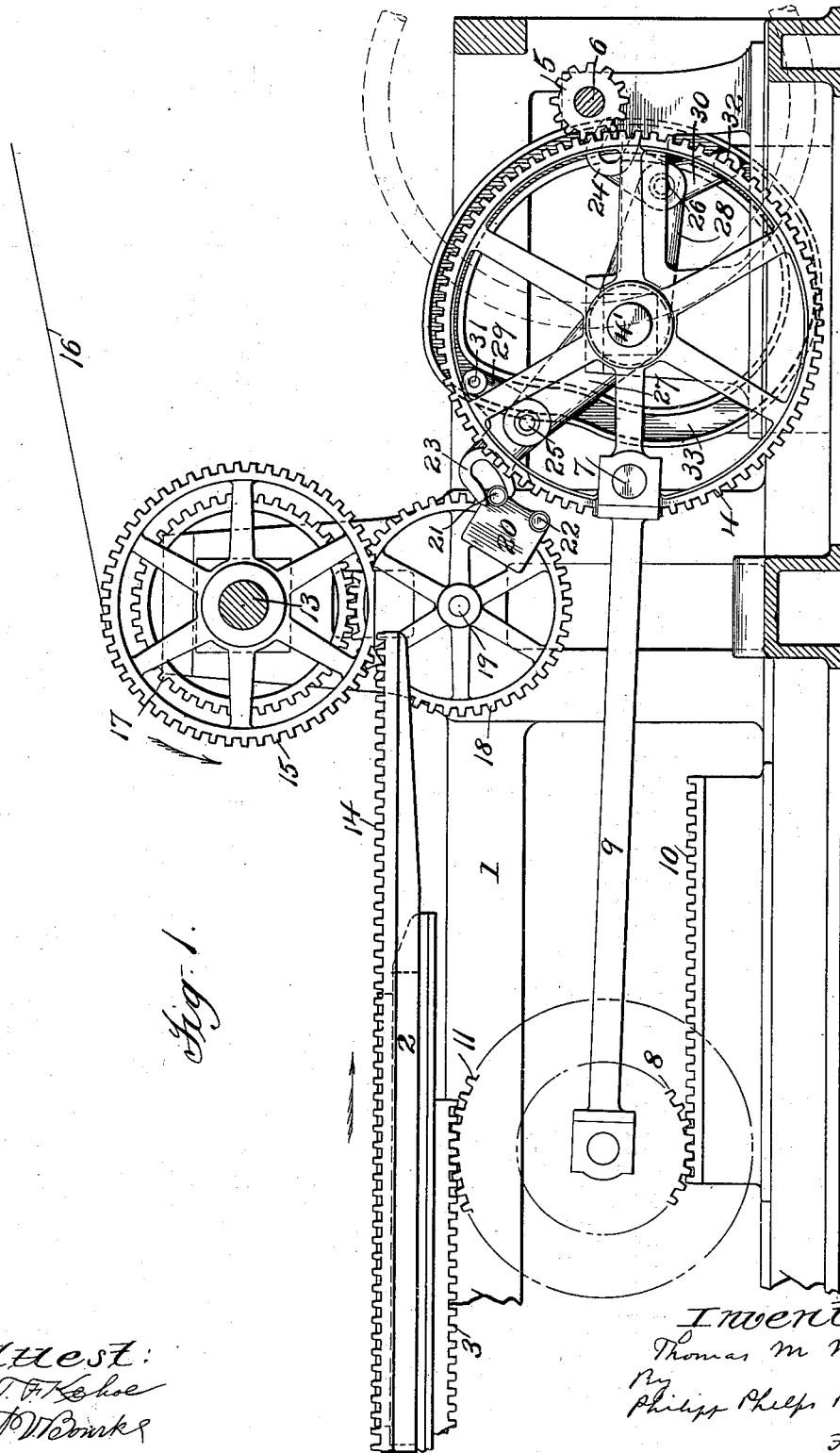
T. M. NORTH.

CYLINDER CONTROLLING MECHANISM FOR PRINTING MACHINES.

(Application filed July 10, 1899.)

(No Model.)

3 Sheets—Sheet 1.



Attest:  
O. F. Schoe  
J. W. Brink

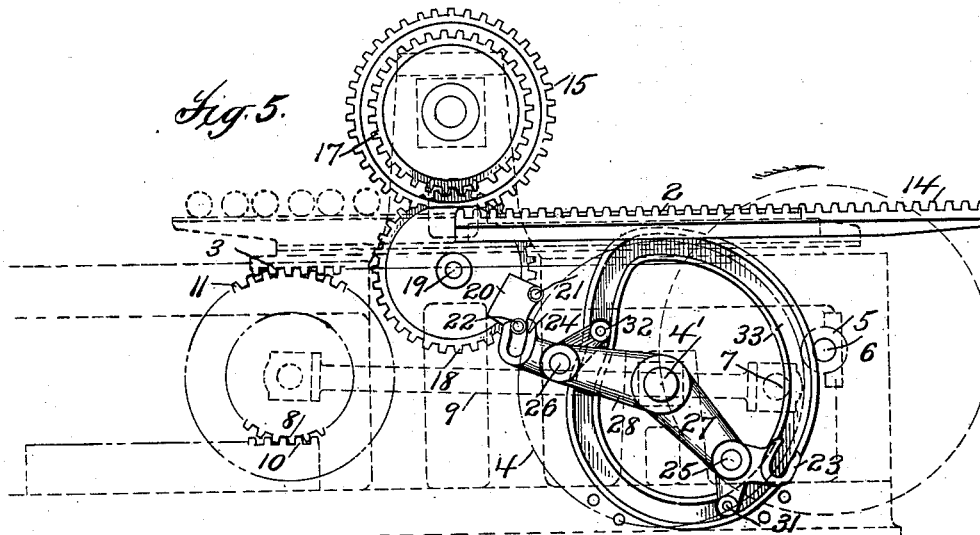
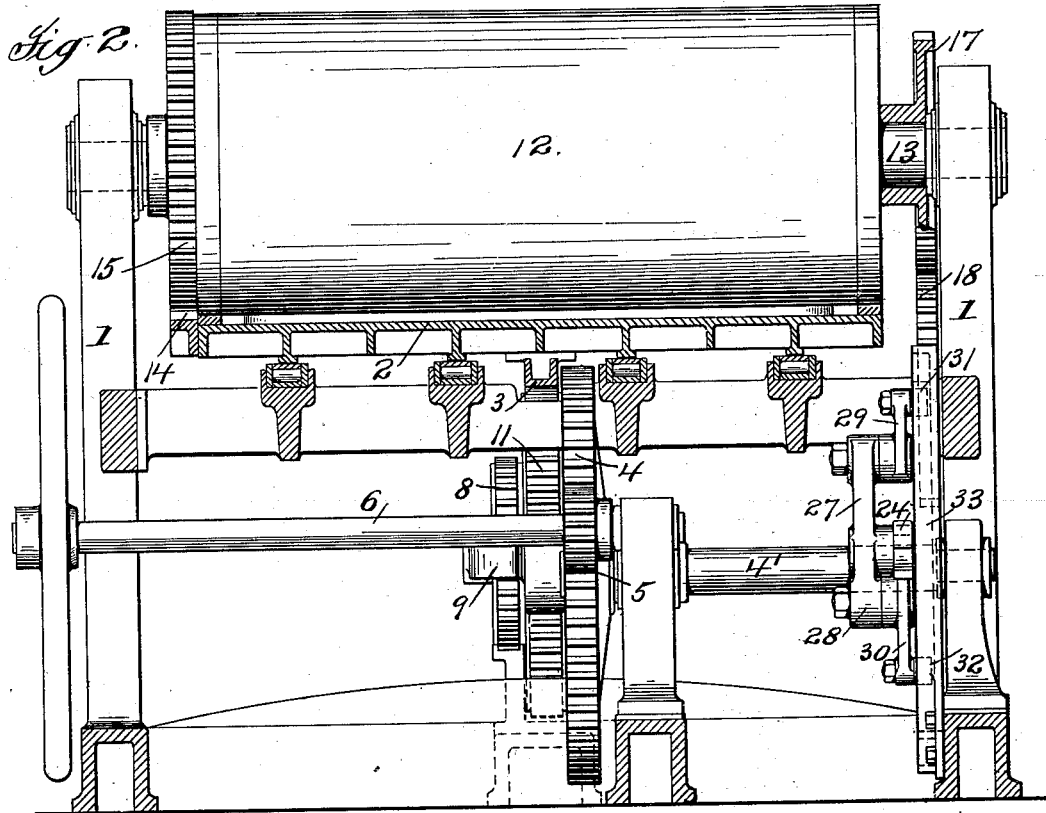
Inventor:  
Thomas M. North  
By Philip Phelps Stanger  
Attys

T. M. NORTH,  
CYLINDER CONTROLLING MECHANISM FOR PRINTING MACHINES.

(Application filed July 10, 1899.)

3 Sheets—Sheet 2.

(No Model.)



Attest:  
T. O. K. Hae  
A. T. Bowker.

Inventor:  
Thomas M. North  
By Philip Phelps Sanger  
Attys

CYLINDER CONTROLLING MECHANISM FOR PRINTING MACHINES.

(Application filed July 10, 1899.)

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3 Sheets—Sheet 3.

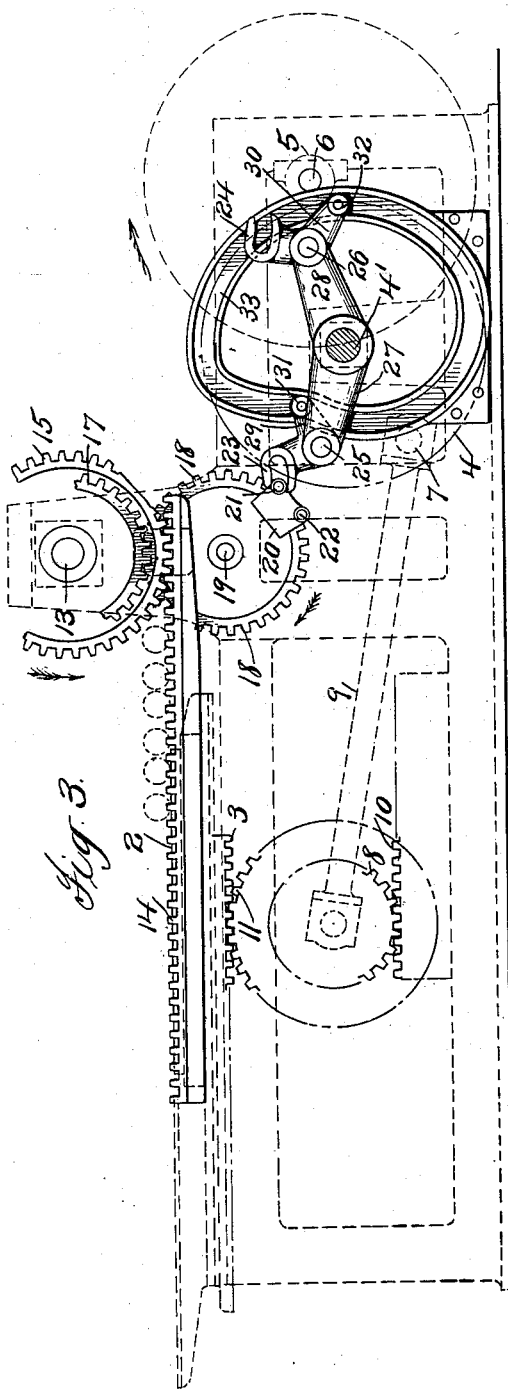


Fig. 3.

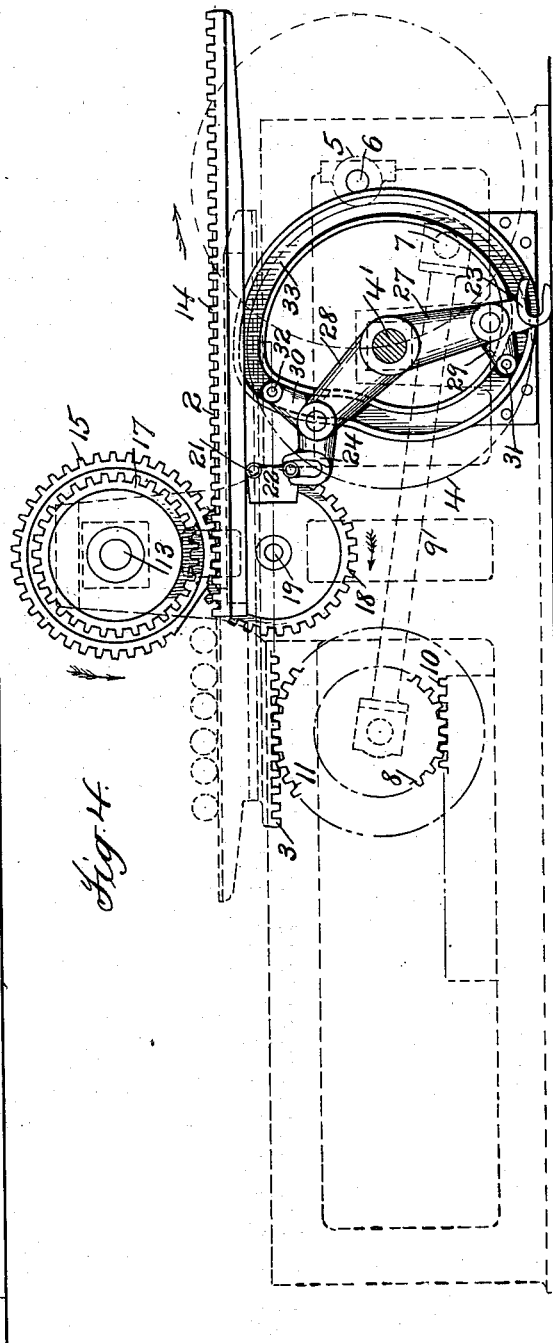


Fig. 4.

Attest:  
T. C. Schae  
A. T. Bourke

Inventor  
Thomas M. North  
By  
Philip Phelps Sanger  
Attys

# UNITED STATES PATENT OFFICE.

THOMAS M. NORTH, OF NEW YORK, N. Y., ASSIGNOR TO ROBERT HOE,  
THEODORE H. MEAD, AND CHARLES W. CARPENTER, OF SAME PLACE.

## CYLINDER-CONTROLLING MECHANISM FOR PRINTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 648,424, dated May 1, 1900.

Application filed July 10, 1899. Serial No. 723,311. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS M. NORTH, a subject of the Queen of Great Britain and Ireland, residing at New York city, county of Kings, and State of New York, have invented certain new and useful Improvements in Cylinder-Controlling 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 cylinder-controlling mechanism, said mechanism being more particularly intended for use in connection with the cylinders of bed-and-cylinder machines of the stop-cylinder class. As is well known in machines of this class the cylinder is driven in synchronism with the bed and usually by the bed during a part of the complete reciprocation, after which it is brought to a stop and remains stationary while the bed reverses and returns. The cylinder may either have a low side to permit the bed to pass it on its return or the separation of the bed and cylinder on the return stroke of the bed may be effected in any suitable way—as, for instance, by using any of the ordinary forms of raising and lowering devices.

Many forms of controlling mechanism have been devised which take the cylinder at some point between the end of the printing operation and the end of the stroke of the bed and bring it to a gradual and easy stop, and after the bed has reversed and returned and again started on its printing stroke these devices act to start the cylinder with a gradually-accelerating motion and bring it up to the speed of the bed, after which it is again engaged by the bed. These devices have, however, usually been in the form of oscillating racks or else they have depended upon irregular gears, and in either case the constructions have been more or less unsatisfactory and are also expensive and complicated.

It is the object of this invention to produce a simple, cheap, and exceedingly efficient mechanism which will operate to take the cylinder prior to the end of the stroke of the bed and after the printing operation and bring it

to an easy and gradual stop to permit the reversing and return of the bed and after this to start it up with a gradually-accelerating motion and bring it up to the speed of the bed, so that it may again be driven in synchronism therewith during the printing operation.

With these and other objects in view the invention consists in certain constructions, parts, improvements, and combinations, as will be hereinafter described, and more particularly pointed out in the claims hereunto appended.

In the accompanying drawings, Figure 1 indicates a side view of a bed-and-cylinder printing-machine of the stop-cylinder type, illustrating one embodiment of the invention. Fig. 2 is a sectional end elevation of the construction shown in Fig. 1. Fig. 3 is a side view, on a smaller scale, illustrating the position of the cylinder and stopping devices just after the bed has begun its printing stroke and at the time when the controlling mechanism after having brought the cylinder up to the speed of the bed is about to release it. Fig. 4 is a view similar to Fig. 3, but illustrating the position of the cylinder and the controlling devices as the bed is about to complete its printing stroke and the controlling devices are assuming control of the cylinder and about to bring it to a stop. Fig. 5 is a view similar to Fig. 3, showing the cylinder and controlling devices in the position they occupy when the controlling devices have brought the cylinder to a stop and the bed is beginning its return movement.

Referring to the drawings, 1 indicates the frame of the machine, and 2 the bed. The bed may be driven in any desired manner by any of the usual forms of bed-driving mechanism. Preferably, however, it will be driven by a crank mechanism of the character illustrated in the drawings, in which a crank gear-wheel 4, mounted on a shaft 4' and driven from a pinion 5 on a pulley-shaft 6, is provided with a crank-stud 7, which drives a railroad-gear 8 through the medium of a connecting-rod 9, said gear-wheel meshing with stationary rack 10 and being provided with an additional gear 11, which engages the rack 3. The cylinder 12 is shown as mounted on

a cylinder-shaft 13, which finds its bearings in uprights in the frame, as is common.

The cylinder may be driven in any of the well-known ways, so as to cause it to move in synchronism with the bed during the printing operation, and it may be driven either from the bed or by an independent mechanism. Preferably, however, the bed is provided with an ordinary register-rack 14, which engages a segment 15, secured to the cylinder-shaft. The cylinder is fed from the feed-board (indicated at 16) and is provided with the usual sheet-taking devices which are omitted from the illustration, inasmuch as they form no part of the present invention.

As is usual in this class of machines the cylinder will be brought to a stop at the completion of the printing stroke of the bed, and there is provided a controlling mechanism which serves to take the cylinder at or near the end of the printing stroke and bring it to an easy and gradual stop, at which time the untoothed portion of the segment 15 will be opposite the rack 14 and the low side of the cylinder will be opposite the bed. The cylinder after being thus stopped remains stopped while the bed reverses, completes its return reciprocation, and again reverses, after which the controlling mechanism operates to start the cylinder with an easy and gradually-accelerating movement until it is brought up to the speed of the bed, at which time the register-rack 14 engages the segment 15, and the cylinder and bed move in exact synchronism during the printing stroke.

The controlling mechanism may be widely varied within the limits of the invention. In the machine shown the cylinder-shaft carries a gear 17, which meshes with a gear 18, journaled on a stud 19, fast in the frame. This gear 18 carries a block 20, secured thereto in any suitable manner, said block being provided with studs or rollers 21 and 22.

In the form of controlling mechanism which is preferably used the rollers 21 and 22 are engaged by coupling-levers 23 and 24. The coupling-levers 23 and 24 are pivoted on studs 25 and 26, said studs being carried on arms 27 and 28. The levers 23 and 24 are provided with extensions 29 and 30, said extensions carrying roller-studs 31 and 32, which engage the groove of the path-cam 33, suitably mounted on the frame of the machine. The arms 27 and 28, which carry the levers before referred to, are mounted on the crank-shaft 4' and revolve with said shaft.

In Patent No. 629,087, granted July 18, 1899, I have shown and described a coupling-lever mechanism similar to that which is herein shown and described, the said mechanism being used for the purpose in that patent of starting and stopping the impression-cylinder of a rotary stop-cylinder printing-machine. The specific operation of this mechanism is fully set forth in said patent, and reference is made thereto for a detailed description of the

operation of this part of the mechanism. For the purpose of this application it is sufficient to say that as the bed starts on its printing stroke, the parts being then in the position shown in Fig. 1, the lever 23 engages the stud 21 on the gear 18. As the crank-shaft revolves and the bed moves to the right the lever 23, acting on the stud 21 and being in turn rotated by its carrying-arm 27 and at the same time being acted upon by the path-cam 33 through the extension 29 and roller-stud 31, produces a gradually-accelerated movement of the gear. This movement is due not only to the advancing movement of the lever 23, produced by its movement around the axis of the shaft 4', but is also due to the fact that the engaging surface of the lever is constantly changing its inclination with respect to the path of movement of the lever. This compound movement of the lever, as has been stated, produces a gradually-accelerated motion of the gear, and this motion is transmitted to the cylinder. The cylinder is therefore started with an easy, gradual, and constantly-accelerating motion until it is brought up to the speed of the bed and its segment 15 is caused to engage with the register-rack 14 on the bed. This position of the parts is shown in Fig. 3. Shortly after the rack 14 has fully engaged the segment 15 the lever 23 is disengaged from the roller 21. The cylinder is now entirely under the control of the bed and is driven from the rack 14, and this relation of the parts continues until the bed has nearly completed its printing stroke. At the time when the cylinder has nearly completed its printing stroke, which position of the parts is shown in Fig. 4, the lever 24 is caused to engage the stud 22, the lever at this time of course traveling at the speed of the gear 18. The reverse of the operation previously described now occurs—that is to say, as the lever 24 advances its engaging surface is caused to change its inclination with respect to the path in which the lever travels, so that the lever causes the gear to move at a gradually-decreasing speed, the rack 14 having at this time run out of mesh with the segment 15 and to continue this movement until the untoothed portion of the segment 15 is brought opposite the rack 14. At this time the cylinder, through the operation of the lever 24, stud 22, and gear 18, is brought to a full stop and remains in this position, with the low side opposite the bed, until the bed reverses, returns, and again reverses, after which the cycle of operations which have been described is repeated.

If thought desirable, any convenient form of locking or brake mechanism, or both, may be used with the cylinder; but inasmuch as these mechanisms are common in the art and have no relation to the invention they are not herein illustrated.

While the invention has been shown in connection with a stop-cylinder having a low side to permit the bed to return, it is to be under-

stood that it might be used with any other form of stop-cylinder machine—as, for instance, a machine in which the cylinder is raised to permit the bed to return.

5 While, furthermore, the invention is particularly applicable to stop-cylinder machines, it is not necessarily limited to machines in which the cylinder remains quiescent while the bed reverses and returns; but  
10 it is applicable to all bed-and-cylinder machines in which the movement of the cylinder is to be varied with relation to the bed when the two are not moving in synchronism.

While, also, the specific construction of the  
15 engaging surfaces and the means by which they are operated to control the cylinder is considered preferable, the invention is by no means limited to such constructions, inasmuch as it is possible to vary such constructions within wide limits without departing  
20 from the principle of the invention.

While, also, in the present machine the controlling mechanism is caused to take the cylinder near the end of the printing stroke of  
25 the bed and to release it to the bed near the beginning of said stroke, it is to be understood that the limits within which the controlling mechanism is brought into action may be widely varied, inasmuch as it is only  
30 necessary for the cylinder to move in synchronism with the bed during that part of the stroke in which the printing operation takes place.

While, also, it is considered particularly desirable to mount the levers or engaging surfaces on a rotating carrier, so as to gain the manifest and important advantages of a rotating movement, constructions might be devised in which the engaging surfaces that control  
40 the cylinder are otherwise mounted.

The invention is not, therefore, limited to the specific construction shown and described.

What is claimed is—

1. In a bed-and-cylinder printing-machine,  
45 the combination with the cylinder, of means for driving it in synchronism with the bed during a part of a complete reciprocation of the bed, and a controlling mechanism for varying the speed of the cylinder with relation  
50 to the bed when it is not driven in synchronism with the bed, said controlling mechanism including traveling engaging surfaces, one of which is movable, and means for giving it a movement with relation to its path of travel,  
55 substantially as described.

2. In a bed-and-cylinder printing-machine, the combination with the cylinder, of means for driving it in synchronism with the bed during a part of a complete reciprocation of  
60 the bed, and a rotating controlling mechanism for varying the speed of the cylinder with relation to the bed when it is not driven in synchronism with the bed, said controlling mechanism including engaging surfaces, one  
65 of which is movable, and means for giving it a movement with relation to its path of rotation, substantially as described.

3. In a bed-and-cylinder printing-machine, the combination with a stop-cylinder, of means for driving it in synchronism with the bed  
70 during a part of a complete reciprocation of the bed, and a controlling mechanism for stopping and starting the cylinder, said controlling mechanism including traveling engaging surfaces, one of which is movable, and  
75 means for giving it a movement with relation to its path of travel, substantially as described.

4. In a bed-and-cylinder printing-machine, the combination with a stop-cylinder, of means  
80 for driving it in synchronism with the bed during a part of a complete reciprocation of the bed, and a rotating controlling mechanism for stopping and starting the cylinder, said controlling mechanism including engaging  
85 surfaces, one of which is movable, and means for giving it a movement with relation to its path of rotation, substantially as described.

5. In a bed-and-cylinder printing-machine,  
90 the combination with the cylinder, of means for driving it in synchronism with the bed during a part of a complete reciprocation of the bed, a controlling mechanism for varying the speed of the cylinder with relation to the  
95 bed when it is not driven in synchronism with the bed, said controlling mechanism including engaging surfaces, one of which is inclined to its path of movement, and means for varying the inclination of said surface,  
100 substantially as described.

6. In a bed-and-cylinder printing-machine, the combination with a stop-cylinder, of means for driving it in synchronism with the bed  
105 during a part of a complete reciprocation of the bed, a controlling mechanism for stopping and starting the cylinder, said controlling mechanism including engaging surfaces, one of which is inclined to its path of movement, and means for varying the inclination of said  
110 surface, substantially as described.

7. In a bed-and-cylinder printing-machine, the combination with the cylinder, of means for driving it in synchronism with the bed  
115 during a part of a complete reciprocation of the bed, a rotating controlling mechanism for varying the speed of the cylinder with relation to the bed when it is not driven in synchronism with the bed, said controlling mechanism including engaging surfaces, one  
120 of which is inclined to its path of movement, and means for varying the inclination of said surface, substantially as described.

8. In a bed-and-cylinder printing-machine, the combination with a stop-cylinder, of  
125 means for driving it in synchronism with the bed during a part of a complete reciprocation of the bed, a rotating controlling mechanism for stopping and starting the cylinder, said controlling mechanism including engaging  
130 surfaces, one of which is inclined to its path of movement, and means for varying the inclination of said surface, substantially as described.

9. In a bed-and-cylinder printing-machine, the combination with the cylinder, of means for driving it in synchronism with the bed during a part of a complete reciprocation of the bed, and a controlling mechanism for varying the speed of the cylinder with relation to the bed when it is not driven in synchronism with the bed, said mechanism including two pairs of traveling engaging surfaces, one surface of each pair being movable, and means for giving it a movement with relation to its path of travel, substantially as described.

10. In a bed-and-cylinder printing-machine, the combination with a stop-cylinder, of means for driving it in synchronism with the bed during a part of a complete reciprocation of the bed, and a controlling mechanism for stopping and starting the cylinder, said mechanism including two pairs of traveling engaging surfaces, one surface of each pair being movable, and means for giving it a movement with relation to its path of travel, substantially as described.

11. In a bed-and-cylinder printing-machine, the combination with the cylinder, of means for driving it in synchronism with the bed during a part of a complete reciprocation of the bed, and a rotating controlling mechanism for varying the speed of the cylinder with relation to the bed when it is not driven in synchronism with the bed, said mechanism including two pairs of engaging surfaces, one surface of each pair being movable, and means for giving it a movement with relation to its path of rotation, substantially as described.

12. In a bed-and-cylinder printing-machine, the combination with a stop-cylinder, of means for driving it in synchronism with the bed during a part of a complete reciprocation of the bed, and a rotating controlling mechanism for stopping and starting the cylinder, said mechanism including two pairs of engaging surfaces, one surface of each pair being movable, and means for giving it a movement with relation to its path of rotation, substantially as described.

13. In a bed-and-cylinder printing-machine, the combination with the cylinder, of means for driving it in synchronism with the bed during a part of a complete reciprocation of the bed, a controlling mechanism for varying the speed of the cylinder with relation to the bed when it is not driven in synchronism with the bed, said mechanism including two pairs of engaging surfaces, one surface of each pair being inclined to its path of movement, and means for varying the inclination of said surfaces, substantially as described.

14. In a bed-and-cylinder printing-machine, the combination with a stop-cylinder, of means for driving it in synchronism with the bed during a part of a complete reciprocation of the bed, a controlling mechanism for stopping and starting the cylinder, said

mechanism including two pairs of engaging surfaces, one surface of each pair being inclined to its path of movement, and means for varying the inclination of said surfaces, substantially as described.

15. In a bed-and-cylinder printing-machine, the combination with the cylinder, of means for driving it in synchronism with the bed during a part of a complete reciprocation of the bed, a rotating controlling mechanism for varying the speed of the cylinder with relation to the bed when it is not driven in synchronism with the bed, said mechanism including two pairs of engaging surfaces, one surface of each pair being inclined to the path of movement, and means for varying the inclination of said surfaces, substantially as described.

16. In a bed-and-cylinder printing-machine, the combination with a stop-cylinder, of means for driving it in synchronism with the bed during a part of a complete reciprocation of the bed, a rotating controlling mechanism for stopping and starting the cylinder, said mechanism including two pairs of engaging surfaces, one surface of each pair being inclined to its path of movement, and means for varying the inclination of said surfaces, substantially as described.

17. In a bed-and-cylinder printing-machine, the combination with a stop-cylinder, of a rotating member mounted independently of the cylinder and carrying a pair of engaging surfaces, a second rotating member mounted independently of the cylinder and carrying a pair of engaging surfaces, means whereby one surface of each pair is brought into engagement to stop the cylinder and the other surface of each pair is brought into engagement to start the cylinder, and means for giving one of each two engaging surfaces a movement independent of its rotating movement, substantially as described.

18. In a bed-and-cylinder printing-machine, the combination with a stop-cylinder, of means for driving it in synchronism with the bed during the printing operation, a rotating member mounted independently of the cylinder and from which the cylinder is driven when it is not driven in synchronism with the bed, a second rotating member, mounted independently of the cylinder and engaging surfaces intermediate the two members by which the cylinder-driving member is stopped and started and means for giving one of each two engaging surfaces a movement independent of its rotating movement, substantially as described.

19. In a bed-and-cylinder printing-machine, the combination with a stop-cylinder, of a rotating member carrying a pair of engaging surfaces, means for giving the surfaces a movement in addition to the rotating movement, a second member carrying a pair of engaging surfaces, and means whereby the engagement of two surfaces of each pair is caused to stop the cylinder and the engage-

ment of the other two surfaces of each pair is caused to start the cylinder, substantially as described.

20. In a bed - and - cylinder printing - machine, the combination with a cylinder, of a rotating member carrying a pair of pivoted engaging surfaces, a second rotating member carrying a pair of engaging surfaces, means for turning the pivoted surfaces about their pivots, and means whereby the engagement of a surface of each pair is caused to stop the cylinder and the engagement of the other surfaces of each pair is caused to start the cylinder, substantially as described.

21. In a bed - and - cylinder printing - machine, the combination with the cylinder, of a rotating member carrying a pair of pivoted levers, a second rotating member carrying a pair of studs which are engaged by the levers, and means for turning the levers about their pivots, substantially as described.

22. In a bed - and - cylinder printing - machine, the combination with the cylinder, of a rotating member carrying a pair of pivoted levers, a second rotating member carrying a pair of studs with which the levers engage, and a cam for turning the levers about their pivots, substantially as described.

23. In a bed - and - cylinder printing - machine, the combination with the cylinder, of a gear on the cylinder-shaft, a second gear in

mesh therewith, a pair of studs carried by said second gear, a rotating member carrying a pair of pivoted levers, and a cam for turning the levers about their pivots, substantially as described.

24. In a bed - and - cylinder printing - machine, the combination with the cylinder, of a gear on the cylinder-shaft, a second gear in mesh therewith, a pair of studs carried by said second gear, a rotating member carrying a pair of pivoted levers, and a stationary cam for turning the levers about their pivots, substantially as described.

25. In a bed - and - cylinder printing - machine, the combination with the cylinder, of a gear on the cylinder-shaft, a second gear in mesh with the first gear, a pair of studs carried by said second gear, a rotating member carrying a pair of pivoted levers, a crank-shaft on which said member is mounted, a stationary cam for operating the levers, a crank mounted on the crank-shaft, and bed-driving connections operated by said crank, substantially as described.

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

THOMAS M. NORTH.

Witnesses:

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