

No. 629,915.

Patented Aug. 1, 1899.

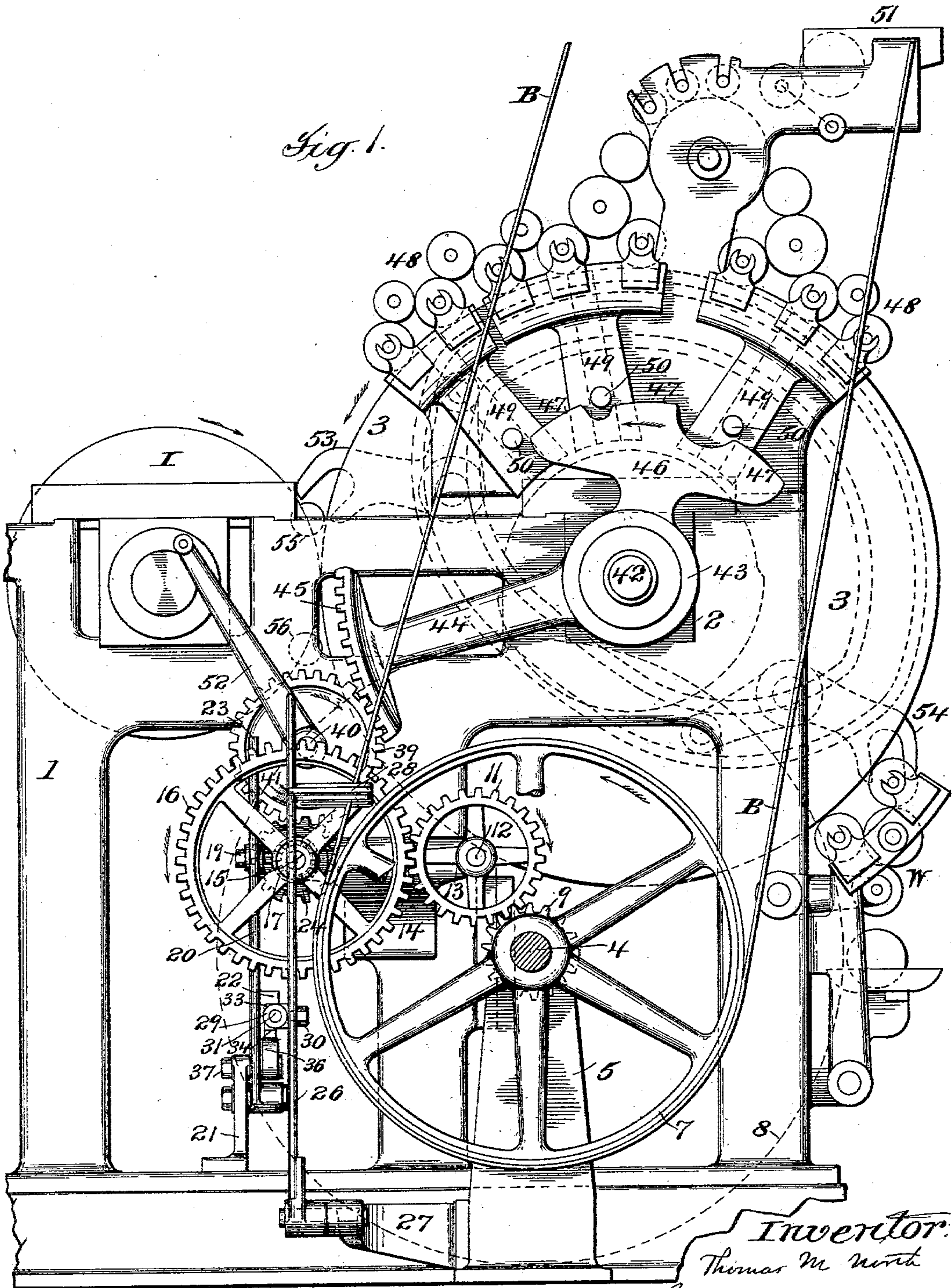
T. M. NORTH.

AUTOMATIC LIFTING MECHANISM FOR INKING APPARATUS.

(Application filed Dec. 7, 1898.)

(No Model.)

2 Sheets—Sheet 1.



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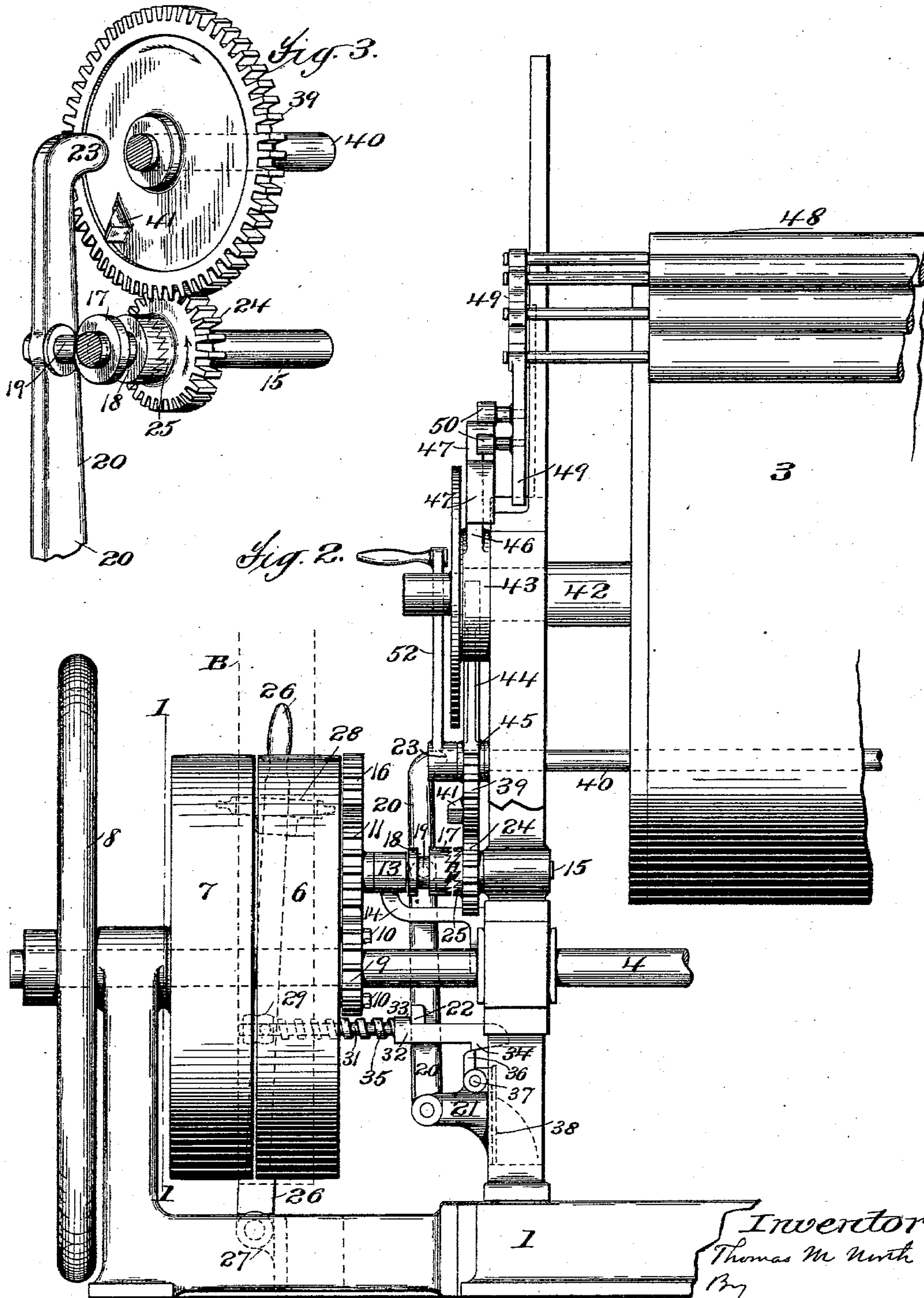
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No Model.)

2 Sheets—Sheet 2.



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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.

AUTOMATIC LIFTING MECHANISM FOR INKING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 629,915, dated August 1, 1899.

Application filed December 7, 1898. Serial No. 698,502. (No model.)

To all whom it may concern:

Be it known that I, THOMAS M. NORTH, a subject of the Queen of Great Britain, residing at New York city, county of Kings, and State of New York, have invented certain new and useful Improvements in Automatic Lifting Mechanism for Inking Apparatus, 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 inking apparatus.

It sometimes happens in operating printing machinery that the inking or form rollers are allowed to remain in contact with the form when the machine is not running. If, however, the form-rollers are allowed to remain in contact with the form for any considerable length of time when the machine is at rest, they will lose their true circular outline and will not perform their function satisfactorily. Furthermore, if the machine is of the type which prints from planographic surfaces—such, for instance, as from aluminium or zinc plates or from a lithographic stone—a prolonged contact of the ink-rollers with the printing-surface produces a stain on the surface which is very difficult to remove, as it yields only to repeated washings, and in some cases it is necessary to resort to etching the surface in order to remove it.

The object of this invention is to produce an automatic mechanism by which the inking-rollers will be lifted from the form when the machine is not running, thus avoiding the objections above referred to.

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 pointed out 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 represents in side elevation a printing-machine to which the invention is applied, certain parts of the machine being omitted for the sake of clearness. Fig. 2 is a rear elevation of one end of the machine shown in Fig. 1, certain parts being removed.

Fig. 3 is a detail view illustrating the automatic device by which the clutch is uncoupled.

Referring to the drawings, 1 indicates the frame of a machine of the rotary stop-impression-cylinder type, illustrating one embodiment of the invention. The frame 1 supports suitable journal-boxes 2, in which is mounted a shaft 42, said shaft supporting a printing-cylinder 3, the cylinder being preferably constructed to carry zinc or aluminium printing-plates. The impression-cylinder is revolved from a gear mounted on the main shaft 4. This gear is on the end of the shaft which is farthest from the observer in Fig. 1 and is omitted from the drawings in the interest of clearness. The main shaft 4 is mounted in suitable standards or bearings 5, only one of which is shown, and is provided with a loose pulley 6 and a fast pulley 7. The fast and loose pulleys, in connection with the belt-shifter, to be hereinafter referred to, constitute a convenient and well-known form of stopping and starting mechanism. Many other forms of stopping and starting mechanism may, however, be substituted for this form, as the invention is not primarily concerned with any specific form of such mechanism. The shaft 4 is operated by a belt running to any convenient source of power and is further provided with the usual balance-wheel 8.

On the shaft 4 is mounted a loose gear 9, this gear being connected to the loose pulley in any suitable manner, as by bolts 10. Meshing with the gear 9 is an intermediate gear 11, which is mounted on a short stud 12, which is supported in a bearing 13 on a bracket 14, projecting from the frame. At the other end of the bracket 14 there is located a short shaft 15, which has bearings both in the bracket 14 and in the frame of the machine. This shaft 15 supports a gear-wheel 16, which meshes with the intermediate 11, before described. The shaft 15 also carries a sliding toothed clutch-collar 17, which is splined to the shaft in the usual manner. This clutch-collar 17 has a groove 18, which is engaged by a pin 19, mounted on lever 20, the said lever 20 being pivoted on a bracket 21, which is suitably supported on the frame of the machine. The lever 20 has a projection 22 extending from its side near the bottom, and it has its upper

end bent to form an extension or nose 23, the purpose of which will hereinafter appear. The shaft 15 supports a loose gear 24, the hub of which is toothed to form a clutch member 25, which at certain times is engaged by the clutch member 18, before described.

The machine is provided with the usual belt-shifting lever 26, which is pivoted to a bracket 27 on the frame of the machine and carries an extension 28, by which the belt B is shifted from the fast to the loose pulley, or vice versa, as the occasion requires. The belt-shifting lever 26 carries a small swivel-bearing 29, which is connected to the lever by a nut 30, and this swivel-bearing supports one end of a rod 31. The other end of the rod 31 carries a short bar 32, which is provided with a shoulder 33 and a latch 34. The rod 31 is surrounded by a spring 35, which bears at one end against the swivel-bearing 29 and at the other end against the shoulder 33 of the bar 32. The latch end 34 of the bar 32 normally rests on a small bell-crank 36, which is pivoted on a bolt 37, which is supported on the bracket 21. A spring 38 bears against one of the arms of the bell-crank 36 and keeps the bell-crank normally in an upright position.

The pinion 24, which has been heretofore described as carried on the shaft 15, meshes with a gear 39 on a shaft 40, which is suitably mounted in the frame of the machine and which may extend through the machine from side to side in case it is desired to duplicate the lifting mechanism to be hereinafter described. The gear-wheel 39 carries an angular cam projection 41, which coöperates with the extension or nose 23 of the lever 20 to disengage the parts of the clutch, as will be hereinafter described.

The gears, clutch, and clutch-operating lever which have been described form an efficient means by which the mechanism for moving the inking-rollers, which will be hereinafter described, is connected to and disconnected from the stopping mechanism, so that the moving mechanism may be automatically operated from the stopping mechanism. Various other forms and kinds of connections may, however, be used.

The cylinder 3 has been before described as mounted on a shaft 42, which is supported in the boxes 2, and this shaft has surrounding it a collar 43. This collar has projecting from it an arm 44, the outer end of which is formed to provide a segment-rack 45, which meshes with the gear 39, before referred to. The collar has also projecting from it a cam-arm 46, which is provided with a series of cam-faces 47, the whole forming a simple and effective means for moving the inking-rollers away from the path of the form. Other mechanism might, however, be used for this purpose.

The form-rollers 48 may be mounted in any convenient way, so as to be moved by the mechanism before described. Preferably,

however, said rollers are carried by a series of slides 49, these slides being suitably supported and guided in the frame of the machine. A convenient way of supporting and guiding them is to provide ribs on the slides which engage guides in the frame, this construction being indicated by dotted lines in Fig. 1. The slides 49 are preferably provided with pins 50, which when the form-rollers are in operative position come opposite depressions between the cam-faces 47, and thus allow the form-rollers to come in contact with the forms. When, however, the machine is not running, these pins 50 are engaged by the cam-faces 47 and the form-rollers are lifted clear of the forms, as will be hereinafter described. The form-rollers are supplied with ink in the usual manner from a fountain 51, which is provided with the usual ductor and transmitting and distributing rolls.

The operation of the machine is as follows: So long as the belt B is on the fast pulley 7 the impression-cylinder will be operated through the shaft 4 and there will be no operation of the mechanism which has been heretofore described. When, however, the belt-shifting lever is operated to shift the belt from the fast to the loose pulley, the rod 31 is caused to move the bar 32 forward. This causes the shoulder 33 to engage the projection 22 on the lever 20 and throws the said lever, causing the clutch member 17 to engage the clutch member 25 and locking the loose gear 24 to the shaft 15. The spring 35 permits a yielding action between the clutch-lever and the rod 31, and thus prevents any jamming or breaking of the parts in case the teeth of the clutch do not come accurately into mesh as soon as the rod is thrown. As soon as the bar 32 has been advanced its latch portion 34 drops behind the bell-crank 36, and thus releases the projection 32 from the shoulder 33. In the meantime the belt having passed fairly onto the loose pulley 6 turns the same and causes the gear 9 to rotate the intermediate 11 and the gear 16. The gear 16 in its turn operates the shaft 15, and the gear 24 having been locked to the shaft by the engagement of the clutch members 18 and 25 turns with the shaft. The gear 24 operates the gear 39, which in its turn by reason of its engagement with the segment-rack 45 rocks the arm 44 and cam 46 and causes the cam-faces 47 to engage the pins 50 on the slides 49. The engagement of the cam-faces 47 with the pins 50 operates the slides in which the inking-rollers are mounted and raises them clear of the form. By the time the gear 39 has rotated sufficiently far to operate the levers 44 and 46 and raise the slides the cam projection 41, which is carried by the gear, is brought into engagement with the bent nose 23 of the lever 20 and rocks the said lever backward, thus disengaging the parts of the clutch 18 25. The disengagement of the parts of the clutch releases the gear 24, and no further movement of this gear or the parts operated by it takes place. The shaft

40 is provided with a suitable handle 52, and when it is desired to drop the form-rollers into their inking position the shaft 40 may be rocked by the pressman by means of this handle. This returns the gear 39 to the position it occupied before it was operated by the gear 24, restores the cam 46 to its original position, and permits the slides carrying the form-rollers to move downward, thus bringing the said rollers again into inking position.

When the pressman operates the belt-shifter to shift the belt from the loose to the fast pulley, the rod 31 is drawn backward. This rocks the bell-crank 36 sufficiently to allow the latch 34 to become disengaged from the bell-crank, and as soon as this happens the spring 38 returns the bell-crank to its normal position. The parts are now ready to be again operated to automatically raise the form-rollers when the machine is stopped.

In the machine shown the rollers are lifted at one end only, sufficient movement being given them to cause them to clear the forms. Should it be desired to lift them at both ends, and in actual practice this will be frequently required, it is only necessary to provide a set of slides for the opposite ends of the rollers and mount a cam similar to the cam 46 on the opposite end of the impression-cylinder shaft. The shaft 40 will carry two gears 39, one on each side of the machine, there being also two arms 44, with segment-racks 45. This modification is an obvious one and is not, therefore, illustrated.

The machine in connection with which the invention has been described is, as has been before stated, a rotary machine of the stop-impression-cylinder type and is shown as printing from planographic surfaces. The impression-cylinder I is stopped and started by means of bell-crank levers 53 54, which engage with studs 55 56, carried upon the impression-cylinder, the levers 53 54 being mounted on the plate-carrying cylinder and being controlled by a path-cam, which is shown in dotted lines in Fig. 1. This construction is not herein claimed, and its operation need not be further described.

The machine is shown as supplied with a damping apparatus W of any usual type.

While the mechanism which has been heretofore described is an effective means for carrying this invention into effect, it may be widely varied, the gist of the invention being the provision of automatic means by which when the machine is stopped the form-rollers are lifted clear of the forms.

The invention is not confined to a rotary printing-machine, nor to any particular style of printing-machine, nor to any particular means for carrying it into effect, but is to be understood as generic in its nature and as including all modifications and changes in construction which fall within its spirit and scope as defined in the claims hereunto appended.

What I claim is—

1. In a printing-machine, the combination

with a form-carrier, of inking mechanism, and means operated from a power-driven part of the machine for automatically moving the inking mechanism away from the path of the form when the machine is stopped, substantially as described.

2. In a printing-machine, the combination with a form-carrier and means for operating it, of suitable inking mechanism, machine-stopping devices, and means operated from a power-driven part of the machine and automatically controlled from said stopping devices for moving the inking mechanism away from the path of the form when the stopping devices are operated, substantially as described.

3. In a printing-machine, the combination with a rotating form-carrier and means for operating it, of inking mechanism, machine-stopping devices, and means operated from a power-driven part of the machine and automatically controlled from said stopping devices for moving the inking mechanism away from the path of the form when the stopping devices are operated, substantially as described.

4. In a printing-machine, the combination with a form-carrier, of an inking mechanism, supports in which the inking mechanism is mounted, and suitable devices operated from a power-driven part of the machine for automatically moving the supports away from the path of the form when the machine is stopped, substantially as described.

5. In a printing-machine, the combination with a form-carrier and means for operating it, of inking mechanism, machine-stopping devices, a cam, and means automatically operated from a power-driven part of the machine and controlled by the movement of the stopping devices for moving the cam so as to move the inking mechanism away from the path of the form, substantially as described.

6. In a printing-machine, the combination with a form-carrier, of an inking mechanism, sliding supports in which the inking mechanism is mounted, machine-stopping devices, a cam for lifting the sliding supports, and means controlled by the stopping devices and operated from a power-driven part of the machine for operating the cam, substantially as described.

7. In a printing-machine, the combination with a rotating form-carrier and means for operating it, of a set of inking-rolls, slides in which the inking-rolls are mounted, a cam for actuating the slides, machine-stopping devices, and means whereby the cam is automatically operated from a power-driven part of the machine when the stopping devices are operated, substantially as described.

8. In a printing-machine, the combination with a rotating form-carrier and the shaft upon which it is mounted, of an inking mechanism, supports in which the inking mechanism is mounted, a cam mounted on the shaft of the form-carrier and acting to move the sup-

ports, machine-stopping devices, and means whereby the cam is automatically operated to move the supports and lift the inking mechanism away from the path of the form when the machine is stopped, substantially as described.

9. In a printing-machine, the combination with a rotating form-carrier and the shaft on which it is mounted, of an inking mechanism, supports on which it is mounted, a rocking cam mounted on the shaft of the form-carrier, an arm for rocking the cam having a segmental rack thereon, a normally inoperative gear meshing with the rack on the arm, means including a clutch mechanism for rendering the gear inoperative, machine-stopping devices, and connections including a clutch-operating device between the machine-stopping devices and the gear, substantially as described.

10. In a printing-machine, the combination with a form-carrier, of an inking mechanism therefor, automatic means for moving the inking mechanism away from the path of the form when the machine is stopped, and devices for throwing said means out of operation when the inking mechanism has been moved, substantially as described.

11. In a printing-machine, the combination with a form-carrier, of an inking mechanism therefor, machine-stopping devices, means for moving the inking mechanism away from the path of the form, said means being automatically operated by the stopping devices, and devices for throwing said means out of operation when the inking mechanism has been moved, substantially as described.

12. In a printing-machine, the combination with a form-carrier, of an inking mechanism therefor, means for moving said inking mechanism away from the path of the form, stopping mechanism, and automatically-operating devices for connecting the means for moving the inking mechanism to and disconnecting it from the stopping devices, substantially as described.

13. In a printing-machine, the combination with a form-carrier, of an inking mechanism therefor, means for moving the inking mechanism away from the path of the form, machine-stopping devices, connecting mechanism intermediate the machine-stopping devices and the means for moving the inking mechanism, said connecting mechanism being automatically operated from the machine-stopping devices, and means for rendering said connecting mechanism inoperative after the inking mechanism has been moved away from the form, substantially as described.

14. In a printing-machine, the combination with a form-carrier, of an inking mechanism therefor, means for moving the inking mechanism away from the path of the form, machine-stopping devices, connecting mechanism intermediate the machine-stopping devices and the means for moving the inking mechanism, said connecting mechanism be-

ing automatically operated from the machine-stopping devices, and automatic means for rendering said connecting mechanism inoperative after the inking mechanism has been moved away from the form, substantially as described.

15. In a printing-machine, the combination with a form-carrier, of an inking mechanism therefor, automatic means for moving the inking mechanism away from the path of the form when the machine is stopped, devices for throwing said means out of operation when the inking mechanism has been moved, and means for causing the inking mechanism to resume its form-inking position, substantially as described.

16. In a printing-machine, the combination with a form-carrier, of an inking mechanism therefor, automatic means for moving the inking mechanism away from the path of the form when the machine is stopped, devices for throwing said means out of operation when the inking mechanism has been moved, and manually-operated means for causing the inking mechanism to resume its form-inking position, substantially as described.

17. In a printing-machine, the combination with a form-carrier, of an inking mechanism therefor, means for moving the inking mechanism away from the path of the form, machine-stopping devices, connecting mechanism intermediate the machine-stopping devices and the means for moving the inking mechanism, said connecting mechanism being automatically operated from the machine-stopping devices, automatic means for rendering said connecting mechanism inoperative after the inking mechanism has been moved away from the form, and means for causing the inking mechanism to resume its form-inking position, substantially as described.

18. In a printing-machine, the combination with a form-carrier, of an inking mechanism therefor, means for moving the inking mechanism away from the path of the form, machine-stopping devices, connecting mechanism intermediate the machine-stopping devices and the mechanism for moving the inking mechanism, said connecting mechanism being automatically operated from the machine-stopping devices, automatic means for rendering said connecting mechanism inoperative after the inking mechanism has been moved away from the form, and manually-operated means for restoring the inking mechanism to the form-inking position, substantially as described.

19. In a printing-machine, the combination with a form-carrier, of an inking mechanism therefor, normally inactive means for moving the inking mechanism away from the path of the form, a shaft on which the form-carrier is mounted, fast and loose pulleys on the shaft, a belt-shifter, gearing including a clutch between the loose pulley and the means for moving the inking mechanism away from the path of the form, a clutch-operating mechanism,

and connections between the same and the belt-shifter, substantially as described.

20. In a printing-machine, the combination with a form-carrier, of an inking mechanism therefor, normally inactive means for moving the inking mechanism away from the path of the form, a shaft on which the form-carrier is mounted, fast and loose pulleys on the shaft, a belt-shifter, gearing including a clutch between the loose pulley and the means for moving the inking mechanism away from the path of the form, a clutch-operating mechanism, and spring connections between the same and the belt-shifter, substantially as described.

21. In a printing-machine, the combination with a form-carrier, of an inking mechanism therefor, normally inactive means for moving the inking mechanism away from the path of the form, a shaft on which the form-carrier is mounted, fast and loose pulleys on the shaft, a belt-shifter, gearing including a clutch between the loose pulley and the means for moving the inking mechanism away from the path of the form, a clutch-operating mechanism, connections between the same and the belt-shifter, and means for disconnecting the clutch after the inking mechanism has been moved, substantially as described.

22. In a printing-machine, the combination with a form-carrier, of an inking mechanism therefor, normally inactive means for moving the inking mechanism away from the path of the form, a shaft on which the form-carrier is mounted, fast and loose pulleys on the shaft, a belt-shifter, gearing including a clutch between the loose pulley and the means for moving the inking mechanism away from the form, a clutch-operating mechanism, connections between the same and the belt-shifter, and automatic means for disconnecting the clutch after the inking mechanism has been moved, substantially as described.

23. In a printing-machine, the combination with a form-carrier, of an inking mechanism, normally inactive means for moving the inking mechanism away from the path of the form, a train of gearing including a clutch for operating the means for moving the inking mechanism, machine-stopping devices, and means operated by the machine-stopping devices for connecting the clutch and causing the movement of the moving devices, substantially as described.

24. In a printing-machine, the combination with a form-carrier, of inking mechanism therefor, normally inactive means for moving the inking mechanism away from the path of the form, machine-stopping devices, a train of gearing between the stopping devices and the moving devices, one of said gears being provided with a cam, a clutch in said train of gearing, a lever for operating the clutch, means operated by the machine-stopping devices for causing the lever to connect the two parts of the clutch, said clutch-operating lever having a nose or extension lying in the path of the cam on the gear-wheel, whereby the

cam operates to disconnect the parts of the clutch after the moving devices have been operated, substantially as described.

25. In a printing-machine, the combination with a form-carrier, of means for operating the same including a shaft carrying fast and loose pulleys, inking mechanism, normally inactive devices for moving the inking mechanism away from the path of the form, a train of gearing between the loose pulley and the moving devices, a clutch in said train, a belt-shifter, and devices operated by the belt-shifter to cause the parts of the clutch to engage and the train of gearing to operate the moving devices, substantially as described.

26. In a printing-machine, the combination with a form-carrier, of means for operating the same including a shaft carrying fast and loose pulleys, inking mechanism, normally inactive devices for moving the inking mechanism away from the path of the form, a train of gearing between the loose pulley and the moving devices, a clutch in said train, a belt-shifter, devices operated by the belt-shifter to cause the parts of the clutch to engage and the train of gearing to operate the moving devices, and automatic means for disconnecting the clutch substantially as described.

27. In a printing-machine, the combination with a rotating form-carrier and the shaft upon which it is mounted, of inking mechanism, a cam on the shaft of the form-carrier for moving the inking mechanism away from the form, an arm carrying a segment for operating the cam, a shaft, normally stationary gear on said shaft, machine-stopping devices, means whereby the gear is thrown into operation by the machine-stopping devices to cause the segment-carrying arm to operate the cam, and a handle on the shaft of the gear for operating the same and the segment-carrying arm to restore the cam and inking mechanism to their normal position, substantially as described.

28. In a printing-machine, the combination with a rotating form-carrier and the shaft upon which it is mounted, of inking mechanism, a cam on the shaft of the form-carrier for moving the inking mechanism away from the form, an arm carrying a segment-rack for operating the cam, a shaft, a normally stationary gear on said shaft meshing with the segment-rack, machine-stopping devices, means whereby the gear is thrown into operation by the machine-stopping devices, and means carried by the gear whereby its operating mechanism is rendered inoperative after the inking mechanism has been moved away from the path of the form, substantially as described.

29. In a printing-machine, the combination with a rotating form-carrier, of operating devices therefor including a shaft carrying fast and loose pulleys, a belt-shifter, a train of gearing operated from the loose pulley, a clutch in said train, an operating-lever for shifting the clutch, a spring latch-rod carried by the belt-shifter for operating the lever, inking mechanism, a normally inactive cam

for moving the inking mechanism away from the path of the form, connections from the cam to the train of gearing, whereby when the belt-shifter is operated the operating-lever is caused to throw the clutch into engagement and operate the cam to move the inking mechanism, substantially as described.

30. In a printing-machine, the combination with a rotating form-carrier, of operating devices therefor including a shaft carrying fast and loose pulleys, a belt-shifter, a train of gearing operated from the loose pulley, a clutch in said train, an operating-lever for shifting the clutch, a latch-rod carried by the belt-shifter for operating the lever, inking mechanism, a normally inactive cam for moving the inking mechanism away from the path of the form, connections from the cam to the train of gearing, whereby when the belt-shifter is operated the operating-lever is caused to throw the clutch into engagement and operate the cam to move the inking devices, and means carried by the gear-train for throwing the clutch out of operation when the inking mechanism has been moved, substantially as described.

31. In a printing-machine, the combination

with a rotating form-carrier, of operating devices therefor including a shaft carrying fast and loose pulleys, a belt-shifter, a train of gearing operated from the loose pulley, a clutch in said train, an operating-lever for shifting the clutch, a latch-rod carried by the belt-shifter for operating the lever, inking mechanism, a cam for moving the inking mechanism away from the path of the form, connections from the cam to the train of gearing, whereby when the belt-shifter is operated the operating-lever is caused to throw the clutch into engagement and operate the cam to move the inking mechanism, means carried by the gear-train for throwing the clutch out of operation when the inking mechanism has been moved, and devices for restoring the cam to its original position to permit the inking mechanism to again contact with the form, 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,
E. L. SPEIR.