

No. 638,748.

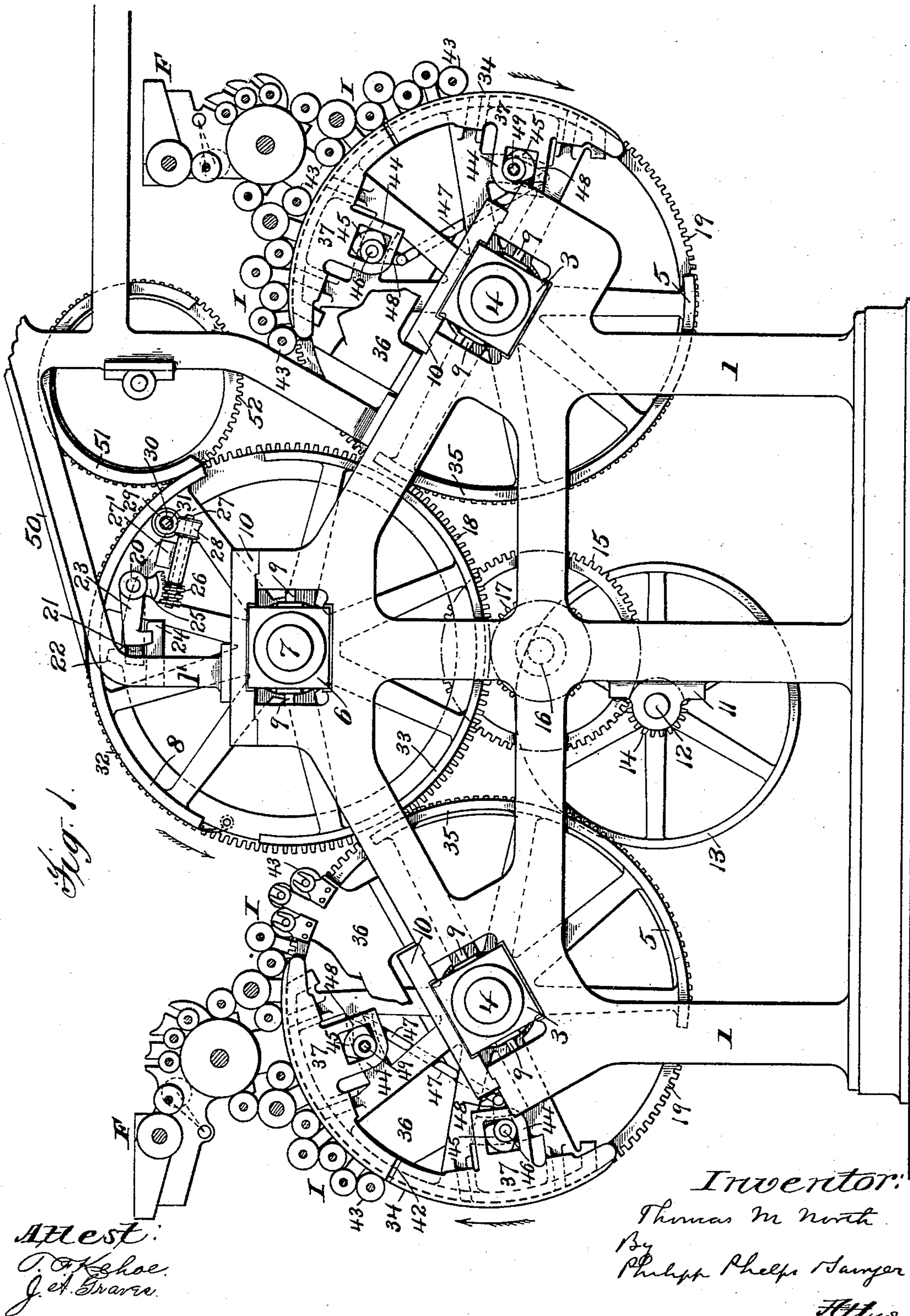
Patented Dec. 12, 1899.

T. M. NORTH.  
INKING APPARATUS.

(Application filed Feb. 24, 1899.)

(No Model.)

3 Sheets—Sheet 1.





No. 638,748.

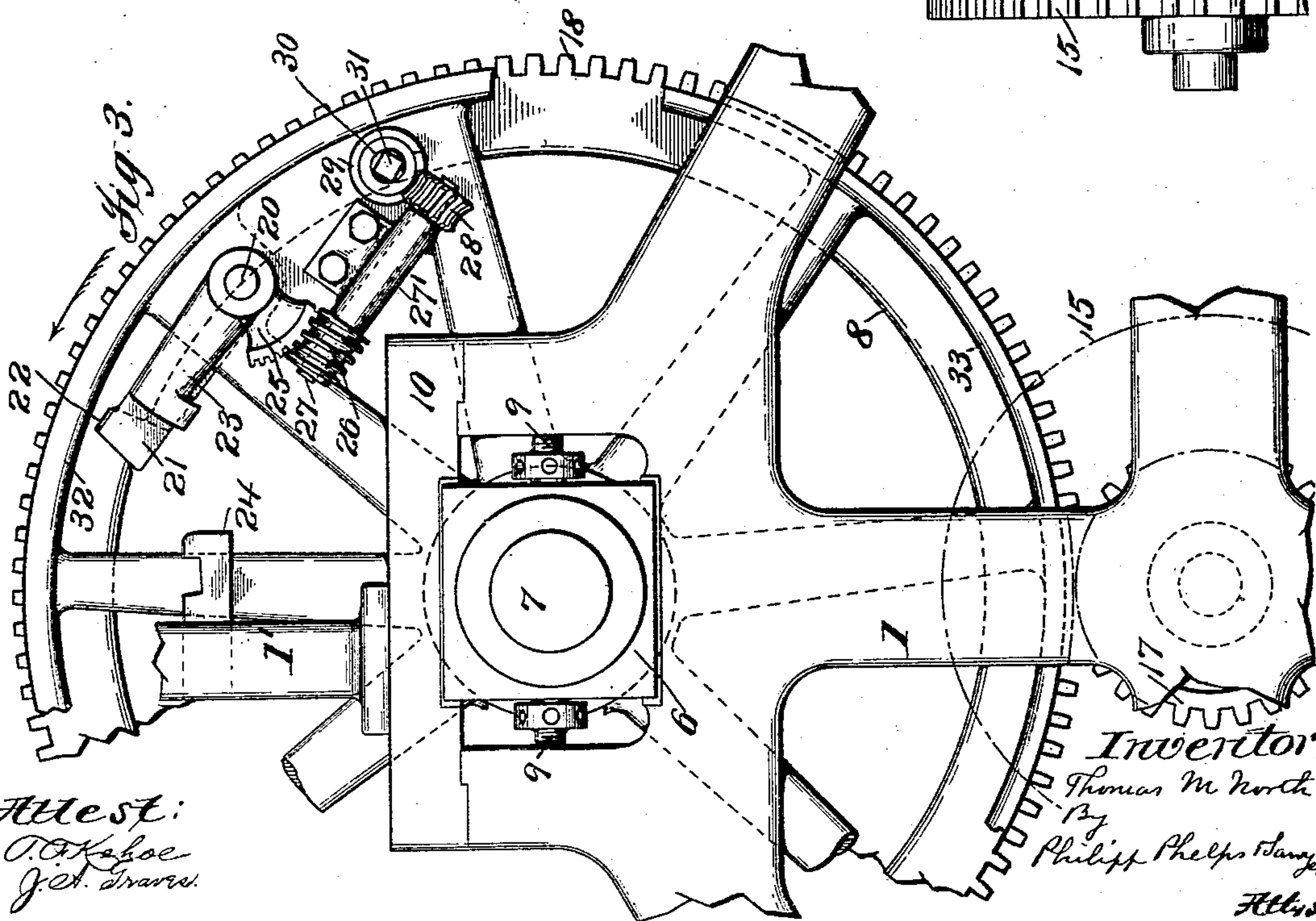
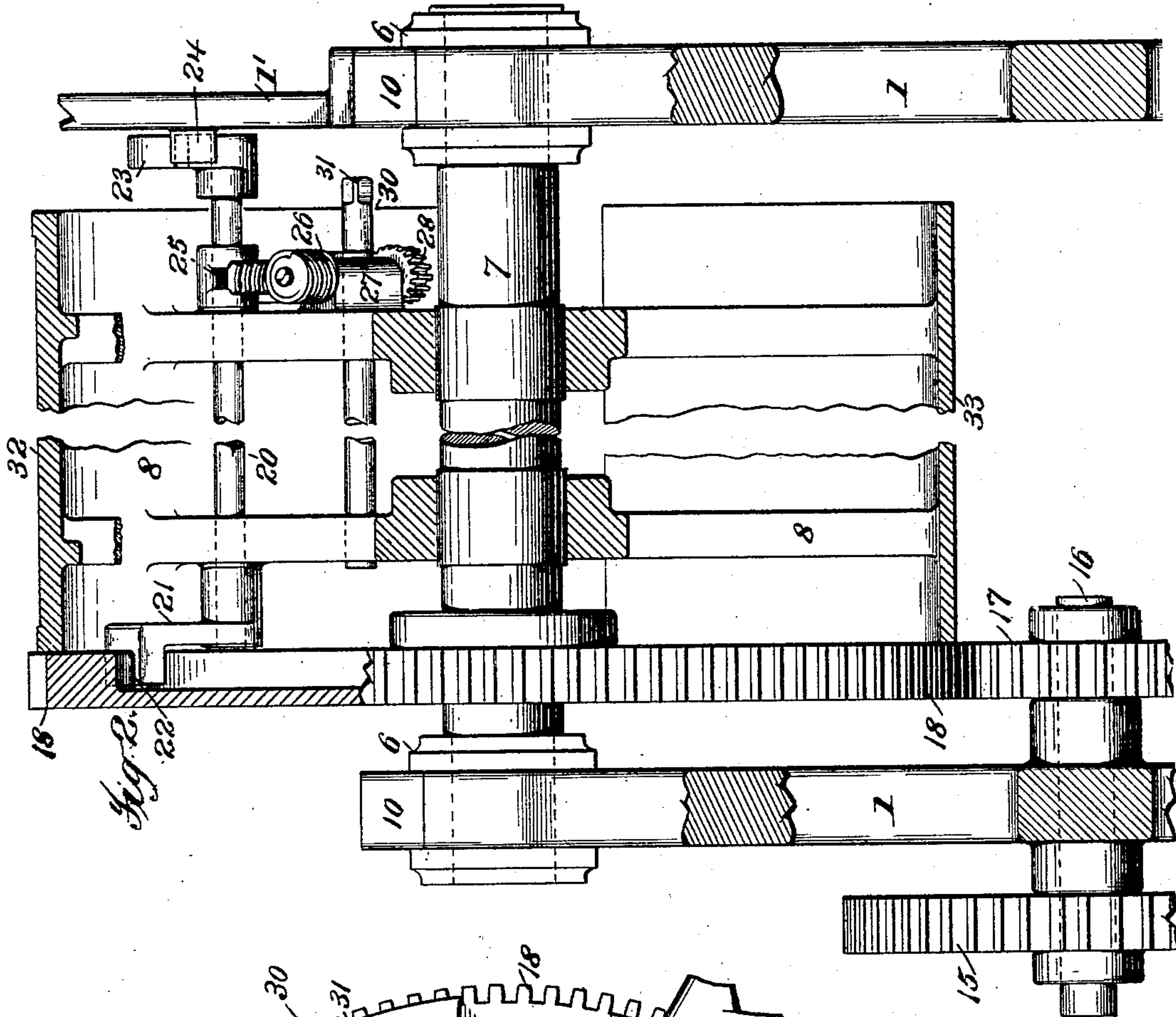
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3 Sheets—Sheet 2.





No. 638,748.

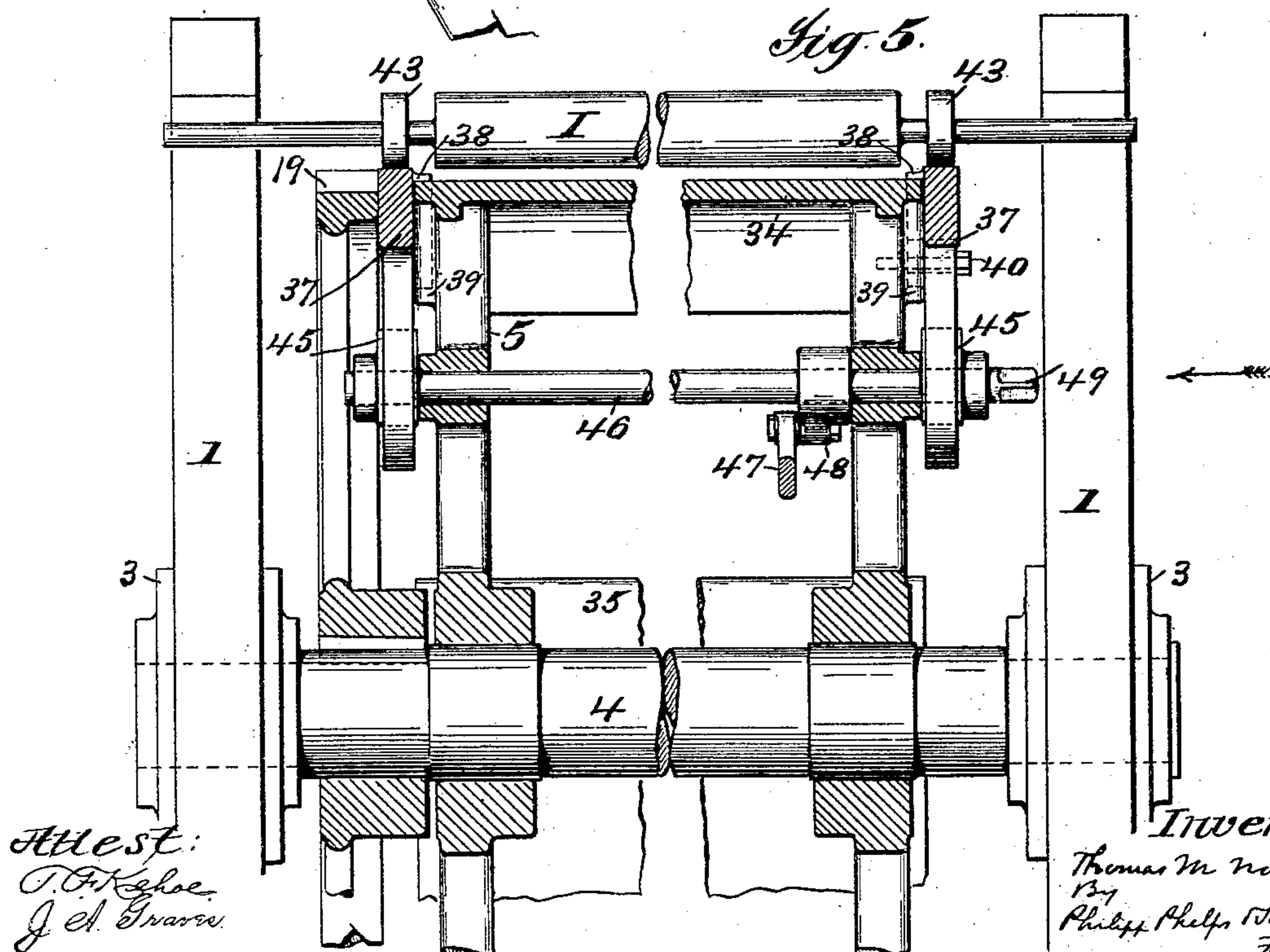
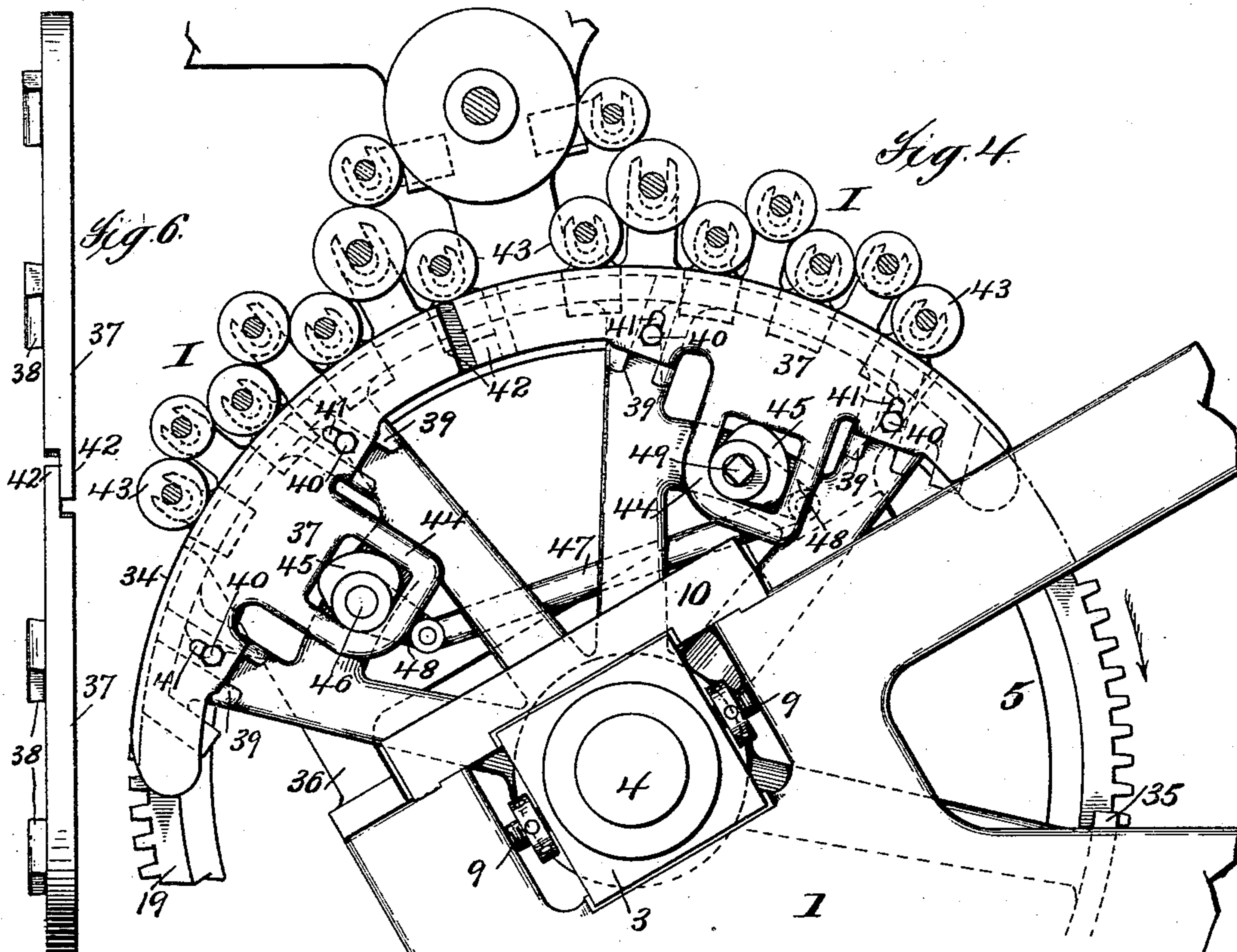
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(Application filed Feb. 24, 1899.)

3 Sheets—Sheet 3.

(No Model.)



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# UNITED STATES PATENT OFFICE.

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## INKING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 638,748, dated December 12, 1899.

Application filed February 24, 1899. Serial No. 706,654. (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, county of Kings, and State of New York, have invented certain new and useful Improvements in 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.

In operating printing-machines it is desirable when the machine is started up to allow it to run for a certain period with the inking devices in full operation, but without permitting the form-rollers to come in contact with the form, the object being to cause the ink to become thoroughly broken up and mixed on the several form distributing-rollers and on the ink-distributing surface or table, so as to obtain an even and thorough distribution of the ink throughout the inking apparatus.

It is the object of this invention to provide means whereby the machine may be run for any desired length of time to thus mix and thoroughly distribute the ink and to do this without permitting the inking devices to come in contact with the form. The ink from the fountain is thus carried to and thoroughly distributed and mixed upon the distributing-surface and form-rollers, so that an even distribution of the ink upon the form may be had as soon as the printing is begun.

A further object of the invention is to provide means whereby the impression-cylinder may be locked against movement during the time when the machine is run for the purpose of distributing the ink, as above stated.

With these and other objects in view the invention consists in certain parts, improvements, and combinations, as will be hereinafter described, and more fully 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 is a side view of a multicolor-machine of the rotary type, illustrating the invention, certain parts of the machine being omitted in the interest of clearness. Fig.

2 is a sectional elevation, on a large scale, of the impression-cylinder, illustrating more particularly the driving means and the locking devices. Fig. 3 is a side view, on a large scale, of the construction shown in Fig. 2. Fig. 4 is a detail view of a portion of one of the form-cylinders, illustrating the lifting-plates and the means for mounting the form-rollers. Fig. 5 is a detail sectional view taken through one of the form-cylinders. Fig. 6 is a detail plan view illustrating the construction of the lifting-plates.

The machine which has been selected to illustrate the concrete embodiment of the invention is a multicolor-machine of the rotary type. In this machine 1 indicates the frame of the machine. The frame is provided with suitable recesses in which are located boxes 3 3, which carry the shafts 4 4 of the form-carrying cylinders 5 5, and boxes 6, which carry the shaft 7 of the impression-cylinder 8. The several boxes may be adjusted in the recesses by means of screws 9 of a well-known type, and the boxes may be held in position by bars 10, which may be secured in any suitable manner to the frame of the machine.

The frame is provided with suitable bearings 11, in which is journaled a power-shaft 12, the power-shaft being provided with any suitable means of driving it—as, for instance, a power or pulley wheel 13. The power-shaft 12 carries a gear 14, which meshes with a gear 15 on a short shaft 16, which is suitably journaled in one side of the frame, this short shaft and gear being on the side opposite to the observer in Fig. 1. This short shaft 16 carries a gear 17, through which power is communicated to the impression-cylinder in a manner to be described hereinafter.

On the impression-cylinder shaft 7 is loosely mounted a gear 18, which is in mesh with the gear 17. This gear is in mesh with and drives gears 19, which are fast on the shafts 4 of the form-carrying cylinders and by which, therefore, these form-carrying cylinders are driven.

The impression-cylinder 8 is provided with a locking device by which it may be secured to and driven from the gear 18 or may be disconnected therefrom when it is desired to run the machine for the purpose of inking up, as heretofore described.



The locking device which connects the cylinder 8 to the gear 18 may be variously constructed. Preferably, however, the cylinder is provided with a shaft 20, which is or may be suitably journaled in the spokes of the cylinder or mounted thereon in any convenient way. This shaft 20 carries at one end a locking-arm 21, which is fixed on the shaft and which engages a cooperating locking member carried or formed on the gear. This cooperating member might be made in various ways; but it is preferably a notch 22, formed in the rim of the gear 18. The shaft 20 preferably carries at its opposite end a locking-arm 23, which is also fast on the shaft and which engages a cooperating locking member, which may also be variously formed, but is preferably a notched block 24, which is carried on any suitable part of the frame. It is herein shown as mounted on the part 1' of the frame, which carries the feed and delivery devices. The arms 21 and 23 are so arranged that when the arm 22 engages the notched block 24 on the frame the arm 21 will be disengaged from the notch 22 in the gear and when the arm 21 is engaging the notch 22 the arm 23 will be disengaged from the notched block 24. It follows, therefore, that when the arm 21 is engaging the notch 22 the impression-cylinder will be locked fast to the gear 18 and will rotate therewith. When, however, the arm 21 is disengaged from the notch 22 and the arm 23 is engaging the block 24, the impression-cylinder will be disengaged from the gear and locked fast to the frame, in which position of the parts the gear 18 is free to revolve without revolving the impression-cylinder.

The shaft 20 may be rocked in various ways in order to produce the movements of the locking-arms before described. Preferably, however, the shaft will be provided with a segmental arm 25, which is fast on the shaft 20. This segmental arm engages a worm 26 on a short shaft 27, which is or may be mounted in a bearing 27', suitably secured to the impression-cylinder. This shaft carries a worm 28, which is engaged by a worm 29 on another shaft 30, suitably mounted in the cylinder. When the shaft 30 therefore is rocked in either direction, the shaft 20 will be correspondingly rocked to produce the desired movement of the locking-arms.

The shaft 30 may be rocked in any suitable manner. In the drawings it is shown as provided with a squared head 31, on which a wrench may be placed. The impression-cylinder 8 is provided with an impression-surface 32 and with a low portion 33, said portion being slightly nearer the axis of movement of the impression-cylinder, so as to pass the form and ink-distributing surfaces of the form-cylinders without touching them, this being a well-understood feature of construction of this type of machines.

The locking-block 24 is so arranged on the frame that when the impression-cylinder is

locked to it its impression-surface 32 will be turned away from the printing and ink-distributing surfaces of the form-carrying cylinders 5. The gear 18 therefore when it is disconnected from the impression-cylinder can rotate the form-carrying cylinders 5 without danger of any portion thereof touching the impression-cylinder, the portion 33 of said cylinder being arranged, as before described, nearer the center of rotation of said cylinder, and consequently in such position that it will not touch either of the form-carrying cylinders.

The form-carrying cylinders 5 are provided with form-carrying surfaces 34 and ink-distributing surfaces 35. The ink is carried from a fountain F through the usual ductor and distributing rolls to a series of form-inking rollers I. These rollers are journaled in slotted open bearings in stationary plates 36, which may be suitably secured to the frame on each side of each form-carrying cylinder.

Various means may be provided to prevent the form-rollers from coming in contact with the printing-surfaces when the machine is being run for the purpose of inking up and at the same time permit said rollers to come into contact with the distributing-surfaces. Preferably, however, each of the cylinders 5 will be provided with one or more lifting-plates 37. In the machine shown there are two of these lifting-plates 37 on each side of each form-carrying cylinder, although the machine might be constructed with a single plate on one side of each cylinder. The construction shown is deemed the preferable one, however, and the number of plates will usually depend upon the length of form-surface on the form-carrying cylinder. These plates 37 are preferably provided with guiding-blocks 38, which engage guides 39, formed on the cylinder, and are secured to the cylinder by means of bolts 40, said bolts working in slots 41, formed in the said plates. The lifting-plates are curved to correspond to the curvature of the cylinder, and in order to allow them to have the radial movement necessary to effect their function and at the same time provide a continuous track they are cut away, as shown at 42, the cut-away portions of the plates overlapping each other.

While the lifting-plates may directly engage the shafts of the form-rollers, each of the said rollers is preferably provided with a pair of trucks 43, which are located so as to be engaged by the lifting-plates 37 when they are in their outward position.

The combined length of the plates 37 is equal to the length of the form-surfaces. When, therefore, the lifting-plates are in their outer position, as the form-surface comes in the revolution of the form-carrying cylinder around to the form-inking rolls the trucks 43 of the rolls will be engaged by the plates and the rolls will be lifted and held out of contact with the form until the form has passed the rolls. After the form has passed



the rolls they will drop into their proper position in the slotted bearings of the plate 36 and will contact with the distributing-surface 35.

5 Various means may be provided for actuating the lifting-plates. In the machine shown each of said plates is provided with a looped extension 44. Each looped extension 44 is engaged by a cam 45, there being a pair of  
10 these cams for each oppositely-located pair of plates. The cams 45 are carried on a shaft 46, which is mounted in suitable bearings in the form-carrying cylinders, and the shafts 46 of each form-carrying cylinder are preferably  
15 connected by means of a connecting-rod 47, which engages arms 48, carried on the shafts. When, therefore, one of the shafts 46 is rocked, its companion shaft will also be rocked and both sets of lifting-plates actuated.

20 Any suitable means may be provided for rocking one of the pair of shafts. In the machine shown one of the shafts is provided with a squared head 49, upon which a wrench may be placed to rock the shaft.

25 The printed sheets may be fed to and delivered from the machine in any suitable manner. In the machine shown there is provided a feed-board 50, mounted on the extension 1' of the frame, from which the sheets  
30 are fed, and the sheets are delivered by delivery-cylinder 51, also mounted in the said extension, the cylinder being provided with a gear 52, which meshes with the gear 18, before described.

35 The operation of the machine will be understood from the foregoing and the following brief description.

When it is desired to operate the machine for the purpose of inking up, the impression-cylinder is brought to the proper position,  
40 with its impression-surface away from the form. A wrench is then placed on the squared head 31, and the shaft 20 is rocked, so as to disconnect the arm 21 from the gear  
45 18 and cause the arm 23 to engage the notched block 24. By means of a wrench one of each pair of shafts 46 of the two impression-cylinders 5 is then rocked to raise the lifting-plates into position, so as to be struck by the trucks  
50 43 on the form-inking rollers. The machine is now started, and the gear 18 will be revolved from the train of gearing between it and the power-shaft and will in turn operate the gears 17 and 19 and rotate the form-carrying  
55 cylinders. As the form-carrying cylinders rotate the form-rollers will be lifted away from the forms, but will run in contact with the distributing-surfaces, and thus cause the ink to become thoroughly mixed and distributed on the rollers and the distributing-surfaces. When the machine has been operated for a sufficient length of time to get the ink into proper condition, the machine will be  
60 stopped and the shaft 20 will be rocked, so as to release the arm 23 from the notched block and cause the arm 21 to engage the notch 22 in the gear. This movement locks the gear

and the impression-cylinder together. The shafts 46 will now be operated to depress the lifting-plates, and the machine is ready for  
70 printing.

The improvements described are particularly adapted for use in multicolor-machines of the type illustrated in the accompanying drawings and described in the foregoing specification, as no movement of the impression-cylinder is required. The invention, however, is not to be confined to use in connection with this particular type of machine, as it is of general utility and may be used with  
80 many other forms of printing-machines.

The invention is not, furthermore, to be limited to the particular mechanism employed which has been described for carrying it into effect. Many changes may be made in this  
85 mechanism, and such changes will readily suggest themselves to skilled mechanics. The invention is not therefore to be confined to the specific mechanical details which have been shown and described; but it is to be re-  
90 garded as covering all forms of mechanism which fall within the spirit and scope of the claims hereunto appended.

What is claimed is—

1. In a printing-machine, the combination  
95 with a printing-couple having a continuously-rotating member, a gear whereby the other member of the couple may be continuously rotated, and means intermediate the gear and said member for locking the member to and  
100 releasing it from the gear, substantially as described.

2. In a printing-machine, the combination with a continuously-driven train of gearing, of a printing-couple, one member of which is  
105 continuously driven from the train, and means intermediate one of the gears of the train and the other member of the couple for locking the member to and releasing it from the gear, substantially as described. 110

3. In a printing-machine, the combination with an impression-cylinder, of a gear whereby it may be continuously rotated, means intermediate the cylinder and the gear for locking the cylinder to and releasing it from the  
115 gear, and a continuously-rotating form-cylinder, substantially as described.

4. In a printing-machine, the combination with a continuously-driven train of gearing, of a continuously-rotating form-cylinder  
120 driven from the train, an impression-cylinder, and means intermediate the impression-cylinder and one of the gears of the train whereby the cylinder may be locked to and released from said gear, substantially as described. 125

5. In a multicolor-printing machine, the combination with an impression-cylinder, of a plurality of form-cylinders coöperating therewith, means for continuously driving all the cylinders in unison, and means for connecting the impression-cylinder to and  
130 disconnecting it from the driving means without disconnecting the driving connections of the form-cylinders, substantially as described.



6. In a multicolor-printing machine, the combination with an impression-cylinder, of two form-cylinders, means for driving the three cylinders in unison, means for connecting the impression-cylinder to and disconnecting it from the driving means, and a locking device for holding the impression-cylinder against action when it is disconnected from the driving means, substantially as described.

7. In a printing-machine, the combination with an impression-cylinder, of a gear whereby it may be continuously rotated, means between the cylinder and the gear for locking the cylinder to and releasing it from the gear, a continuously-rotating form-carrying cylinder, an ink-distributing surface, form-rollers, and means whereby the form-rollers may be kept out of contact with the form but allowed to run in contact with the distributing-surface, substantially as described.

8. In a printing-machine, the combination with an impression-cylinder, of a gear whereby it may be continuously rotated, means between the cylinder and the gear for locking the cylinder to and releasing it from the gear, a continuously-rotating form-carrying cylinder, said form-carrying cylinder having an ink-distributing surface, form-rollers, and means whereby the form-rollers may be kept out of contact with the form but allowed to run in contact with the distributing-surface, substantially as described.

9. In a printing-machine, the combination with an impression-cylinder, of a gear whereby it may be continuously rotated, means between the cylinder and the gear for locking the cylinder to and releasing it from the gear, means for locking the cylinder against movement when disconnected from the driving means, a form-cylinder, an ink-distributing surface, form-rollers, and means whereby the form-rollers are kept out of contact with the form but allowed to come in contact with the distributing-surface, substantially as described.

10. In a printing-machine, the combination with an impression-cylinder, of a gear whereby it may be continuously rotated, means between the cylinder and the gear for locking the cylinder to and releasing it from the gear, means for locking the cylinder against movement when disconnected from the driving means, a form-cylinder having an ink-distributing surface, form-rollers, and means whereby the form-rollers are kept out of contact with the form but allowed to come in contact with the distributing-surface, substantially as described.

11. In a multicolor-printing machine, the combination with an impression-cylinder having an impression-surface and a low side, of a plurality of form-cylinders cooperating with the impression-cylinder, means for driving the cylinders simultaneously, means for connecting the impression-cylinder to and disconnecting it from the driving means, ink-distributing surfaces on the form-cylinders,

form-rollers, and means operating to hold the form-rollers out of contact with the form-surfaces but permitting them to run on the distributing-surfaces, substantially as described.

12. In a printing-machine, the combination with an impression-cylinder having an impression-surface and a low side, of means whereby it may be continuously driven, a plurality of form-cylinders, means for continuously driving the form-cylinders, means for connecting the impression-cylinder to and disconnecting it from its driving means, a locking device, said locking device being located so as to be in position to hold the impression-cylinder against movement with its low side opposite the form-cylinders, ink-distributing surfaces on the form-cylinders, and means operating to hold the form-rollers out of contact with the form-surfaces but permitting them to run in contact with the distributing-surfaces, substantially as described.

13. In a printing-machine, the combination with an impression-cylinder, of a gear whereby it may be continuously driven, a locking device intermediate the cylinder and the gear for locking the cylinder to and releasing it from the gear, a locking device for holding the cylinder against movement when it is disconnected from the gear, and means for simultaneously operating the locking devices, substantially as described.

14. In a printing-machine, the combination with an impression-cylinder, of a plurality of form-cylinders, means for driving all the cylinders in unison, means for connecting the impression-cylinder to and disconnecting it from the driving means, a locking device for holding the impression-cylinder against movement when so disconnected, means for simultaneously operating the connecting means and the locking device, ink-distributing surfaces on the form-cylinder, form-rollers, and means operating to hold the form-rollers out of contact with the form but permitting them to run in contact with the distributing-surfaces, substantially as described.

15. In a printing-machine, the combination with an impression-cylinder, of a plurality of form-cylinders, means for driving the cylinders in unison, means carried by the impression-cylinder for connecting it to and disconnecting it from the driving means, ink-distributing surfaces on the form-cylinders, form-rollers, and means operating to hold the form-rollers out of contact with the form but permitting them to run in contact with the distributing-surfaces, substantially as described.

16. In a printing-machine, the combination with an impression-cylinder, of a plurality of form-cylinders, means for driving the cylinders in unison, means carried by the impression-cylinder for connecting it to and disconnecting it from the driving means, a locking member carried by the cylinder, a cooperating locking member, ink-distributing surfaces on the form-cylinders, form-rollers, and means operating to hold the form-rollers out



of contact with the form but permitting them to run in contact with the distributing-surfaces, substantially as described.

17. In a printing-machine, the combination  
5 with an impression-cylinder, of a form-cylinder, means for continuously driving the cylinders in unison, means carried by the impression-cylinder for connecting it to and disconnecting it from the driving means, a locking member carried by the cylinder, a coöperating locking member, means for simultaneously operating the connecting means and the locking member, an ink-distributing surface on the form-cylinder, form-rollers,  
10 and means operating to hold the form-rollers out of contact with the form but permitting them to run in contact with the distributing-surface, substantially as described.

18. In a printing-machine, the combination  
20 with a shaft, of a gear loosely mounted thereon and continuously rotating in the same direction, a cylinder fast on the shaft, and means carried by the cylinder and coöperating with means on the gear for connecting the cylinder to and disconnecting it from the gear, substantially as described.

19. In a printing-machine, the combination  
30 with a shaft, of a gear loosely mounted on the shaft and continuously rotating in the same direction, a cylinder fast on the shaft, means for connecting the cylinder to and disconnecting it from the gear, and a locking device for holding the cylinder stationary when it is disconnected from the gear, substantially as described.

20. In a printing-machine, the combination  
40 with a cylinder, of a gear continuously rotating in the same direction, means for connecting the cylinder to and disconnecting it from the gear, a locking device for holding the cylinder stationary when it is disconnected from the gear, and means for simultaneously operating the connecting means and the locking device, substantially as described.

21. In a printing-machine, the combination  
50 with a continuously-rotating gear, of a plurality of cylinders driven from the gear, and means carried by one of the cylinders and coöperating with means on the gear for connecting and disconnecting that cylinder from the gear without disturbing the driving connections of the other cylinders, substantially as described.

22. In a printing-machine, the combination  
55 with a continuously-rotating gear, of a plurality of cylinders driven from the gear, means for connecting and disconnecting one of the cylinders from the gear, and a locking device for holding it stationary when it is disconnected from the gear, substantially as described.

23. In a printing-machine, the combination  
65 with a continuously-rotating gear, of a plurality of cylinders driven from the gear, means for connecting and disconnecting one of the cylinders from the gear, a locking device for holding it stationary when it is disconnected

from the gear, and means for simultaneously operating the connecting means and the locking device, substantially as described. 70

24. In a printing-machine, the combination  
75 with a continuously-running gear, of an impression-cylinder, means for connecting the cylinder to and disconnecting it from the gear, a plurality of form-cylinders driven from the gear, ink-distributing surfaces carried by the form-cylinders, form-rollers, and means operating to hold the form-rollers out of contact with the form but permitting them to run in contact with the distributing-surfaces, substantially as described. 80

25. In a printing-machine, the combination  
85 with a continuously-running gear, of an impression-cylinder, means for connecting it to and disconnecting it from the gear, a locking device for holding the cylinder stationary when it is disconnected from the gear, a plurality of form-cylinders driven from the gear, ink-distributing surfaces on the form-cylinder, form-rollers, and means operating to  
90 hold the form-rollers out of contact with the form but permitting them to run in contact with the distributing-surfaces, substantially as described.

26. In a printing-machine, the combination  
95 with a continuously-running gear, of an impression-cylinder, means for connecting it to and disconnecting it from the gear, a locking device for holding the cylinder stationary when it is disconnected from the gear, means  
100 for simultaneously operating the connecting means and the locking device, a plurality of form-cylinders driven from the gear, ink-distributing surfaces on the form-cylinders, form-rollers, and means operating to hold the  
105 form-rollers out of contact with the form but permitting them to run in contact with the distributing-surfaces, substantially as described.

27. The combination with a continuously-  
110 running gear having a locking member, of a cylinder, a rock-shaft carried by the cylinder having a locking-arm coöperating with the member on the gear, and means for rocking the shaft to connect the cylinder to and  
115 disconnect it from the gear, substantially as described.

28. The combination with a continuously-  
120 running gear having a locking member, of a cylinder, a rock-shaft carried by the cylinder having a locking-arm coöperating with the locking member on the gear, means for rocking the shaft to connect the cylinder to and disconnect it from the gear, and a locking device for holding the cylinder stationary, substantially as described. 125

29. In a printing-machine, the combination  
130 with a continuously-running gear having a locking member, of an impression-cylinder, a rock-shaft carried in the cylinder and having a locking-arm which coöperates with the locking member on the gear, a second locking-arm, a stationary member with which said second locking-arm coöperates, and means



for rocking the shaft to simultaneously operate the arms, one being thrown into and the other out of locking position, substantially as described.

5 30. In a printing-machine, the combination with a form-cylinder having an ink-distributing surface, of a set of form-rollers mounted in stationary bearings, and means carried by the cylinder and movable thereon for lifting  
10 the form-rollers in their bearings to hold them out of contact with the form-surface but permitting them to run in contact with the ink-distributing surface, substantially as described.

15 31. In a printing-machine, the combination with a form-cylinder having an ink-distributing surface, of a set of form-rollers, stationary bearings in which the form-rollers are mounted, and a set of radially-moving lifting-plates  
20 carried by the cylinder and operating to lift the form-rollers away from the form but permitting them to run in contact with the ink-distributing surface, substantially as described.

25 32. In a printing-machine, the combination with a form-cylinder having an ink-distributing surface, of a set of form-rollers, stationary bearings in which the form-rollers are mounted, a set of radially-moving lifting-plates carried by the cylinder and operating to lift the  
30 form-rollers away from the form and permit them to come in contact with the ink-distributing surface, and means for simultaneously operating the plates, substantially as described.  
35

33. In a printing-machine, the combination with a form-cylinder having an ink-distributing surface, of a set of form-rollers mounted in stationary bearings, trucks on the rollers,  
40 and a set of radially-moving overlapping lifting-plates located along the form-surface, substantially as described.

34. In a printing-machine, the combination with a form-cylinder having an ink-distributing surface, of a set of form-rollers mounted  
45

in stationary bearings, trucks on the rollers, a set of radially-moving overlapping lifting-plates located along the form-surface, and cams for operating the lifting-plates, substantially as described.

50 35. In a printing-machine, the combination with a form-cylinder having an ink-distributing surface, of a set of form-rollers mounted in stationary bearings, trucks on the rollers, a set of radially-moving overlapping lifting-  
55 plates located along the form-surface, and a set of connected cams for operating the lifting-plates whereby the plates are operated simultaneously, substantially as described.

36. The combination with a form-cylinder, 60 of a set of form-rollers, stationary bearings in which the rollers are mounted, a pair of radially-moving lifting-plates on each side of the cylinder, a rock-shaft mounted in the cylinder, and cams on the rock-shaft acting to move  
65 the plates both in and out, substantially as described.

37. In a printing-machine, the combination with an impression-cylinder and a shaft with which it is rigidly connected, of a continu-  
70 ously-running gear loosely mounted on the shaft, means for connecting the cylinder to and disconnecting it from the gear, a plurality of form-cylinders having operating-gears meshing with the continuously-running gear,  
75 a set of form-rollers, stationary bearings in which they are mounted, ink-distributing surfaces on the form-cylinders with which the form-rollers contact, and means for lifting the  
80 form-rollers in their bearings to cause them to clear the form as the cylinders rotate, 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.