

(No Model.)

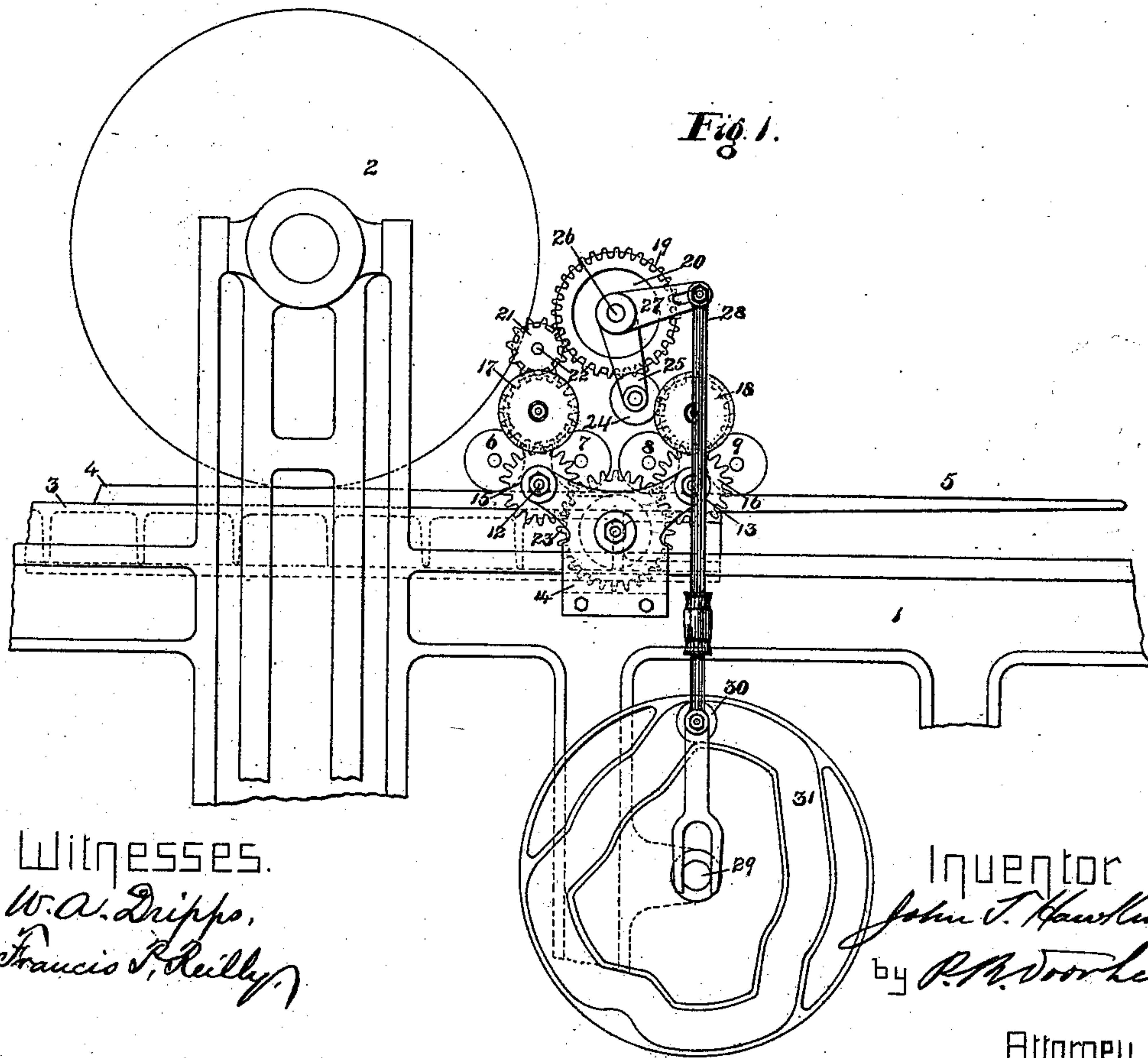
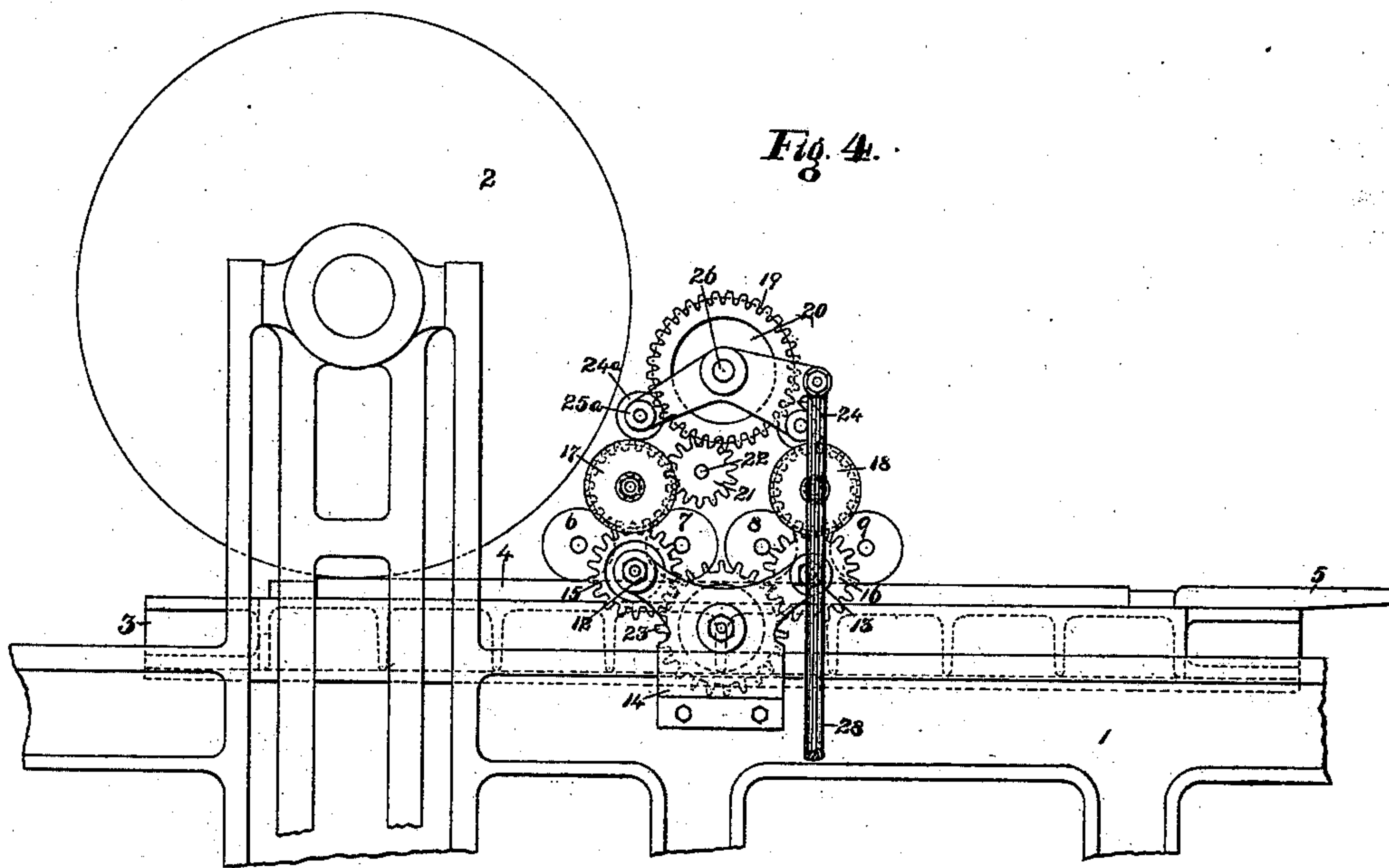
4 Sheets—Sheet 1.

J. T. HAWKINS.

INKING APPARATUS FOR PRINTING PRESSES.

No. 402,447.

Patented Apr. 30, 1889.



Witnesses.  
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*Francis P. Reilly,*

Inventor  
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by *R. M. Voorhees*  
Attorney.

(No Model.)

4 Sheets—Sheet 2.

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Fig. 2.

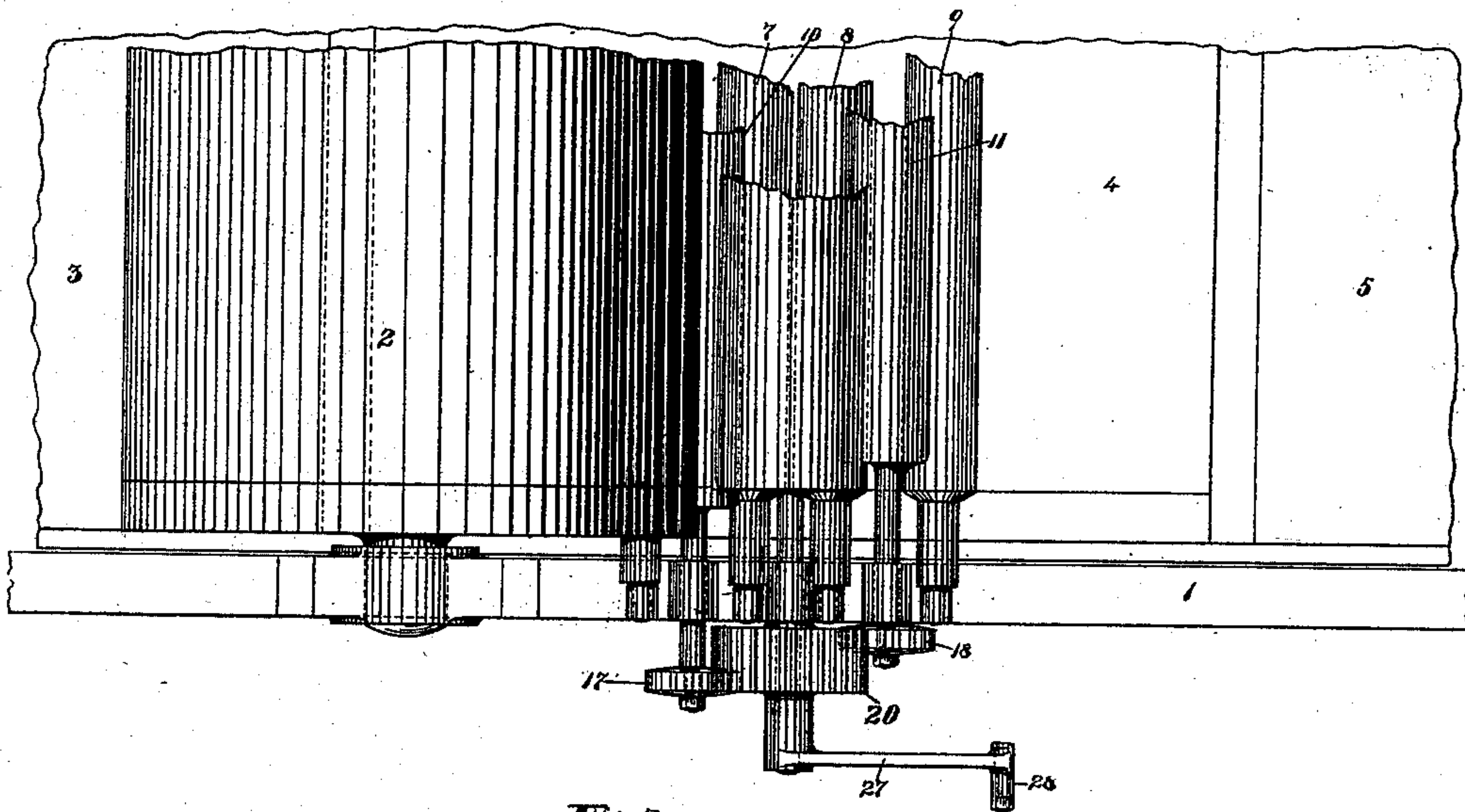
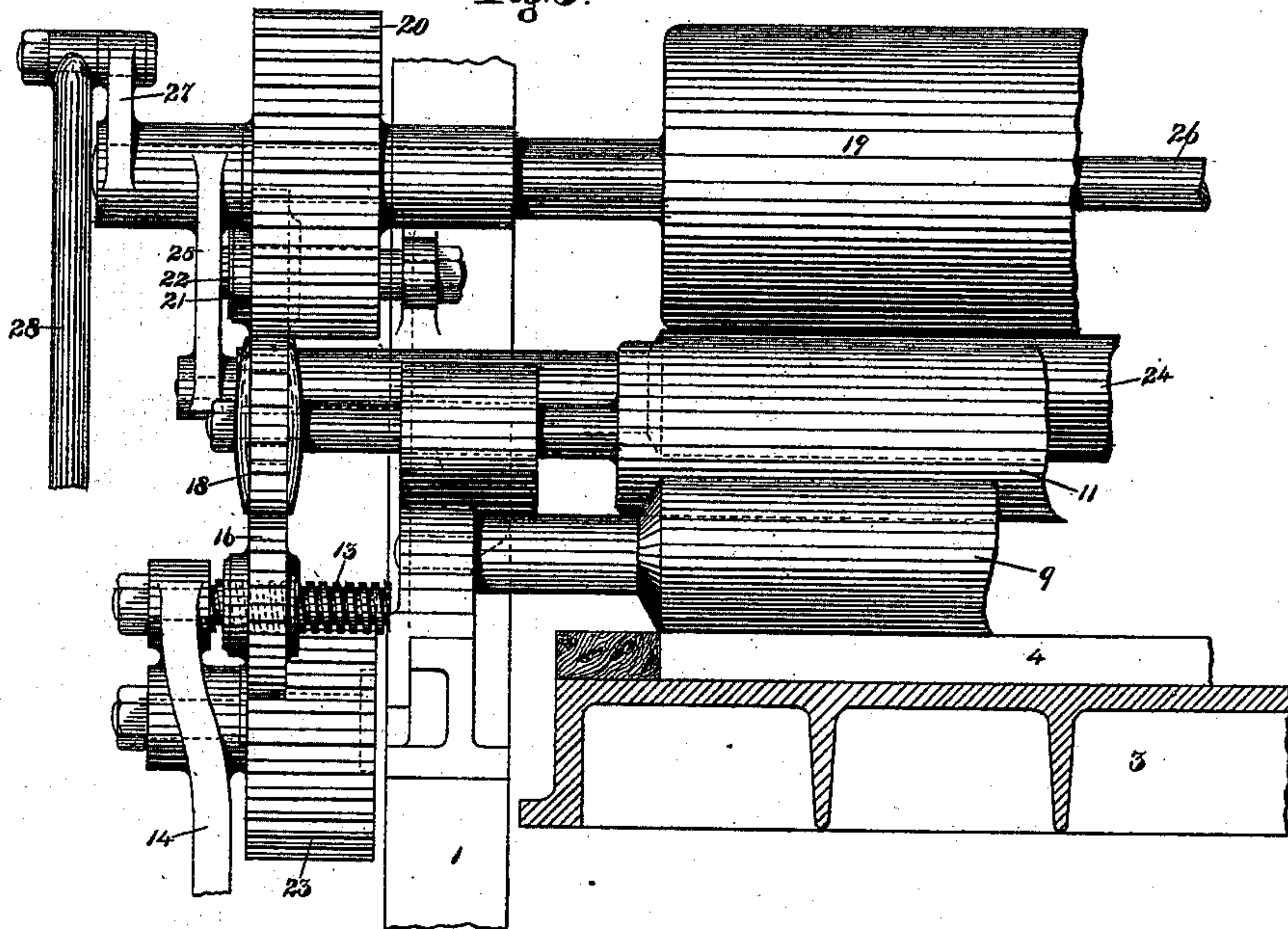


Fig. 3.



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(No Model.)

4 Sheets—Sheet 3.

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Fig. 5.

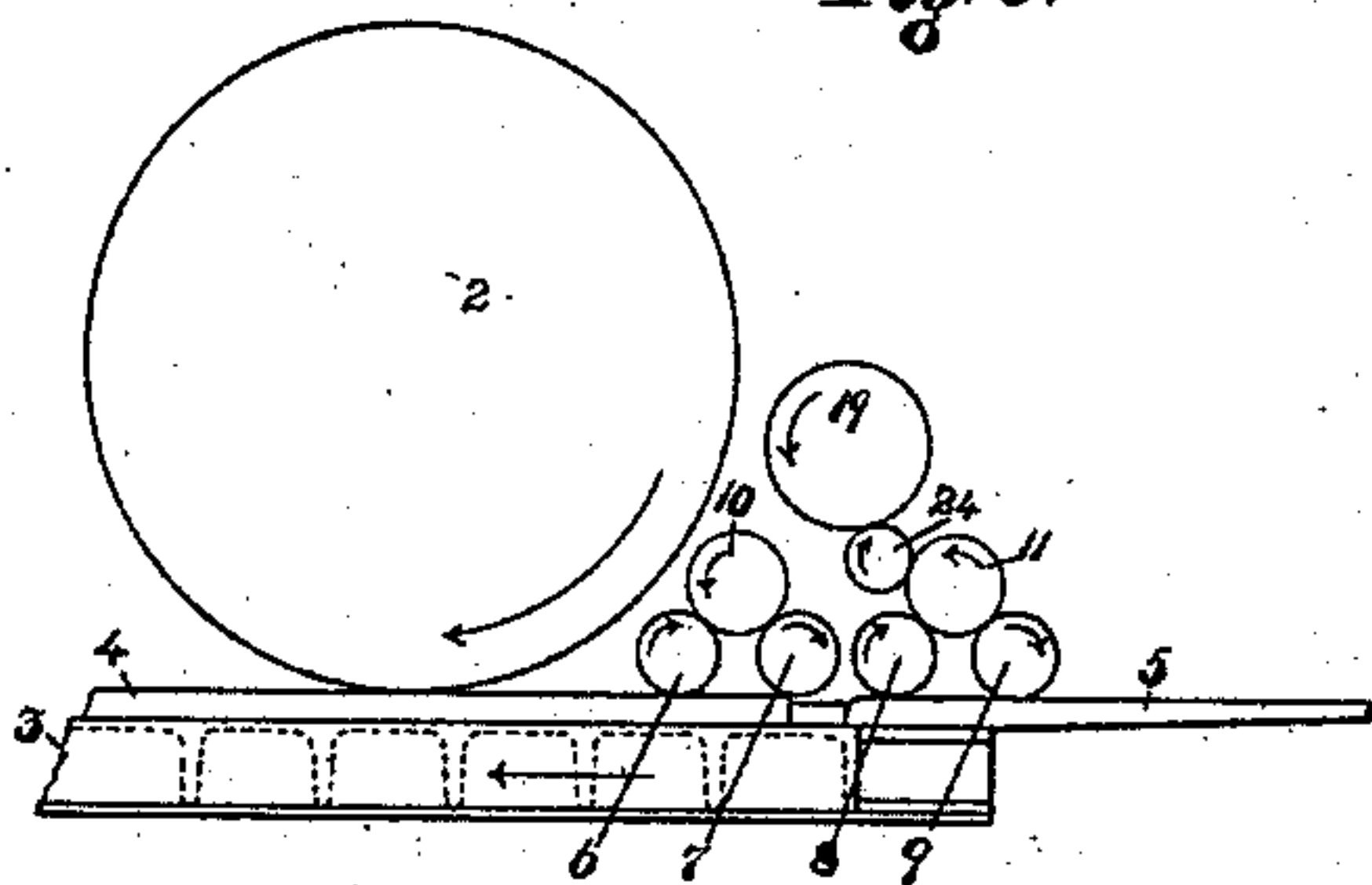


Fig. 6.

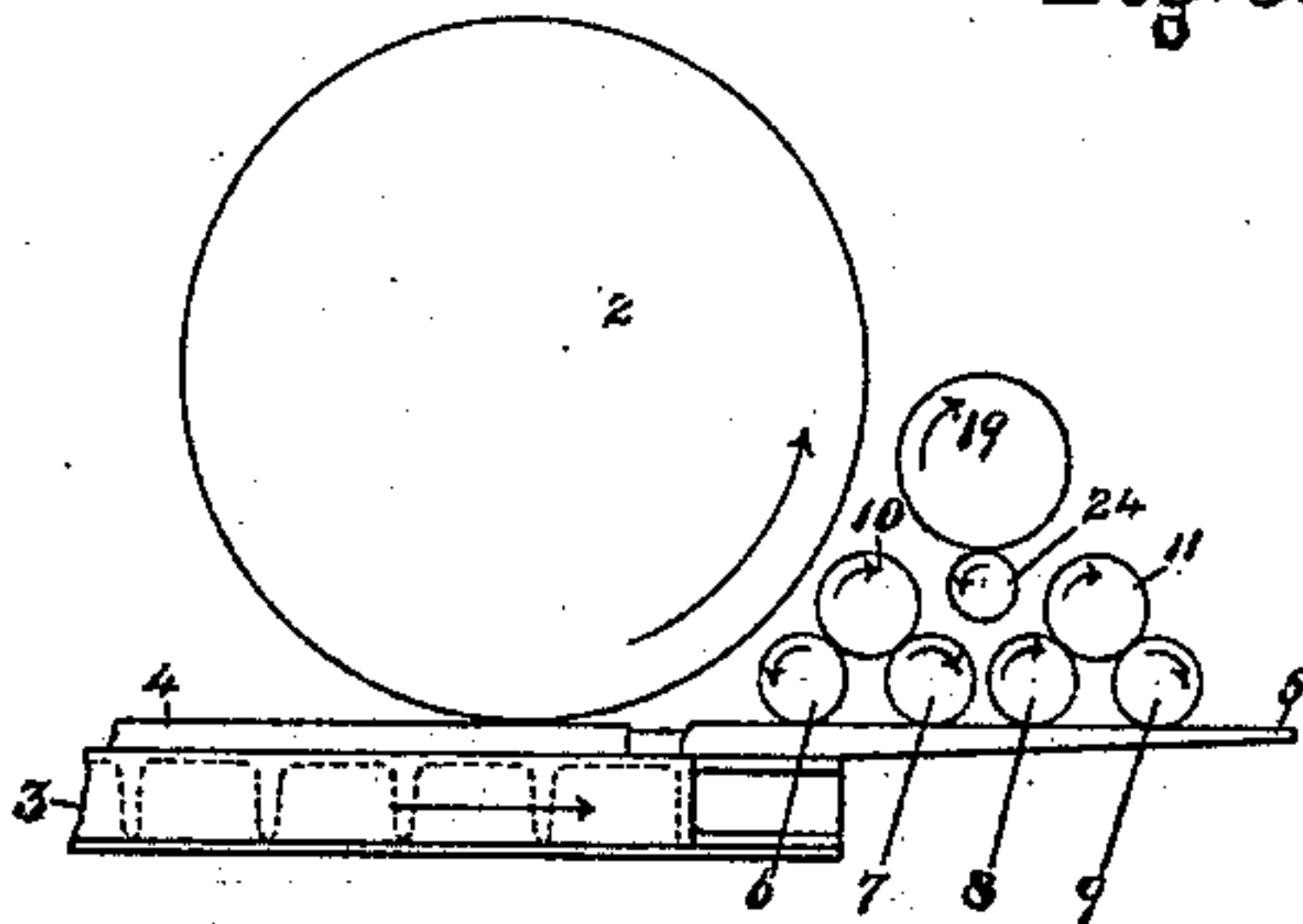


Fig. 7.

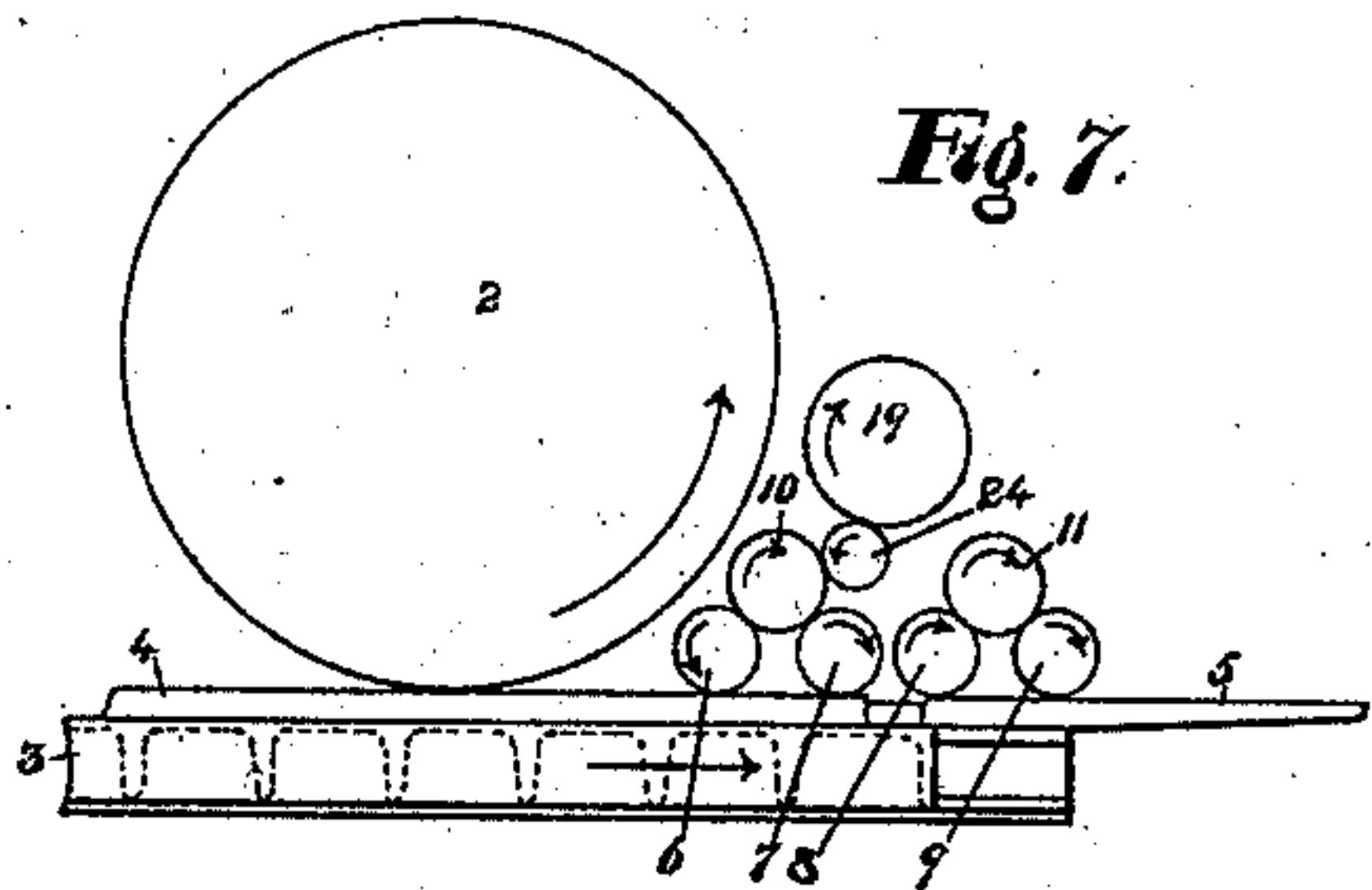


Fig. 8.

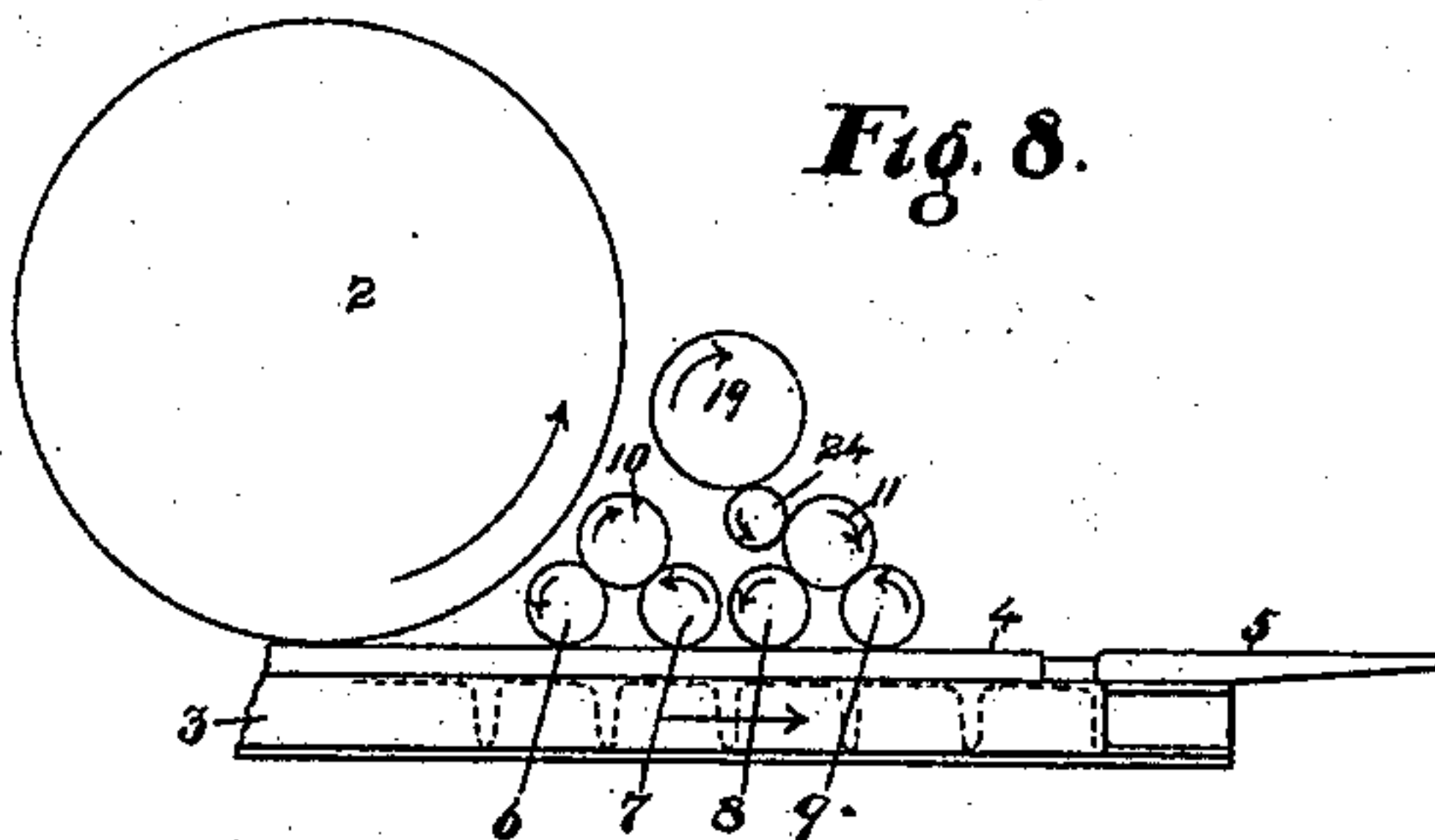


Fig. 9.

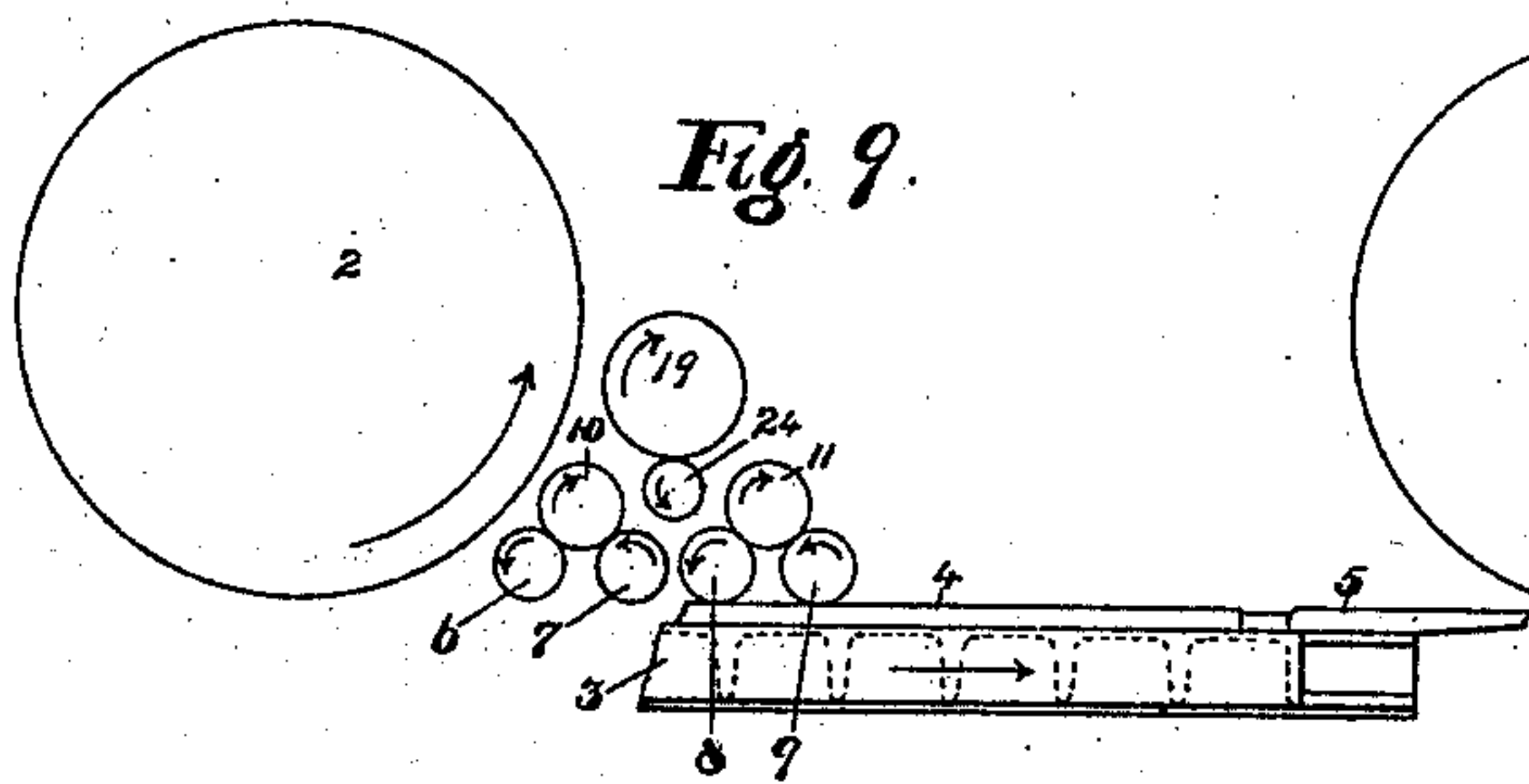


Fig. 10.

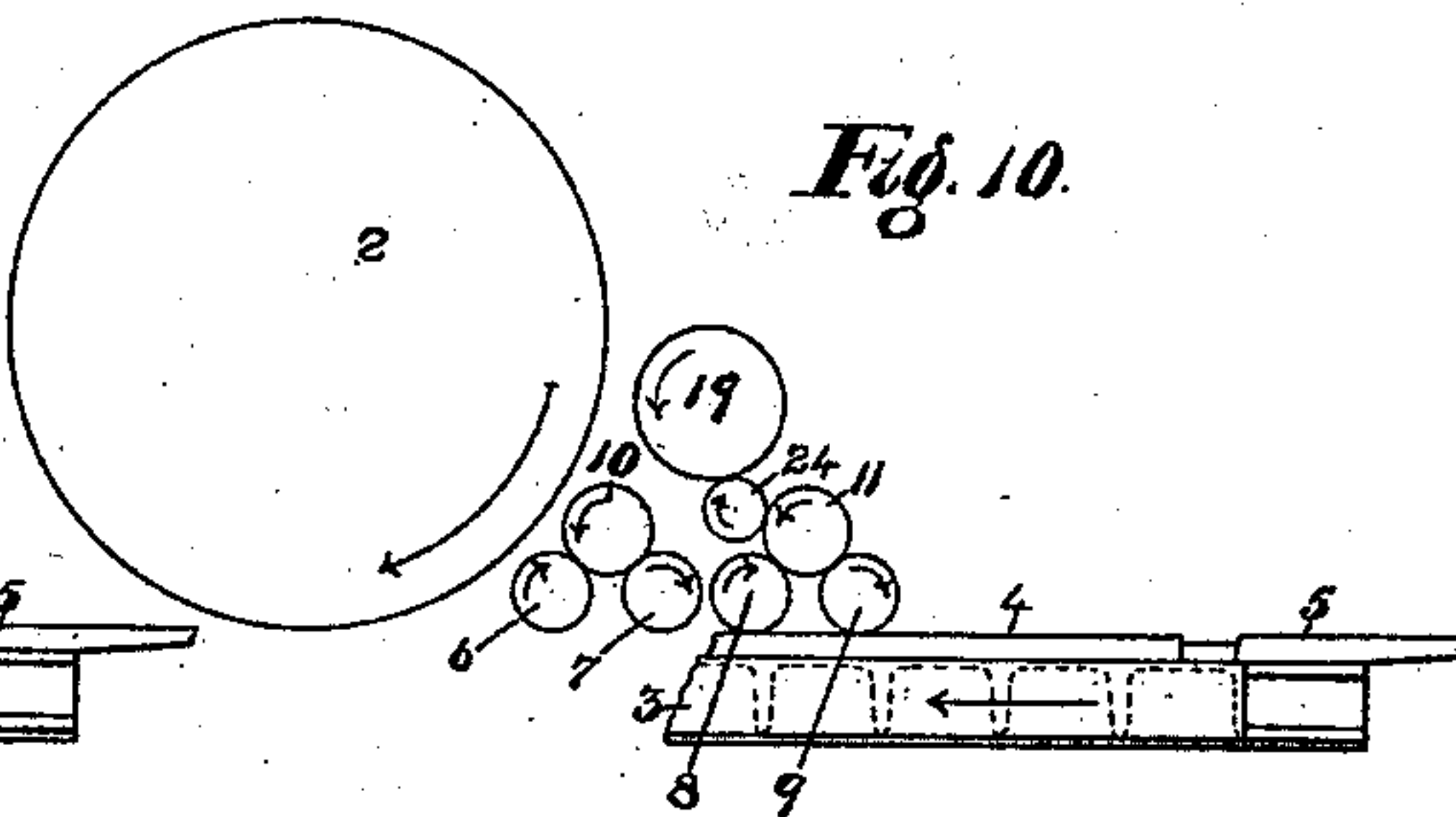
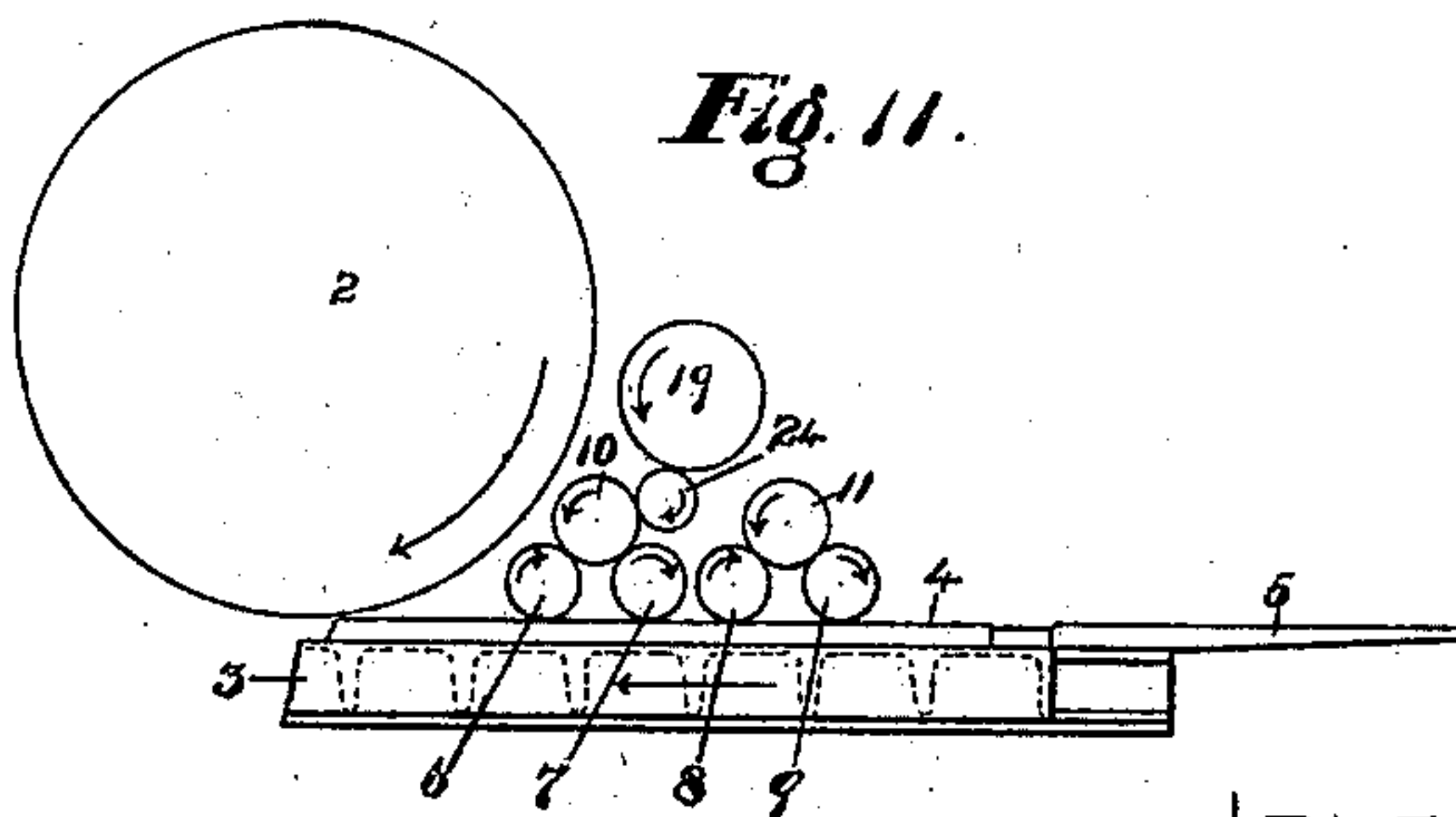


Fig. 11.



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4 Sheets—Sheet 4.

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Fig. 12.

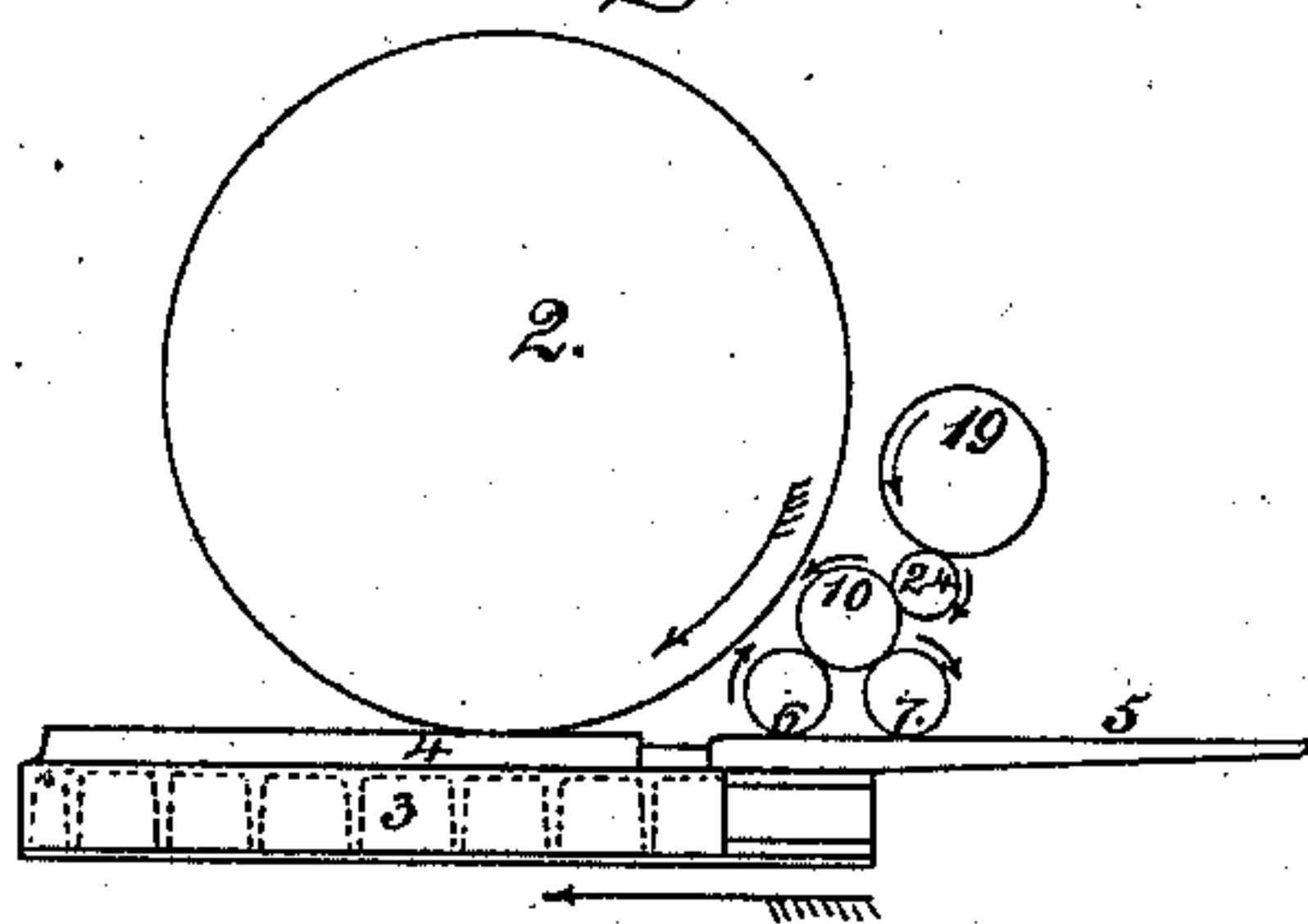


Fig. 13.

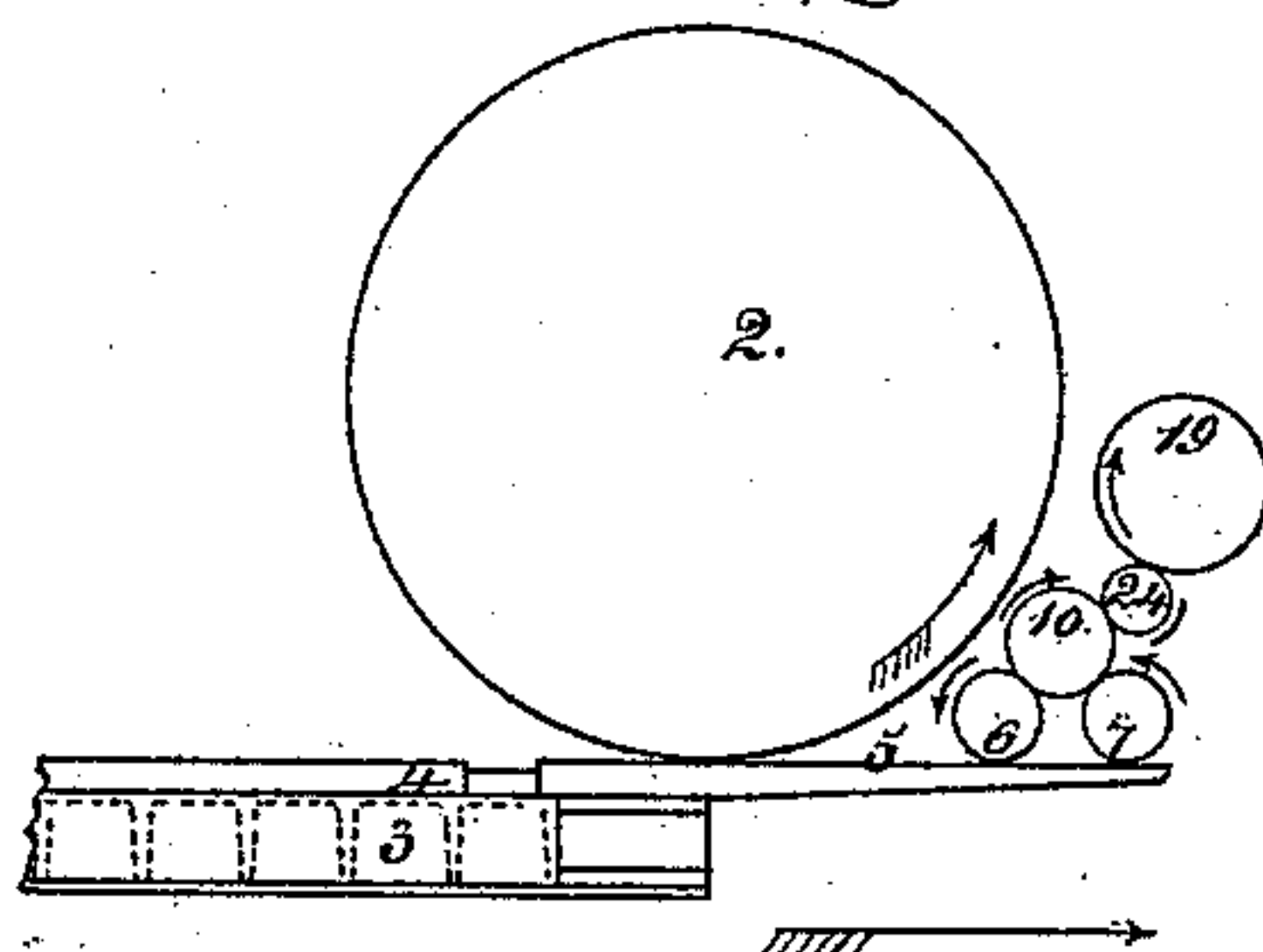


Fig. 14.

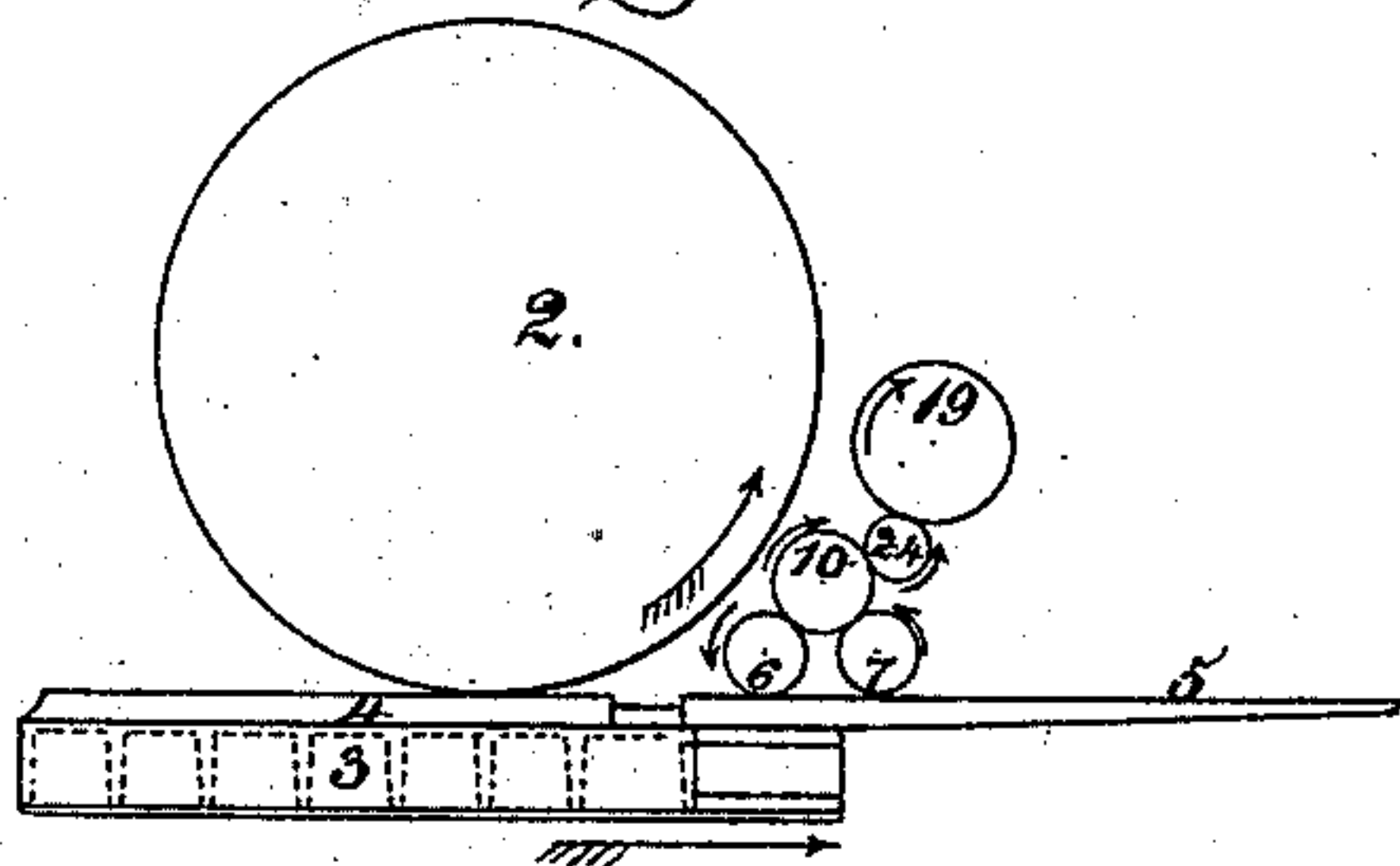
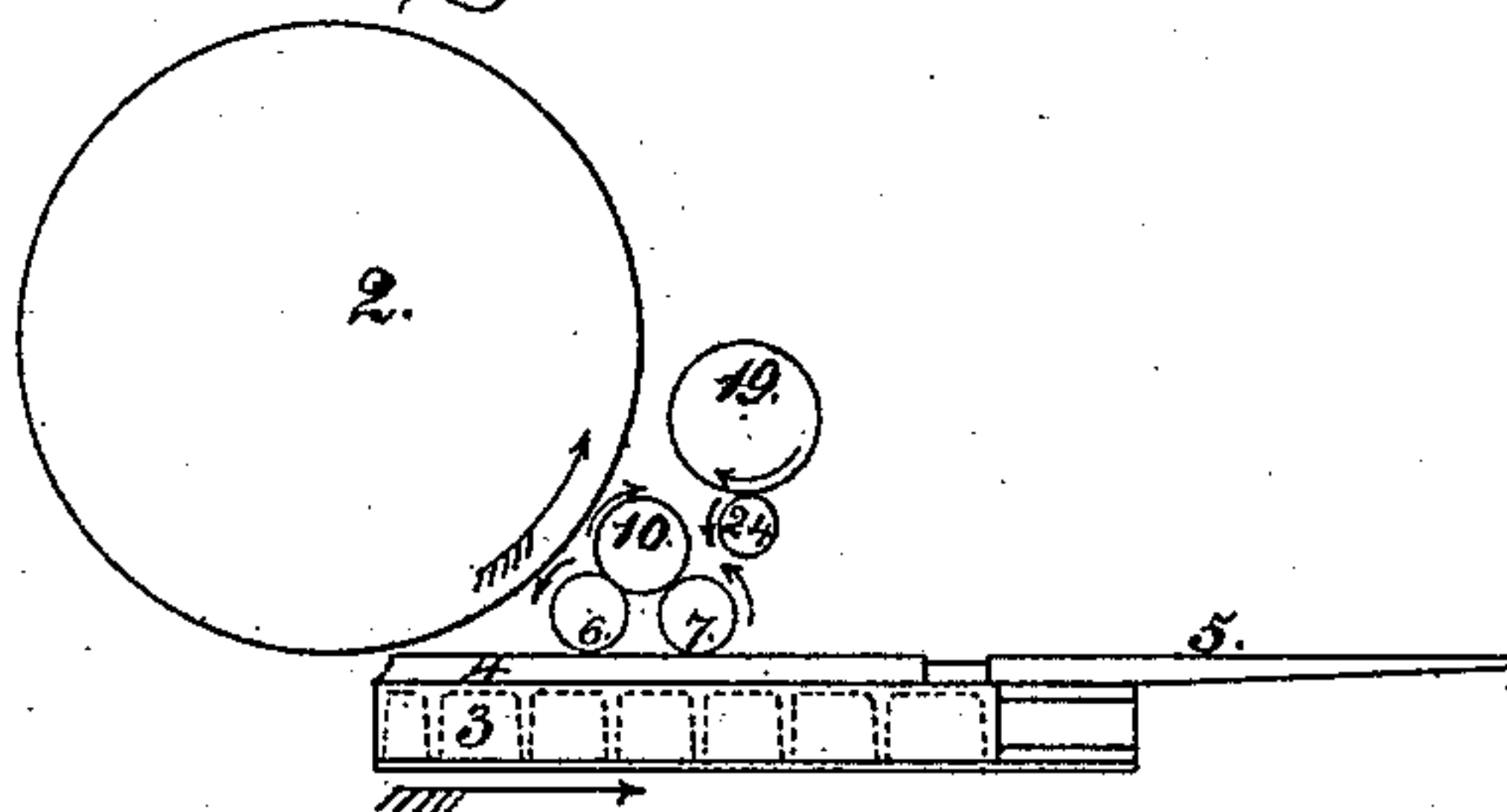


Fig. 15.



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# UNITED STATES PATENT OFFICE.

JOHN T. HAWKINS, OF TAUNTON, MASSACHUSETTS.

## INKING APPARATUS FOR PRINTING-PRESSES.

SPECIFICATION forming part of Letters Patent No. 402,447, dated April 30, 1889.

Application filed March 20, 1888. Serial No. 267,798. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN T. HAWKINS, of Taunton, in the county of Bristol and State of Massachusetts, have invented a new and useful Improvement in Inking Apparatus for Printing-Presses, which invention is fully described and illustrated in the following specification and accompanying drawings.

The object of this invention is to provide means of depositing the ink more equably upon the reciprocating flat form of a cylinder printing-machine than is done by means heretofore in use.

The invention will first be described in detail, and then particularly set forth in the claim, a short explanation being given before describing the drawings.

It is well understood in the art that a charged ink-roller whose circumference is less than the length of the form it is designed to ink will deposit more ink on the form during its first revolution thereon than during any subsequent revolution, and where all the form-rollers are on one side of the impression-cylinder the effect, though somewhat modified by riding or distributing rollers, (the latter serving to some extent as reservoirs of ink,) remains appreciable in the finer grades of printing. To obviate this difficulty, I arrange additionally a large roller or cylinder receiving the bulk of the ink first from the ink-table, to serve as a reservoir from which to draw the ink during the passage of the form-rollers over the form, and a ductor roller or rollers in contact therewith caused to automatically oscillate in and out of contact with one or both of the usual riding or distributing rollers at the proper times to deliver ink to the partially-exhausted form-rollers as they pass over those parts of the form to be covered after they have delivered to the form the main part of the ink first deposited on them.

In the accompanying drawings, Figure 1 shows in side elevation so much of a cylinder printing-machine as is necessary to fully illustrate the invention. Fig. 2 shows the parts of Fig. 1 in half plan. Fig. 3 shows in transverse elevation the same parts, partly in section, upon a larger scale for the sake of clearer illustration. Fig. 4 shows in side elevation a modification of said parts, wherein two ductor-rollers are used instead of one. Figs. 5 to 11, inclusive, are diagrammatic elevations showing the relative positions of parts at different times.

In said figures the several parts are indicated by numbers of reference, as follows:

The number 1 indicates one of the main frames of the machine; 2, the impression-cylinder; 3, the reciprocating type-bed; 4, the form, and 5 the ink-plate attached to and reciprocating with the type-bed. This ink-plate receives its ink from the usual fountain and ductor roller, which ink is distributed over said plate by the usual angle-rollers, the fountain and angle rollers not being deemed necessary to be shown in the illustration of this invention, as such apparatus is well known in the art. It may therefore be considered in this description that the ink-table receives its ink from such an apparatus in the usual way.

The rollers 6, 7, 8, and 9 are the form-rollers, and rollers 10 and 11 are the riding or distributing rollers, 10 being in contact with the form-rollers 6 and 7, and 11 in contact with 8 and 9, in the usual manner. Rollers 10 and 11 have imparted to them end motion by means of screw-studs 12 and 13, (secured to a bracket, 14, which in turn is secured to the frame 1,) and threaded gears 15 and 16 running upon said studs, which engage flanged gears 17 and 18, which in turn are secured to rollers 10 and 11, all the latter in a well-known way now long in use.

The number 19 indicates a reservoir-roller.

The bearings in which the rollers 6, 7, 8, 9, 10, 11, and 19 are run are omitted in Figs. 1 and 4 in order to better show the gears thereon. Said bearings are shown only in Figs. 2 and 3. The reservoir-roller 19 is rotated by means of a wide-faced gear, 20, secured upon its end, and a sliding intermediate pinion, 21, engaging it and the flanged gear 17, the intermediate gear 20 sliding upon a stud, 22. The whole is actuated by the wide-faced intermediate gear 23 running upon a stud in frame 1, which in turn is suitably driven by intervening gears from a rack secured to a reciprocating part of the press in a well-known way, (not necessary to be shown,) the rotary motion thus imparted and the dimensions of all parts described being such as to



drive the rollers 6, 7, 8, and 9 in uniformity with the surface of the form.

The ductor-roller 24 is journaled at one end in the free end of a lever, 25, the other end 5 being journaled in a similar lever. The lever 25 and its mate (not shown) are secured to a shaft, 26, passing entirely through roller 19, and to the end of shaft 26 is secured a lever, 27. Lever 27 is articulated to the upper end 10 of a connecting-rod, 28, which is bifurcated at its lower end to embrace shaft 29, and carries a roller, 30, which engages the groove of a box-cam, 31. The cam 31 is so formed as to impart oscillations and periods of rest to the 15 ductor-roller 24, as hereinbefore described. The shaft 29, to which cam 31 is secured, makes one revolution to each complete evolution of the machine.

In the modification shown in Fig. 4 the 20 ductor-rollers 24 and 24<sup>a</sup> are carried in double-armed levers 25<sup>a</sup>, and in such modification the ductor-rollers do not require to have so large an amount of oscillation imparted to them as with the single roller, while they, in 25 part, serve as additional ink-reservoirs.

Referring now to the diagrams Figs. 5 to 11, inclusive, the several parts are moving in the direction of the arrows. In Fig. 5 the ink-table 5 has just run under the two form-rollers 8 and 9, and ink has been first taken by 30 roller 9, imparted to 11, thence to 24, thence to 19, without roller 8 having received any except what remained upon the ink-table 5 after 9 had passed over it, and from roller 11 35 after roller 24 had passed over it, roller 24 during this time being held in contact with roller 11 by the cam 31. Continuing until the parts reach the positions shown in Fig. 6, the convection of ink from the table 5 to res- 40 ervoir-roller 19 goes on until the cam drops ductor-roller 24 away from 11, but said table continues to deposit upon roller 11 what it still holds and a portion of what roller 9 holds, after which the ink remaining on roll- 45 ers 9 and 11 is imparted to or divided with roller 8, and rollers 8 and 9 are more lightly inked, and rollers 19 and 24 have received a portion of the ink from the table 5, which would otherwise have gone principally to 50 rollers 8 and 9 and partly to 6 and 7. The rollers 6 and 7 will therefore up to this point have been also only lightly inked. Continuing to positions shown in Fig. 7, the bed has partly returned and the roller 24 is brought 55 into contact with roller 10. Up to this time rollers 6 and 7 have lightly inked the leading end of the form, and thereafter will receive ink from roller 19 through 24 and 10, but must rotate a part of a revolution before the 60 ink furnished by 19 and 24 will reach the form, and thus from about the middle of the form said rollers 6 and 7 will impart to it the ink so received from 19 and 24. During this time the lightly-inked rollers 8 and 9 will 65 have contributed their quota to the leading end of the form, and until the parts move to the positions shown in Fig. 8, when roller 24

is made to pass from 10 to 11 and begins to deliver ink from 19 to 8 and 9, 6 and 7 mean- 70 while delivering that remaining on them which was received from 19 and 24. Continuing, the rollers 8 and 9 begin to deposit on the last half of the form ink received from 19 and 24 until the parts arrive at the positions 75 shown in Fig. 9, the roller 24 having meanwhile been withdrawn from roller 11. Continuing to Fig. 10, the form has passed en- 80 tirely beyond the rollers 8 and 9 and returned to a position where ink may be conveyed from 19 and 24, and 24 is brought again into con- 85 tact with 11, so that the ink will be deposited upon what was at first the leading but now becomes the following end of the form until arriving at position Fig. 11, when roller 24 is 85 changed in position from 11 to 10, and again gives ink to 6 and 7, which in a like manner have become partially exhausted. In this way during the inward stroke of the form a 90 portion of the ink is taken from the table 5 in running under roller 9 and deposited upon the reservoir-roller 19, and thereafter equal- ized over the form.

The press, as shown in Figs. 1 to 11, inclu- 95 sive, is what is known as a "four-roller" machine, having four form-rollers over the form; but an equivalent effect is produced upon a "two-roller" machine by making and breaking 100 contact at the proper time between the ductor-roller 24 and a single riding-roller, as shown in Figs. 12 to 15, inclusive, the operation being as follows: From the position Fig. 12 ink 105 passes from the table 5 to roller 7, thence to 10, to 24, to 19, leaving 6 lightly inked, until the parts arrive at the position shown in Fig. 13, the main portion of the ink having been 110 transferred to the reservoir-roller 19. From the position shown in Fig. 13 the remaining ink upon the table 5, if greater in amount than that on reservoir-roller 19, is taken by roller 6, transferred thence to 10, to 24, to 19, and, if 115 greater on 19 than on the table, its transfer will be in the reverse order, the ink, when the parts have arrived at the position in Fig. 14, being nearly equally distributed over rollers 6 7 10 24 19. Rollers 6 and 7 will now be fed 120 from 19 until the rollers arrive at the proper point, the roller 6 receiving only what remains on 10 after passing 7, thus commencing to ink the first end of the form lightly, then followed by 7 more heavily inked. By the time the roll- 125 ers have reached the middle of the form, or such point that the ink remaining on rollers 6, 7, and 10 has inked the remainder of the form, the roller 24 is moved from 10, as in Fig. 15, and the remainder of the form is inked by 130 the ink remaining on 7 and 10 in diminishing quantity. At the proper point, 24 is again brought into contact with 10 to cover 10, 6, and 7 with ink to be deposited upon the returning other end of the form; but the contact of 24 135 with 10 is not made sufficiently soon to give any additional ink to the last part of the form. The reservoir-roller 19 will then continue to feed ink to 10, 6, and 7 in diminishing quantity



as the form runs in reverse direction under them, and rollers 6 and 7 again enter on the ink-table, to receive and transfer to 19 a new charge, the parts finally arriving again at the position shown in Fig. 12. In this way the rollers deposit ink a little more fully at the entering end of the form, and gradually diminish their deposit to the following end, and then upon reversing receive ink from the reservoir-rollers 19, 24, and 10, deposited more heavily on the re-entering end, and diminished toward that end which was previously inked the heaviest. I therefore do not confine myself to a four-roller machine, as this device is equally applicable to, if not superior in, a machine in which two form-rollers only pass over the form; nor do I confine myself to the methods herein described for the purpose of imparting rotary or lateral motion to the rollers 10, 11, and 19, nor to the oscillation of the ductor-roller 24 or 24<sup>a</sup>, as these operations may be accomplished in many known ways most suitable to the particular form of machine to which they may be adapted; but,

Having thus fully described my said improvement as of my invention, I claim—

In the inking apparatus of a printing-machine, in combination with a reciprocating form, as 4, and ink-table, as 5, a reservoir-roller, as 19, pairs of form-rollers, as 6 and 7 30 8 and 9, one pair or both pairs, riding or distributing rollers, as 10 and 11, one or both, in contact each with a pair of said form-rollers, and a ductor roller or rollers, as 24 24<sup>a</sup>, in constant contact with said reservoir-roller, and 35 automatically oscillated in and out of contact with said riding or distributing roller or rollers, whereby the ink deposited upon said ink-table is first partially conveyed to said reservoir-roller, afterward distributed to the form-rollers, and by them deposited upon the form in an equable manner, substantially as described, for the purposes set forth. 40

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