

T. M. NORTH.
SHEET DELIVERY MECHANISM FOR PRINTING MACHINES.
APPLICATION FILED JAN. 27, 1908.

935,538.

Patented Sept. 28, 1909.
3 SHEETS—SHEET 1.

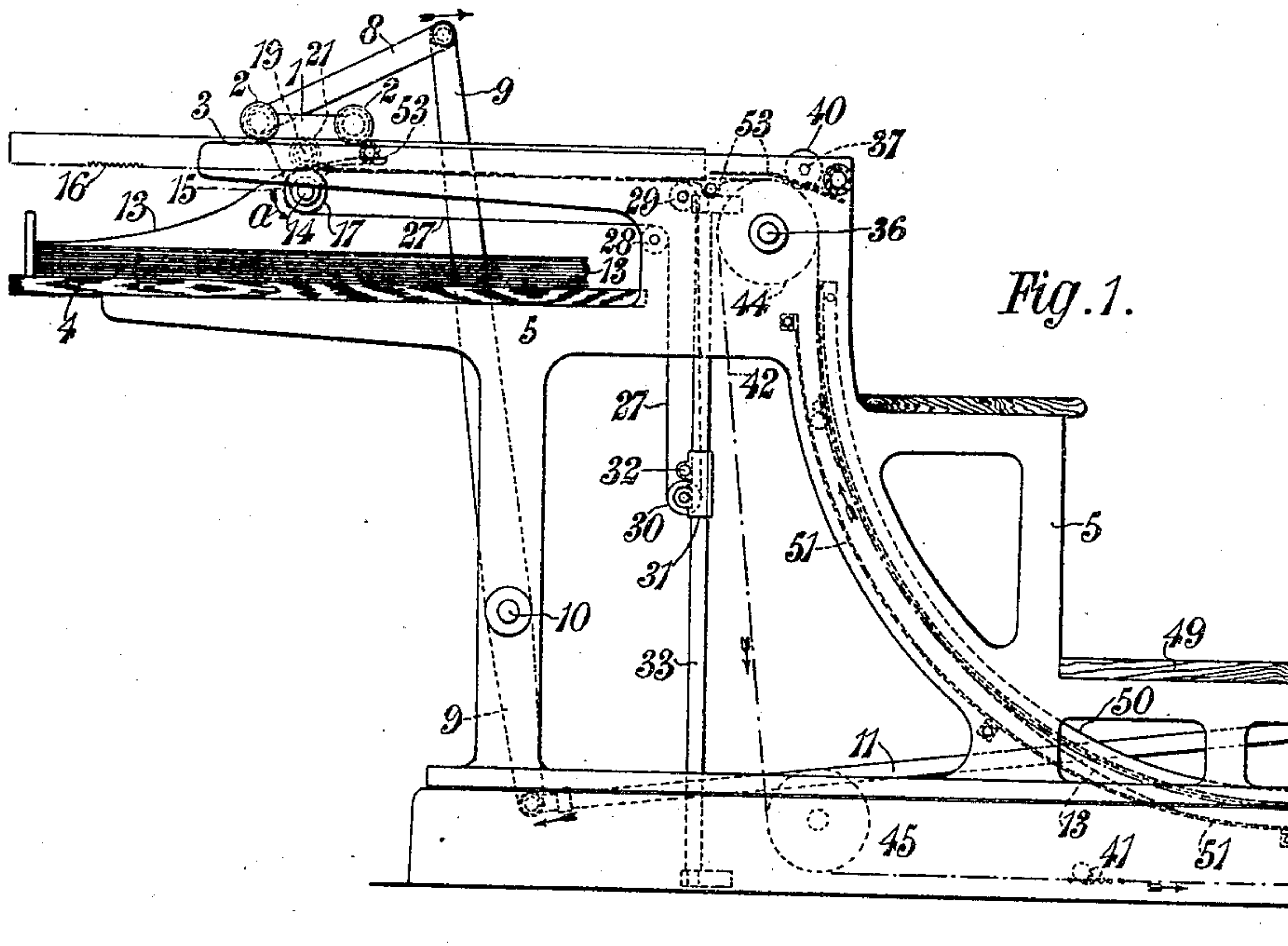


Fig. 1.

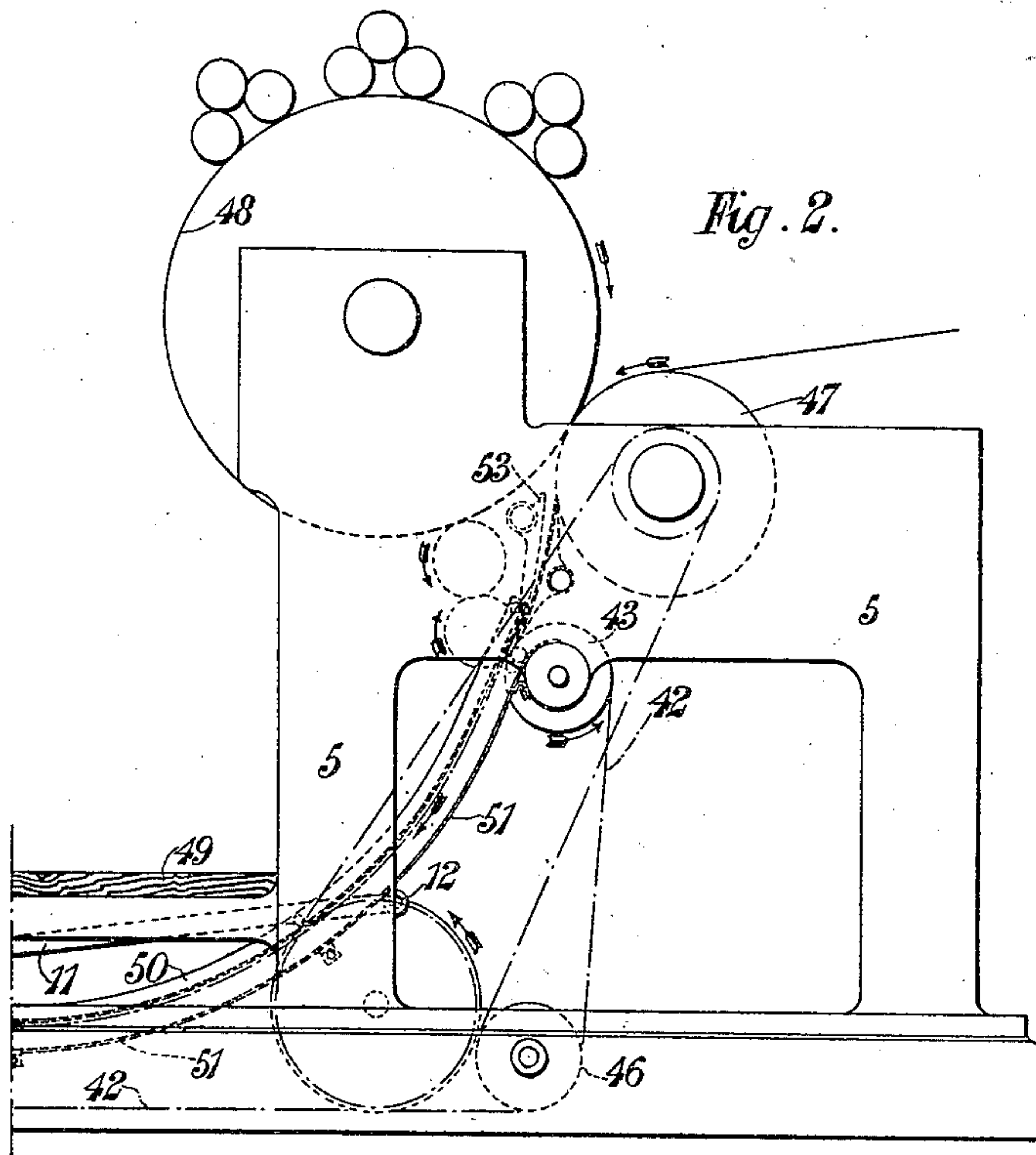
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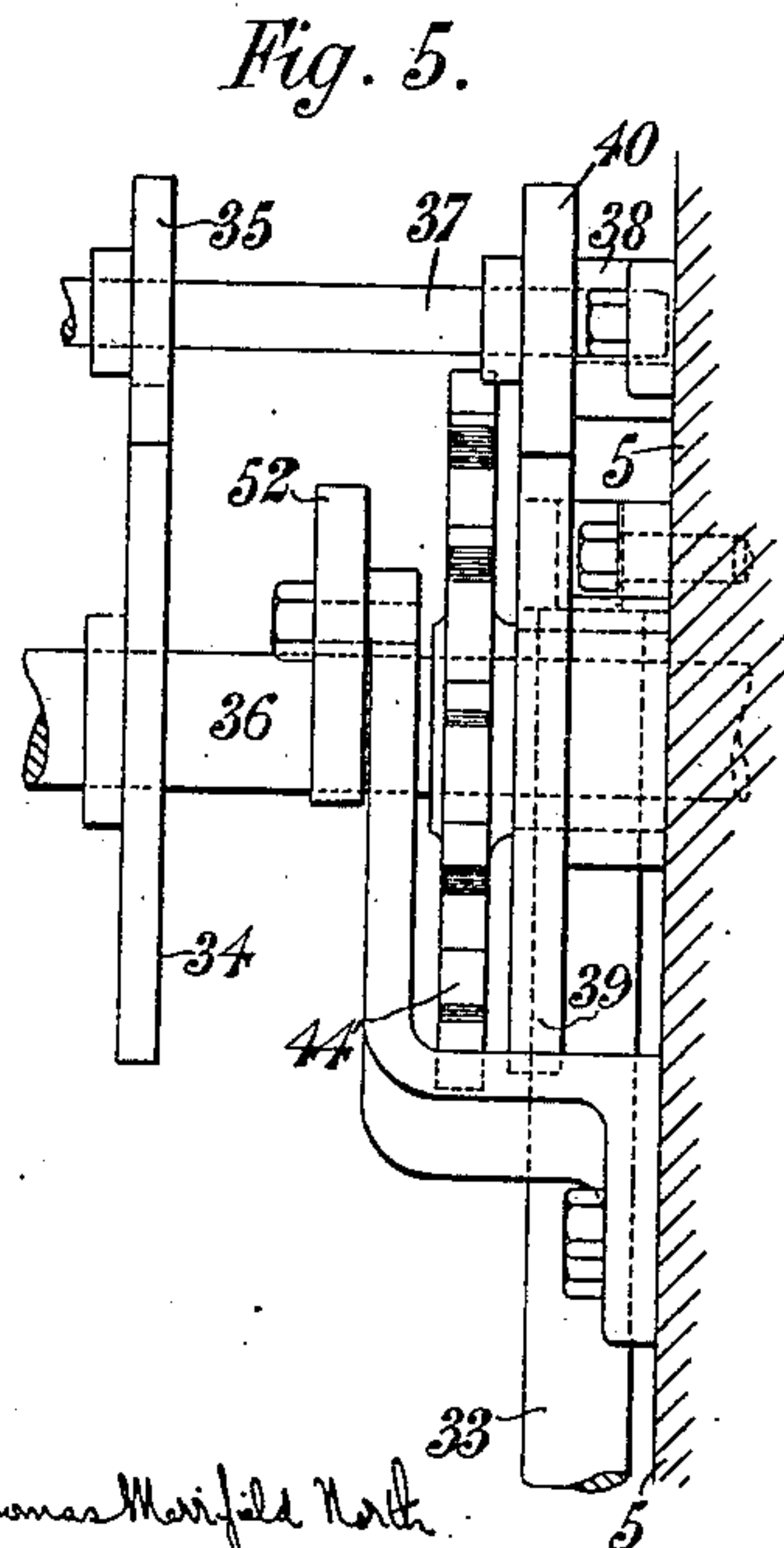
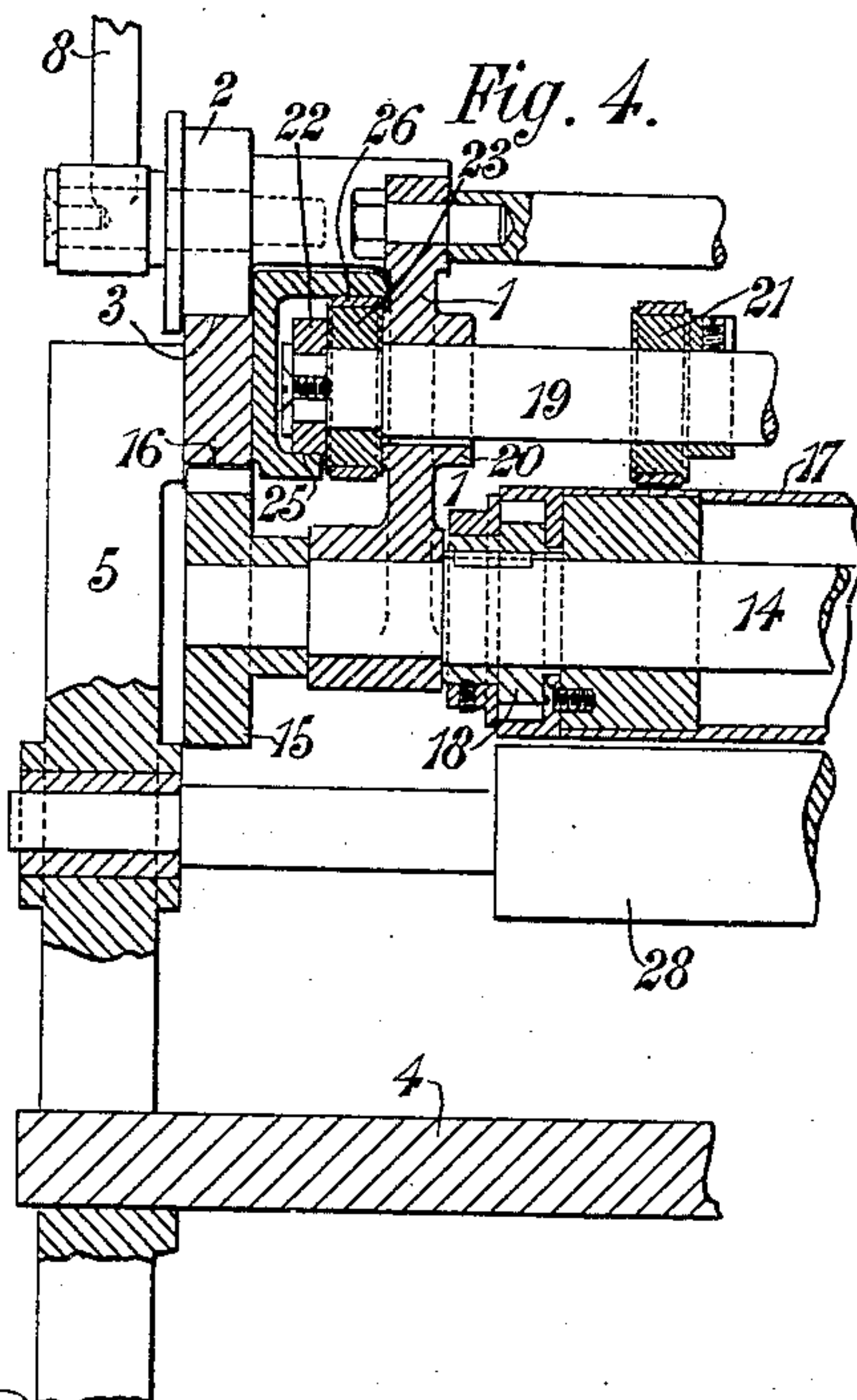
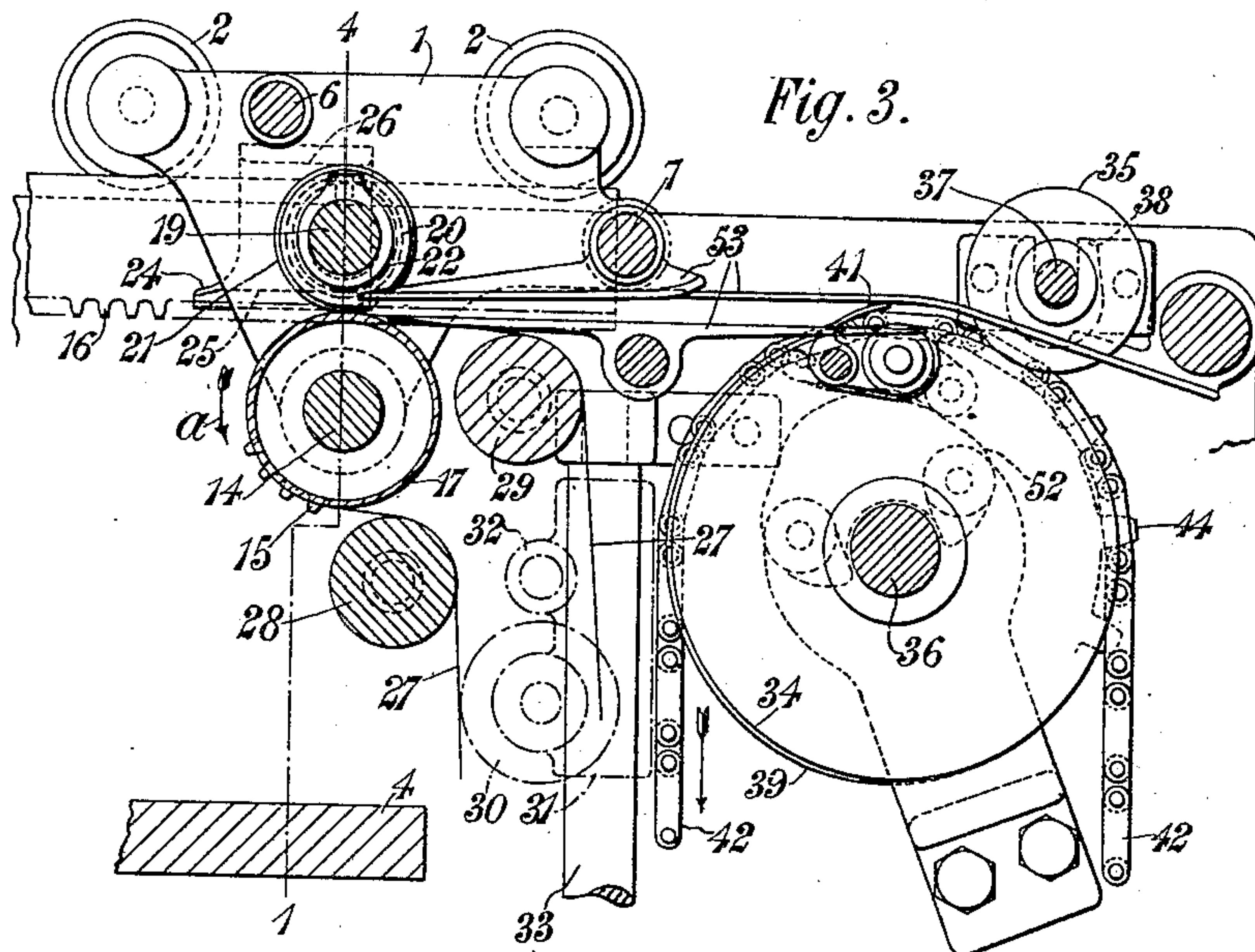
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UNITED STATES PATENT OFFICE.

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SHEET-DELIVERY MECHANISM FOR PRINTING-MACHINES.

935,538.

Specification of Letters Patent. Patented Sept. 28, 1909.

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To all whom it may concern:

Be it known that I, THOMAS MERRIFIELD NORTH, a subject of the King of the United Kingdom of Great Britain and Ireland, residing at 188 and 189 Fleet street, in the city of London, England, have invented new and useful Improvements in Sheet-Delivery Mechanism for Printing-Machines, of which the following is a specification.

10 This invention relates to sheet-delivery mechanism for printing machines and will be best understood by reference to the accompanying drawings which are to be taken as part of this specification and read there-
15 with.

In these drawings:—Figures 1 and 2 are two parts of the same side elevation of a printing machine provided with the improved sheet-delivery mechanism constructed
20 according to the present invention, the side represented in this view being what is known as the "feeder" side; Fig. 3 is a longitudinal vertical section of part of Fig. 1, but shown on a larger scale than that to which Fig. 1
25 is drawn; Fig. 4 is a vertical section taken about on the line 4—4 of Fig. 3, and looking toward the right of that figure; and Fig. 5 is an elevation of the right-hand end of Fig. 3, with certain parts omitted and a part of
30 the main frame shown in section.

In the improved mechanism as represented in the accompanying drawings, there is provided a carriage 1 fitted with flanged rollers 2 adapted to travel along horizontal rails 3.
35 These rails are adapted to guide the carriage 1 over, but at a suitable distance from, the delivery board 4 and they are secured to the machine side frames 5 in any convenient manner. The carriage 1 is of rigid construction and comprises two end plates or frames,
40 which are themselves marked with the numeral 1, and two tie rods 6, 7 by which the said plates or frames are rigidly secured together.

45 At the end of the carriage 1, which is situated at the "gear" side of the machine, that is to say, the end which is represented in Figs. 3 and 4, the said carriage is connected by a link 8—Figs. 1 and 4—to the upper end
50 of a lever 9 pivoted at 10 to the adjacent side frame 5 and whose lower end is connected by a link 11 to a crank pin 12 which is rotated once for each sheet dealt with by the machine; by these means the carriage 1
55 is caused to make a complete forward and

backward journey along the rails 3 during each cycle of the machine.

The lever 9 and link 8 which in the drawings are represented as situated at the gear side of the machine, are not duplicated at
60 the feeder side because it is desired that the free access for the removal of the sheets 13 from the delivery board 4 at that side of the machine, should in no way be obstructed, as it would be if a lever such as 9 were provided
35 and caused to oscillate at the said feeder side of the delivery board. This removal of the sheets from the delivery board 4 may be effected either manually or mechanically.

In the carriage 1 there is rotatably mounted
70 a shaft 14, having fast thereon a spur pinion 15 engaging with a horizontal rack 16 fast to the respective adjacent side frames 5; the drawings—Figs. 3 and 4—illustrate only the pinion 15 and rack 16 appertaining
75 to the gear side of the machine, but it is to be understood that this arrangement is preferably duplicated at the feeder side. On the shaft 14 there is also revolubly mounted a
80 tape cylinder or roller 17 adapted to be locked thereto by a suitable free wheel or clutch device 18 which admits of the said
tape roller rotating only during the return travel of the carriage, and only in the direction indicated by the arrows *a* in Figs. 1 and
85 3. Above the tape roller 17 there is provided in the carriage 1, a shaft 19 free to rotate in bearings 20 which, as shown in Figs. 3 and 4, are slotted or elongated in a
90 vertical direction so as to allow the shaft 19 a slight vertical motion relatively to the tape roller 17. On the shaft 19 there are adjust-
ably secured a number of india-rubber-covered or equivalent rollers 21, only one of
95 which is shown in the drawings, see Figs. 3 and 4. These rollers 21 are adapted to bear on the sheets and nip them between themselves and the tape roller 17 when they,
through their shaft 19, are allowed to rest in their lowest position, and to be clear of
100 the sheets when they—the said rollers—are in the higher position in which they are represented in Figs. 3 and 4.

On each end of the shaft 19 there are
105 mounted two rollers 22, 23, only those on one end of the shaft are shown in the drawings—see Fig. 4—and of these rollers, the roller 22 is free to rotate thereon and adapted to travel over a combined short inclined track
24 and horizontal track 25—see particularly
110

Fig. 3—when the carriage 1 nears the end of its return stroke, while the other roller 23, hereinafter termed a drive roller, is fast on the shaft 19 and adapted, through the co-
 5 operation of the loose roller 22 and track 24, 25, to be brought into frictional contact with the underside of a horizontal track 26 which serves to impart rotation to the shaft 19 just immediately before the latter is lowered by
 10 the inclined track so as to bring the rollers 21 on to the tape roller 17; by this means the rollers 21 are already rotating in the direction of feed when lowered on to the sheet and no strain is put upon the latter for
 15 overcoming the inertia of the rollers 21 as would be the case if the rollers 21 were to be without circular motion when so lowered.

The tape roller 17 is situated in the horizontal bight of a series of endless tapes 27 guided over two rollers 28, 29, over which they pass to form a vertical bight, as shown best in Fig. 1. The lower part of this vertical bight is occupied by a roller 30 rotatably mounted in two bearing brackets 31 at the
 20 respectively opposite sides of the machine and both rigidly connected together by a bar 32 and adapted to slide freely on rigid vertical guide bars 33 secured to the side frames 5. By this last described arrangement the roller
 25 30 is drawn up each time the carriage 1 is moved through its outward stroke, that is to say toward the left-hand side of Fig. 1, and allowed to descend by gravity each time the said carriage is moved through its re-
 30 verse or return stroke.

The sheets are delivered to the carriage rollers 17, 21 by two pairs of feed rollers 34, 35 which nip the sheets at their outer margins; or more than two pairs of feed rollers
 40 may be employed some of which may nip the sheets at their central or inner margins. The rollers 34 are fast to a shaft 36 which rotates in stationary bearings in the side frames 5, and the rollers 35 are fast to a
 45 shaft 37 which rotates in open or slotted bearings 38, as shown in Fig. 3, wherein it is capable of being moved vertically so as to allow the rollers 35 to occupy either the operative position in which they are shown
 50 in Fig. 3, or a higher position in which they are out of coöperative relationship with the rollers 34. This lateral motion of the shaft 37 relatively to the shaft 36 is automatically effected by means of cams 39 fast to, and
 55 rotating with, the shaft 36, and adapted to coöperate with rollers 40 on the shaft 37 of the upper rollers 35. The lower feed rollers 34 may have one or more sheet-supporting disks (not shown in the drawings) concentric therewith situated between them and
 60 fast to the same shaft 36, or, if desired, the said rollers 34 may represent or constitute the two ends of one and the same cylinder. The sheets may be supplied to, or inserted
 65 between, the feed rollers 34, 35 by grippers

carried by the rollers 34 which latter, in that construction, would practically constitute or represent a gripper cylinder; or the said sheets may be delivered to the rollers 34, 35
 70 by a series of chain grippers 41, as shown in the drawings. These grippers 41 which constitute no separate part of the present invention, are carried by two endless chains
 75 42 each of which passes around four sprocket or other wheels 43, 44, 45 and 46, the wheels 43 being situated beneath the impression cylinder 47 and form or plate cylinder 48 and in front of the attendant's platform 49, the wheels 44 being situated to the rear of
 80 the said platform near the position occupied by the carriage 1 when at the forward end of its stroke, and the wheels 45 and 46 near the bottom of the machine. In their passage from the wheels 43 to the wheels 44 the
 85 chains 42 are guided beneath the platform 49 by curved rails or guides 50 concentric with which is provided a plate or series of guide rods or bars 51 to support the rear edges of the sheets 13 as the latter are being
 90 traversed from the wheels 43 to the wheels 44; one sheet 13 is represented in dotted lines in Fig. 1, as thus in course of transit between the wheels 43, 44.

In suitable position adjacent to each of the wheels 44 or to one of them, there is provided a stationary cam 52 adapted to effect
 95 the opening of the chain grippers 41 as shown in Fig. 3, at the time at which the sheets are to be engaged by the before-described rollers 17, 21, and there is a similar
 100 arrangement, not shown in the drawings, adapted to open the grippers 41 for receiving the sheets as they are leaving the impression cylinder 47.

Suitable sheet guides or switches 53 are
 105 provided for supporting and guiding the sheets during their passage from the feed rollers, 34, 35, to the tape roller 17.

The operation of the apparatus may be described as follows:—At the commencement of
 110 the outward or forward stroke of the carriage 1, that is to say from right to left of Figs. 1 and 3, the nipping rollers 21 are in their raised position leaving between them and the tape roller 17 (as shown in Figs. 3
 115 and 4) a space sufficient to admit of the free passage therethrough of a sheet then being delivered by the feed rollers 34, 35. For a short period after the commencement of the
 120 forward stroke of the carriage 1, the drive rollers 23 are in frictional rolling contact with the respective tracks 26, whereby the nipping rollers 21 are caused to rotate with their under surfaces traveling in the same
 125 direction as the feed of the sheet. When the loose rollers 22, during this same stroke, travel down the respective inclines 24, the rollers 23 move out of contact with the tracks 26 and descend on to the sheet 13 then
 130 overlying the tape roller 17. It is to be re-

membered that the tape roller 17, during this outward or forward travel of the carriage 1, has no rotation about its axis and consequently when the nipping rollers 21 descend, as just mentioned, they nip the sheet between themselves and the said tape roller 17 and carry it forward with the said rollers (17, 21) as they travel over the delivery board 4. As the then non-rotating tape roller 17 advances, it carries the tapes 27 along with it as though they were positively attached thereto, the top flights of the horizontal bights of the said tapes, moving forward at approximately the same speed as the sheet then partially supported by them, and the roller 30 during the same period being correspondingly raised. At or about the time that the nipping rollers 21 are moved beyond the rotative influence of the track 26, and the said rollers descend on to the sheet 13 and cease to rotate, the upper feed-rollers 35 are raised by the cams 39, to release the sheet which is thereafter moved farther over the delivery board 4 by the continued advance of the carriage 1. At the end of the outward journey of the carriage 1, the roller 30 occupies a position approximately such as that in which it is represented in dot and dash lines in Fig. 3. During the return travel of the carriage 1, the tape roller 17, through the free wheel 18, is caused to rotate as if in one piece with its shaft 14, and thereby serves to withdraw the tapes 27 from beneath the sheet without imparting any traveling motion to the portions of the tapes on which the sheet is then supported, by which means the sheet is allowed to descend on to the delivery board 4 below, the roller 30 meanwhile descending and serving to keep the tapes 27 taut.

Instead of providing two rollers such as 22, 23, on each end of the before described shaft 19, these two rollers may be provided on one end only of the said shaft, the other end thereof being provided with a single loose roller similar to 22, adapted to travel over a combined inclined and horizontal track corresponding to 24, 25, but it is to be understood that besides this, other modifications may be made without departing from the essential features of the invention.

I claim,

1. In a sheet-delivery mechanism for printing machines, the combination with a traveling carriage and devices adapted to move it backward and forward over the delivery board, of a tape roller rotatable in the carriage, means adapted to impart rotation to the tape roller during the travel of the carriage in only one direction, a tape roller rotatable in fixed supports, a series of endless tapes having one bight in each tape occupied by the first named roller and a second bight in each tape occupied by the second named roller and self operative means adapted to

maintain the tapes taut during the whole of the movement of said carriage.

2. In a sheet delivery mechanism for printing machines, the combination of a traveling carriage adapted to travel horizontally backward and forward over the delivery board, a tape roller rotatable in the carriage, means adapted to impart rotation to the tape roller during the travel of the carriage in only one direction, a series of endless tapes forming horizontal bights and vertical bights, the former occupied by the tape roller and another horizontal roller occupying the vertical bights and capable of vertical motion.

3. In a sheet-delivery mechanism for printing machines, the combination of a traveling carriage and devices adapted to move it backward and forward over the delivery board, a tape roller rotatable in the carriage, means adapted to impart rotation to the tape roller during the travel of the carriage in only one direction, a nipping roller rotatable and capable of vertical motion in the carriage, and a stationary track adapted to raise the nipping roller away from the tape roller.

4. In a sheet-delivery mechanism for printing machines, the combination of a traveling carriage and devices adapted to move it backward and forward over the delivery board, a tape roller rotatable in the carriage, means adapted to impart rotation to the tape roller during the travel of the carriage in only one direction, a shaft rotatable and capable of vertical motion in the carriage, a plurality of nipping rollers fixedly mounted on said shaft, and a stationary track adapted to raise said shaft to move said nipping rollers away from said tape roller.

5. In a sheet-delivery mechanism for printing machines, the combination of a traveling carriage and devices adapted to move it backward and forward over the delivery board, a tape roller rotatable in the carriage, means adapted to impart rotation to the tape roller during the travel of the carriage in only one direction, a nipping roller rotatable and capable of vertical motion in the carriage, a stationary track adapted to raise the nipping roller away from the tape roller, a drive roller operatively fast to the nipping roller, and a stationary track with which the drive roller, when raised, is adapted to contact.

6. In a sheet-delivery mechanism for printing machines, the combination of a traveling carriage and devices adapted to move it backward and forward over the delivery board, a tape roller rotatable in the carriage, means adapted to impart rotation to the tape roller during the travel of the carriage in only one direction, a shaft rotatable and capable of vertical motion in the carriage, a plurality of nipping rollers fixedly mounted on said shaft, a stationary

track adapted to raise said shaft to move said nipping rollers away from the tape roller, a drive roller operatively fast to said shaft, and a stationary track with which the drive roller, when raised, is adapted to contact.

7. In a sheet-delivery mechanism for printing machines, the combination of a series of endless tapes, a tape roller in fixed relationship with the delivery board, a tape roller movable relatively to the delivery board, a reciprocatory carriage adapted to support the secondly named roller, self-operative means adapted to maintain said tapes taut during the whole of the movement of said carriage, a single oscillating lever operatively connected with only one side of the carriage to reciprocate the latter, and means adapted to oscillate the lever.

8. In a sheet-delivery mechanism for printing machines, the combination of a series of endless tapes supported upon tape rollers, one of said tape rollers in fixed relationship with the delivery board, another of said tape rollers movable relatively to the delivery board, a reciprocatory carriage adapted to support the secondly named roller, self-operative means adapted to maintain said tapes taut during the whole of the movement of said carriage, and driving means connected with only one side of said carriage.

9. In a sheet delivery mechanism for printing machines, the combination of a traveling carriage adapted to travel horizontally backward and forward over the delivery board, a tape roller rotatable in the carriage, means adapted to impart rotation to the tape roller during the travel of the carriage in only one direction, a nipping roller rotatable and capable of vertical motion in the carriage, a stationary track adapted to raise the nipping rollers away from the tape roller, a series of endless tapes forming horizontal bights and vertical bights, the former occupied by the tape roller, and another horizontal roller occupying the vertical bights and capable of vertical motion.

10. In a sheet-delivery mechanism for printing machines, the combination of a traveling carriage and devices adapted to move it backward and forward over the delivery board, a tape roller rotatable in the carriage, means adapted to impart rotation to the tape roller during the travel of the carriage in only one direction, a nipping roller rotatable and capable of vertical motion in the carriage, a stationary track adapted to raise the nipping roller away from the tape roller, a drive roller operatively fast to the nipping roller, a stationary track with which the drive roller, when raised, is adapted to contact, a series of end-

less tapes forming horizontal bights and vertical bights, the former occupied by the tape roller, and another horizontal roller occupying the vertical bights and capable of horizontal motion.

11. A printing machine delivery mechanism comprising in combination, a reciprocatory carriage movable over the delivery board, means adapted to receive printed sheets and delivery them to the reciprocatory carriage, a tape roller rotatable in said carriage, a series of endless tapes one bight in each tape being occupied by said tape roller, means adapted to impart rotation to said tape roller during the travel of the carriage in only one direction, a nipping roller rotatable in said carriage and adapted to press said tapes on to said roller, automatic means adapted to raise said nipping roller from its operative position when said carriage approaches its sheet receiving position and to lower said roller as said carriage recedes from such position, and driving means for said carriage.

12. A printing machine delivery mechanism comprising in combination a reciprocatory carriage movable over the delivery board, driving means for said carriage, means adapted to receive printed sheets from the impression cylinder and deliver them to the reciprocatory carriage, a tape roller rotatable in said carriage, a series of endless tapes one bight in each tape being occupied by said tape roller, means adapted to impart rotation to the tape roller during the travel of the carriage in one direction only, a nipping roller operative to press said tapes against said tape roller and rotatable and capable of vertical motion in said carriage, and a stationary track coöperative with said nipping roller to raise the latter away from the tape roller during a portion of every travel of said carriage.

13. A printing machine delivery mechanism comprising in combination a reciprocatory carriage movable over the delivery board, driving means for said carriage, means adapted to receive printed sheets from the impression cylinder and deliver them to the reciprocatory carriage, a tape roller rotatable in said carriage, a series of endless tapes forming a plurality of bights one of which is occupied by said tape roller, means adapted to impart rotation to said tape roller during the travel of the carriage in one direction only, a nipping roller operative to press said tapes against said tape roller and rotatable and capable of vertical motion in said carriage, a stationary track coöperative with said nipping roller to raise the latter away from the tape roller during a portion of every travel of said carriage, and self operative means occupying another of the bights of said tapes for maintaining the latter taut

during the whole of the movement of said carriage.

14. In a sheet delivery mechanism for printing machines, the combination of a
5 traveling carriage and devices adapted to move it backward and forward over the delivery board, a tape roller rotatable in the carriage, means adapted to impart rotation to the tape roller during the travel of the
10 carriage in only one direction, a nipping roller rotatable and capable of vertical motion in the carriage, a stationary track adapted to raise the nipping roller away from the tape roller, a drive roller opera-
15 tively fast to the nipping roller, a stationary

track with which the drive roller, when raised, is adapted to contact, a series of endless tapes forming horizontal bights and vertical bights, the former occupied by the tape roller, another horizontal roller occupying 20 the vertical bights and capable of vertical motion, a pair of feed rollers adapted to alternately nip and release the sheets, and cam mechanism adapted to effect the said release.

In witness whereof I have hereunto set 25 my hand in the presence of two witnesses.

THOMAS MERRIFIELD NORTH.

Witnesses:

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