R. MIEHLE.

SHEET DELIVERING MECHANISM.

APPLICATION FILED JUNE 24, 1905.

912,395. Patented Feb. 16, 1909.

3 SHEETS—SHEET 1.

Fig. 1.

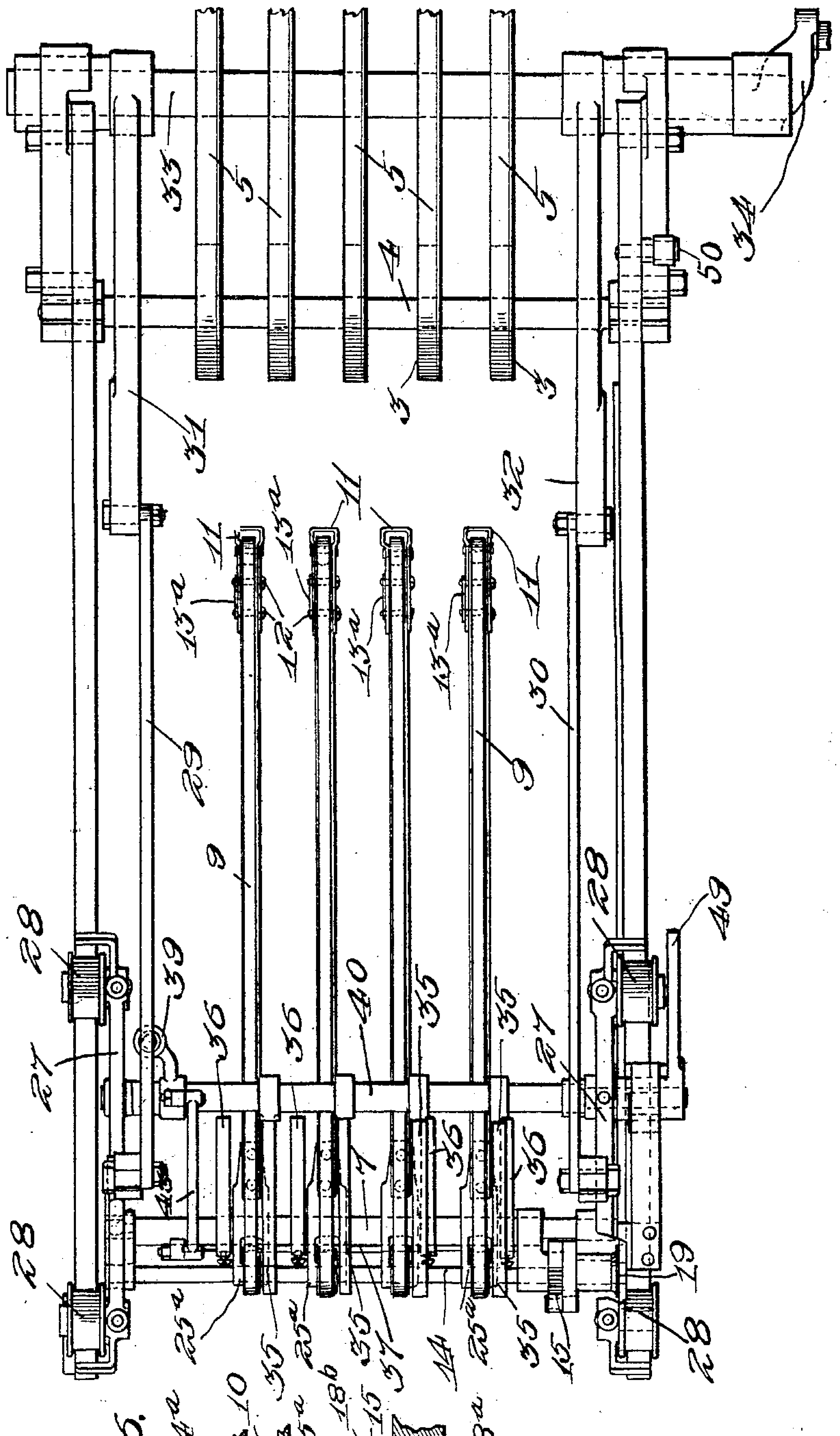
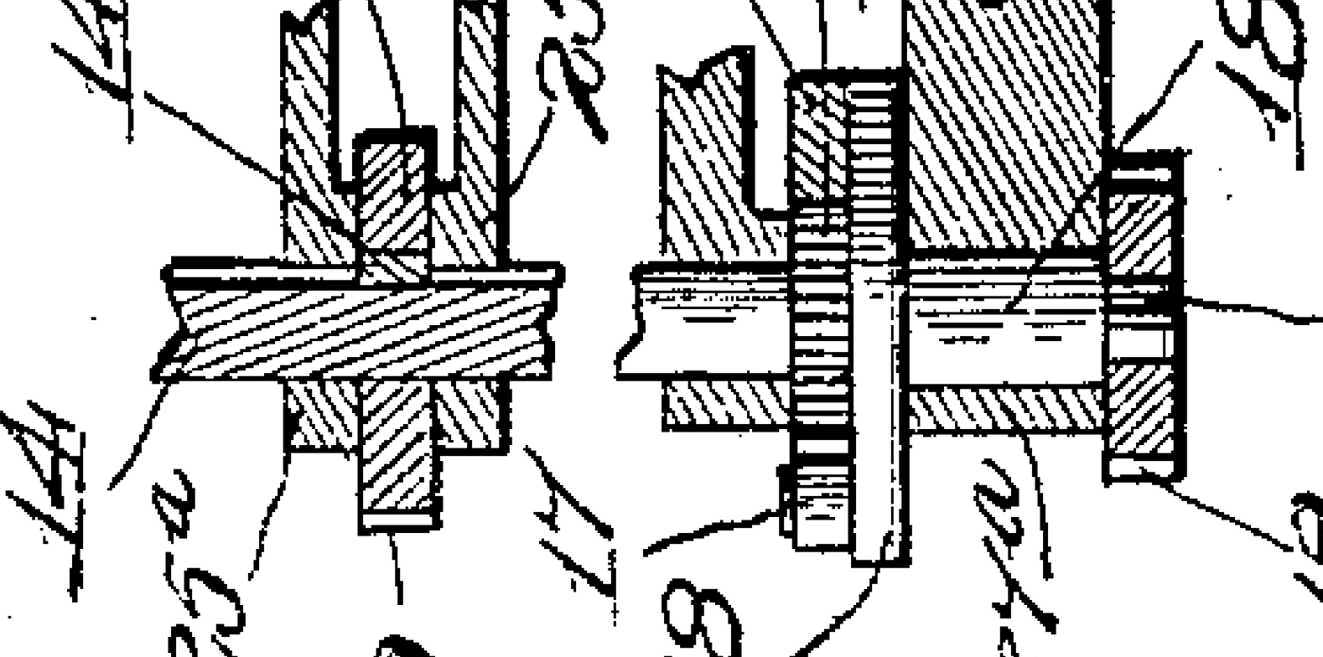


Fig. 6.



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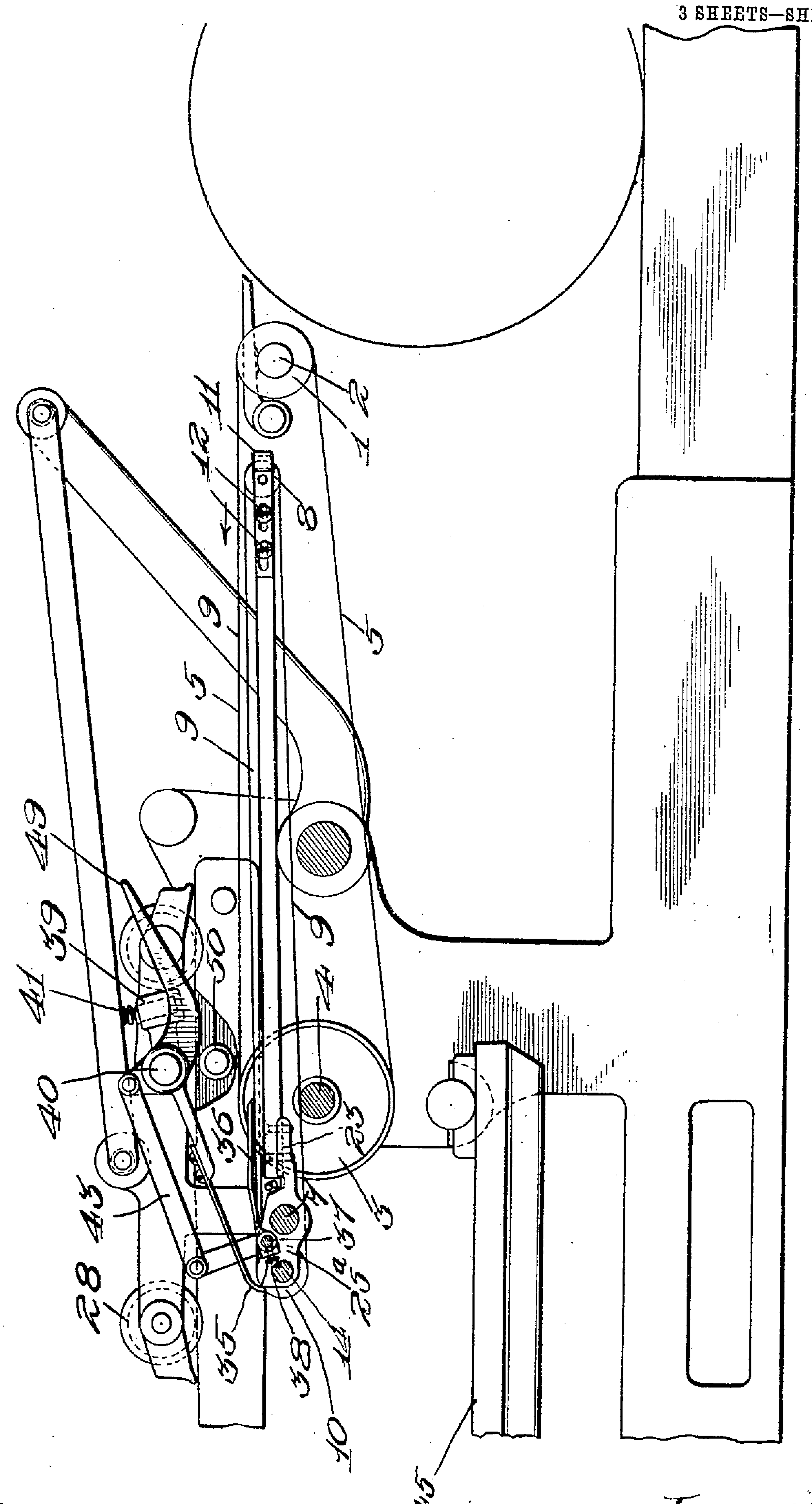
3 SHEETS—SHEET 2.

Fig. 2.



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3 SHEETS—SHEET 3.

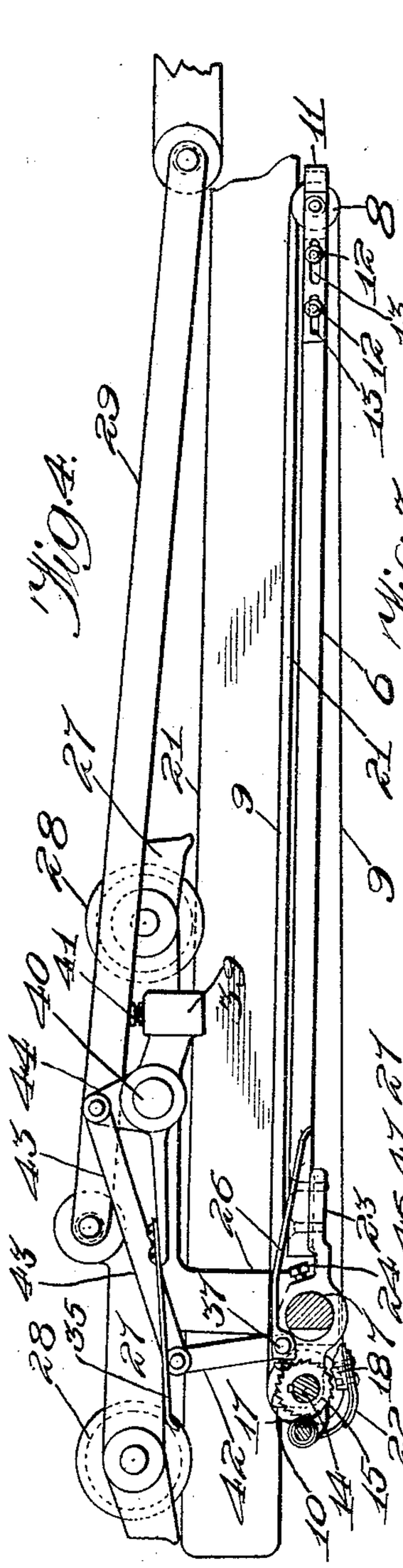

FIG. 4.

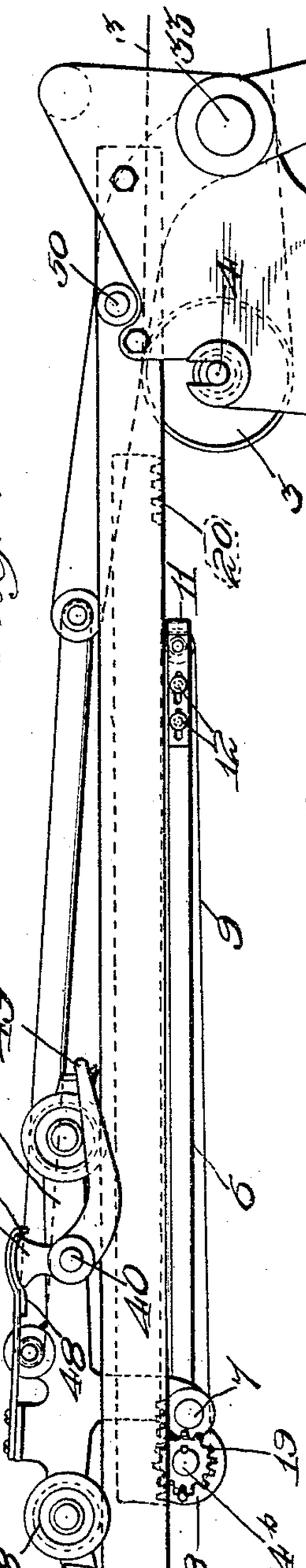

FIG. 3.

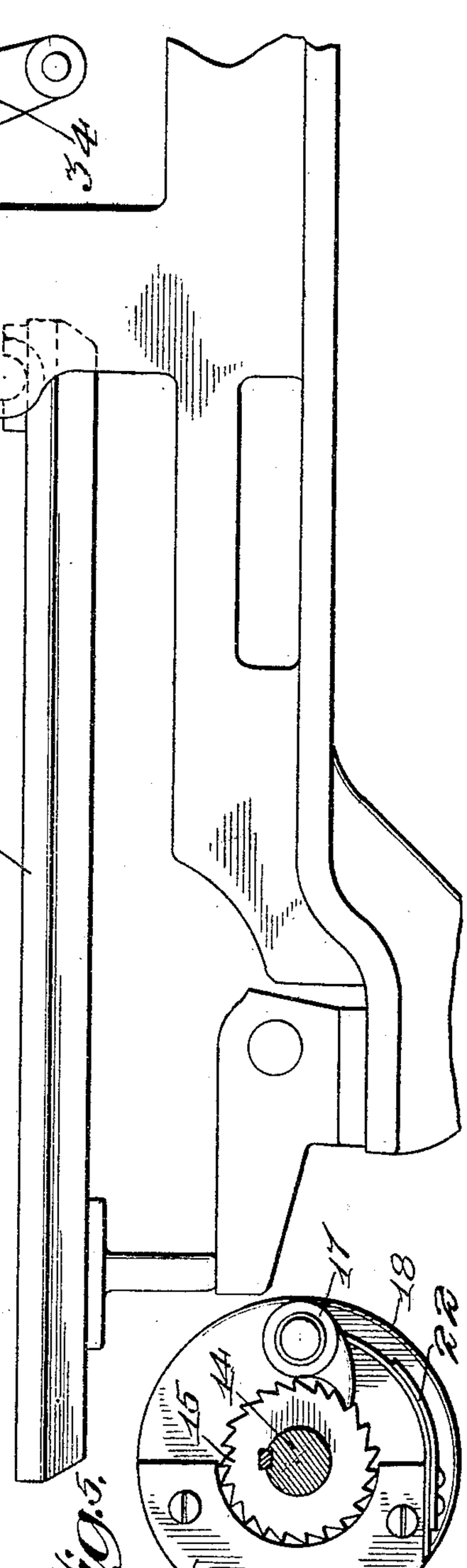

FIG. 5.

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UNITED STATES PATENT OFFICE.

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SHEET-DELIVERING MECHANISM.

No. 912,395. Specification of Letters Patent. Patented Feb. 16, 1909.

Application filed June 24, 1905. Serial No. 266,748.

To all whom it may concern:

Be it known that I, ROBERT MIEHLE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Sheet-Delivering Mechanisms, of which the following is a specification.

This invention relates to reciprocating sheet delivery mechanisms, and more particularly to that type in which the sheet is first deposited upon the upper one of two relatively movable sheet conducting or conveying members, which possesses capability of rolling or propelling it off upon the lower one and the latter in turn rolls or propels it off upon the table, or, in other words, rolls out from under it, allowing it to fall upon the table.

The primary object of the invention is to provide sheet delivery mechanisms of this character whereby the desired close relation between the planes of the sheet delivery members is maintained and their range of movement relatively to each other will be materially increased without increasing the existing dimensions of the machine.

With a view to the attainment of these ends and the accomplishment of certain other objects which will hereinafter appear, the invention consists in the features of novelty which will now be described with reference to the accompanying drawings, and more particularly pointed out in the claims.

In the said drawings—Figure 1 is a plan view of a sheet delivery mechanism embodying this invention; Fig. 2 is a vertical section thereof, partly in side elevation; Fig. 3 is a side elevation thereof with the carriage extended, it being withdrawn in Fig. 2; Fig. 4 is a detail vertical section, on an enlarged scale, showing some of the parts in side elevation; Fig. 5 is an enlarged detail view of a ratchet mechanism hereinafter described, and Fig. 6 is a detail sectional view of the tape pulley driving mechanism.

In this exemplification of the invention the two aforesaid sheet conducting or conveying members each comprises a series of traveling tapes upon which the sheets are received, one of these series being fixed adjacent to the printing mechanism for receiving the sheet as it is discharged therefrom, while the other reciprocates back and forth with relation to the first and is adapted to follow outwardly with the sheet as it leaves the first and to roll out from under the sheet when it returns. The stationary one of these sheet conducting or conveying members may be substantially the same in construction and arrangement as similar parts of sheet delivery mechanisms of this character heretofore employed, and preferably comprises tape rollers 1, mounted upon a suitable shaft 2, at one end of the member, and a corresponding number of tape rollers 3 mounted upon shaft 4 at the other end of such member, 5 being the tapes which pass around the rollers 1, 3, and the upper folds of which are caused to travel towards the left or away from the printing mechanism, so as to conduct or convey the sheet in the proper delivery direction as it is deposited by the printing mechanism or other means, the tapes 5 being driven continuously.

The tape pulleys 3 are considerably larger in diameter than the shaft 4, and arranged at a sufficient distance apart to leave room between them for the passage of a number of sheet supporting fingers arranged in a series alternating with the tapes 5, and constituting a part of the second or lower one of the aforesaid sheet conducting or conveying members. These fingers comprise sticks or arms 6, each rigidly mounted at one end upon a transverse rod 7 or other suitable support, while their other ends are free or independent of each other and carry tape pulleys 8, over which pass sheet conducting or conveying tapes 9. The opposite end of each one of the fingers 6 is provided with a tape pulley 10, around which the other ends of the tape belts 9 pass. The tape pulleys 8, as better shown in Fig. 1, are narrow pulleys approximately the same width as the tapes 9, so as to readily pass between the tape pulleys 3, and each is mounted in its individual bearings or suitable support on its finger or stick 6 by any appropriate means such as U-shaped strap 11, which passes around the pulley and the tape and is secured at its extremities to the end of the finger or stick 6 by set-screws 12 passing through the slots 13 in the straps, and having their extremities screwed into plates 13[a], whereby the strap may be adjusted and the slack of the tapes 9 taken up. The tape pulleys 10 are mounted on a cross shaft 14, and connected thereto by a feather 14[a], upon one end of which shaft 14 is keyed or otherwise secured a ratchet wheel 15, with which engages a pawl 17, mounted

upon a disk 18, which is free from the shaft 14, but which is rigidly secured to a pinion 19 by a short stud shaft 18[a] journaled in bracket 27[a]. Pinion 19 engages with the under side of a stationary rack bar 20, secured to one of the side rails 21 of the frame, so that as the pinion 19 is moved back and forth with relation to the rack bar 20 it will be caused to rotate and its rotation in one direction will be imparted to the shaft 14, causing the tapes 9 to travel in that direction, by virtue of the ratchet 15 and pawl 17, which latter is held in engagement with the ratchet when the pinion 19 turns in one direction by a spring 22, which allows the pawl to slip over the ratchet when the pinion 19 makes its rotation in the opposite direction. On one side of disk 18 is a plate 18[b], rounded out to fit contiguous to the ratchet 15, for bracing the latter against the strain of its pawl 17.

In order that the tape pulley shaft 14 may be rotated, as described, in one direction, and the series of tapes 9 with their supporting sticks 6 may be reciprocated back and forth with relation to the series of tapes 5, any suitable means for supporting and thus moving the movable series of sheet supporting fingers may be employed. In this exemplification of the invention the sticks 6 are secured to socket pieces 23, which are adjustably fixed by set screws 24 to the cross-rod 7, and have yokes 25[a], which support the shaft 14 and brace the tape pulleys 10 for holding them in place. The cross-rod 7 is supported by suitable side arms 26 from two carriages 27, provided with rolls or wheels 28, running on tracks or ways constituted by the side frames 21. These carriages are reciprocated upon their tracks or ways by two links 29, 30, respectively, which are pivotally connected to two arms 31, 32 respectively mounted upon a rocker-shaft 33, one of the arms, the arm 32 for example, being provided with a crank arm 34, whereby it may be connected by any suitable means, not necessary to illustrate, with the operating mechanism of the printing press. In the specific embodiment of the invention shown in the drawings, the crank 34 is secured directly to the shaft 33, see Fig. 1.

The sheet supporting fingers comprising the sticks 6 and tapes 9, are so supported and arranged with relation to the tapes 5 that as the carriages 27 are reciprocated or caused to travel back and forth in the described manner upon their ways 21, the tapes 9 will pass back and forth between the tape rollers 3 above their supporting shaft 4, and the upper folds of the tapes 9 will occupy a plane slightly below the plane of the upper folds of the tapes 5. When the two sheet conducting members are in their coincident position indicated in Fig. 2, the sheet is discharged from the printing mechanism upon the upper folds of the tapes 5, and is urged or propelled forwardly by said tapes until its forward end strikes against a suitable number of stops or gages 35, which are mounted upon the carriages 27 in any suitable way so as to travel with the reciprocating sheet conducting fingers and thus prevent the sheet from floating or discharging from the latter prematurely. When the fingers of the lower one of the sheet conducting members are at the limit of their inward movement or movement towards the series of tapes 5, as shown in Fig. 2, their outer ends are still projecting slightly beyond the tape rollers 3, and in order that the forward edge of the sheet may not be impeded in its movement towards the stops 35 by striking or engaging the tapes 9 where they protrude from the tapes 5, a number of guards 36 are employed, one contiguous to each of the tapes 5, or otherwise arranged so as to hold the sheet aloof from the projecting ends of the tapes 9. As shown in Fig. 2, these guards 36 are adjustably secured to a cross-rod 37 by means of set-screws 38 and project between the rollers 3, with their extremities slightly depressed below the plane of the tapes 5, but above the plane of the tapes 9, so as to receive and support the forward edge of the sheet as it leaves the tapes 5, it being understood that at this time the forward movement of the sheet is faster than the forward movement of the carriage 27, and as a consequence the sheet is enabled to overtake and engage against the stops 35 as they move away from the tapes 5. When the carriages reach the limit of their outward movement the stops 35 are elevated, as shown in Fig. 4, by one of the links 29, 30, the link 29, for example, engaging an arm 39, secured to a rocker-shaft 40, upon which all of the stops 35 are mounted and secured, the arm 39, if desired, being provided with a cushion or spring 41 for relieving the shock that might result from the impact of the link 29 therewith. As the stops 35 are elevated, the guards 36 are automatically depressed so as to allow the sheet to pass from the tapes 9 while the carriages 27 make their return movement. This automatic action of the guards may be accomplished by any suitable connection with the rocker-shaft 40, such, for example, as a crank -arm 42 secured to the rocker-shaft 37 and connected by a link 43 to an arm 44 on rocker-shaft 40, whereby the entire upper surface of the guard will be depressed below the plane of the tape 9, as shown in Fig. 4, the guard being bent so that its rocker-shaft 37 may be below the plane of tape 9, while its operative surface is above such plane. As the carriage makes its return movement, the stops 35 being elevated and the guards 36 depressed, the rotation of the pinion 19 induced by its engagement with the rack 20, causes the tapes 9 to travel towards the left or in a direction away from the tapes 5, and

consequently the sheet is propelled or projected from the tapes 9 with a speed in proportion to their independent travel, and it is allowed to settle upon the table 45 or other sheet receiving surface as the sheet conducting fingers 6, 9 recede from under it. The stops 35 are held thus elevated and the guards 36 depressed during the entire time that the sheet is leaving the tapes 9, by any suitable latch or holding means, such, for example, as a dog 46, secured to rocker-shaft 40, and arranged to engage an elastic hook or catch 47 secured to one of the carriages 27, and faced with a piece of leather or other suitable friction producing material 48, which will permit the dog 46 to disengage from the catch 47 when the requisite power is applied thereon, while at the same time serving to hold the stops 35 elevated against the force of gravity, or other means for returning them to their operative position. When the carriage 27 reaches the limit of its return movement towards tapes 5, or is about to arrive at such position, the dog 46 is forced out of engagement with the catch 47 by a trip 49 secured to shaft 40 and arranged in the line of movement of pin 50, secured to one of the side rails 21, in position to be struck by the trip 49 as the carriage moves towards the right, see Fig. 2, throwing the dog 46 towards the left further under the catch 47, which then serves to hold the stops 35 in their depressed position.

Although I have referred to printing mechanism in describing the invention, as an example of one of the devices to which the invention is applicable, it will nevertheless be understood that it may be used as a sheet delivery mechanism wherever sheet deliveries are required.

Having thus described my invention, what I claim as new therein and desire to secure by Letters Patent, is:

1. In a sheet delivery mechanism, the combination of two sheet supporting members relatively movable and arranged one above the other, and each comprising sheet propelling means, means arranged at the end of the lower one of said sheet supporting members for holding the sheet aloof from its sheet propelling means as the sheet discharges from the upper member on to the lower member, comprising a rocker shaft arranged below the plane of the lower one of said supporting members, and guards secured rigidly to said shaft and bent upwardly therefrom, and means for reciprocating the lower member with relation to the upper member.

2. In a sheet delivery mechanism, a sheet delivery member comprising a stick or arm, a U-shaped strap extending around the end of said stick or arm, means adjustably securing said strap to said stick or arm, a tape pulley journaled in said strap at the end of said arm, and a tape passing around said pulley, in combination with means for delivering the sheet to said sheet delivery member, and means for reciprocating said sheet delivery member.

3. In a sheet delivery mechanism, the combination of a sheet supporting finger comprising an arm, a U-shaped strap passing around the end of said arm and having longitudinal slots, set-screws passing through said slots and arm, a plate arranged against the side of said strap and into which the extremities of said set-screws are screwed, a tape pulley journaled in said strap at the end of said arm, and a tape passing around said pulley, with means for supporting and reciprocating said sheet supporting finger.

4. In a sheet delivery mechanism, the combination of a shaft, means for supporting and rotating the same, tape pulleys mounted to slide longitudinally upon said shaft, means for causing said pulleys to rotate with said shaft, sheet supporting fingers comprising yokes embracing said pulleys respectively for holding them against endwise movement on said shaft, means for securing said yokes against movement longitudinally of the shaft, and tapes mounted upon said fingers to travel around said pulleys.

5. In a sheet delivery mechanism, the combination of two sheet supporting members relatively movable and arranged one above the other, and each comprising sheet propelling means, means arranged at the end of the lower one of said sheet supporting members for holding the sheet aloof from its sheet propelling means as the sheet discharges from the upper member on to the lower member, said means comprising movable guards, and means for reciprocating the lower sheet supporting member with relation to the upper sheet supporting member.

In witness whereof I have hereunto set my hand this 22nd day of June 1905, in the presence of the subscribing witnesses.

ROBERT MIEHLE.

Witnesses:

FRANCIS A. HOPKINS,

CHARLES H. SEEM.