

No. 704,472.

Patented July 8, 1902.

W. Y. DEAR.

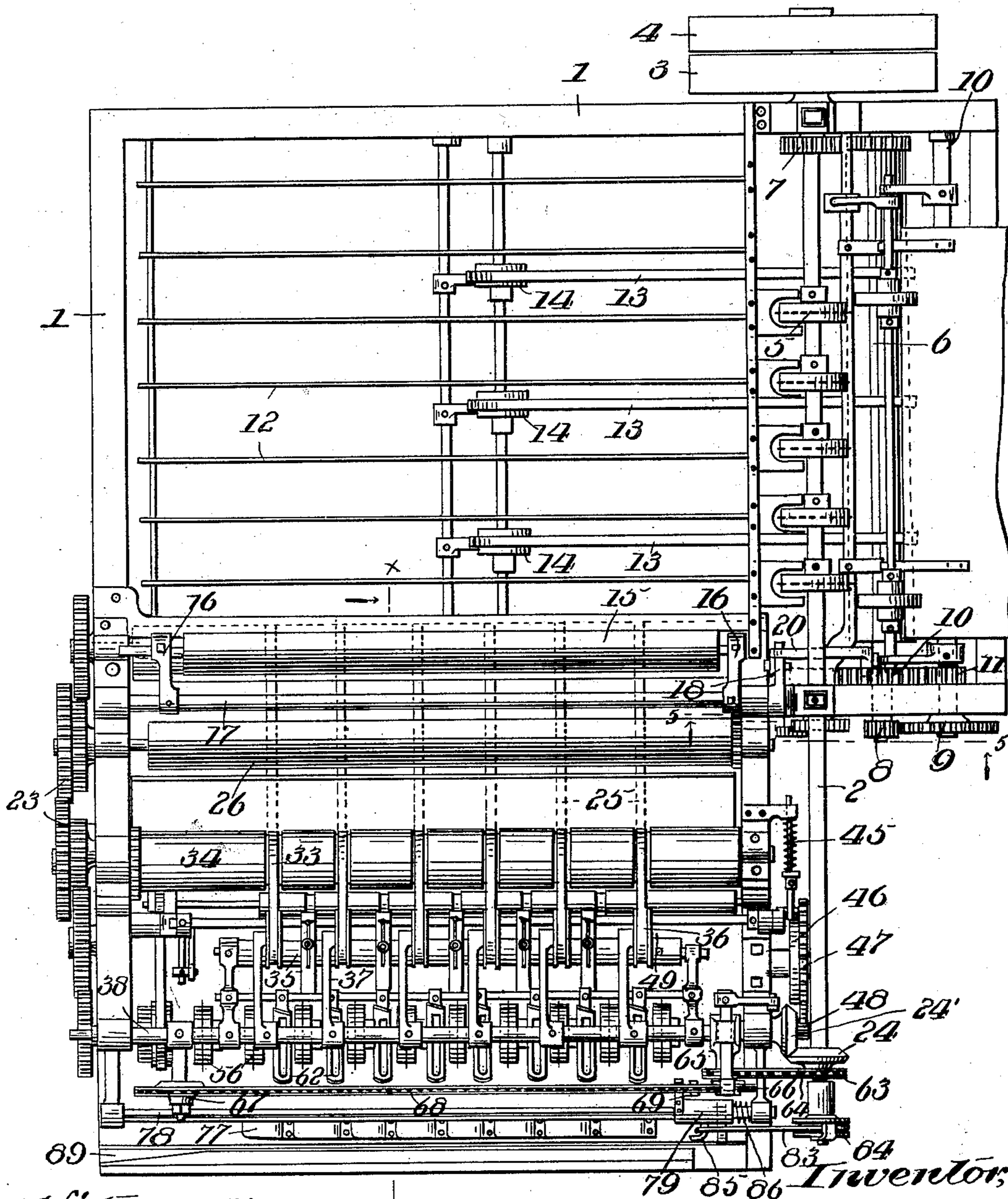
MACHINE FOR CUTTING AND COLLATING PAPER.

(Application filed Dec. 31, 1900.)

(No Model.)

4 Sheets—Sheet 1.

Fig. 1.



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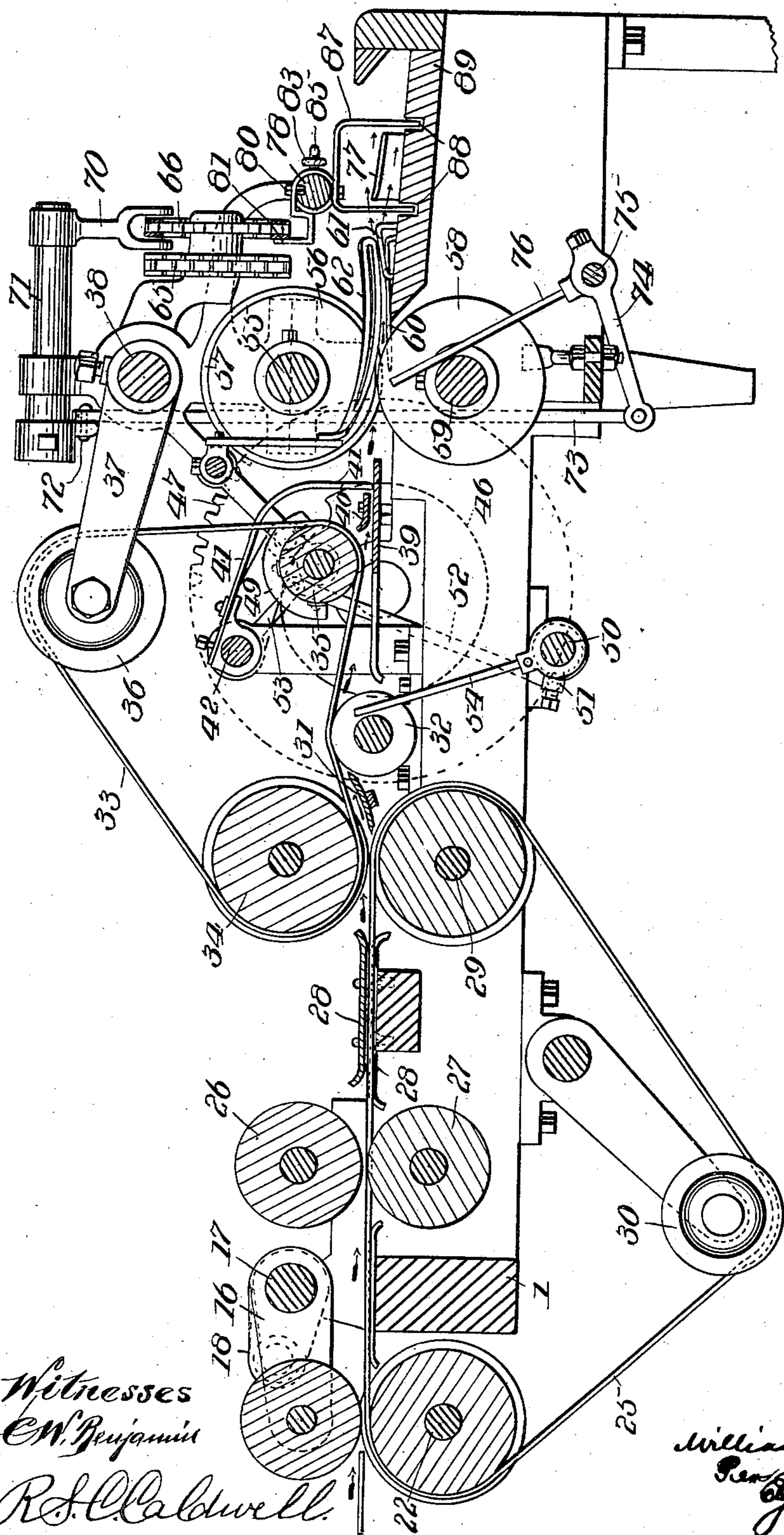


Fig. 2.

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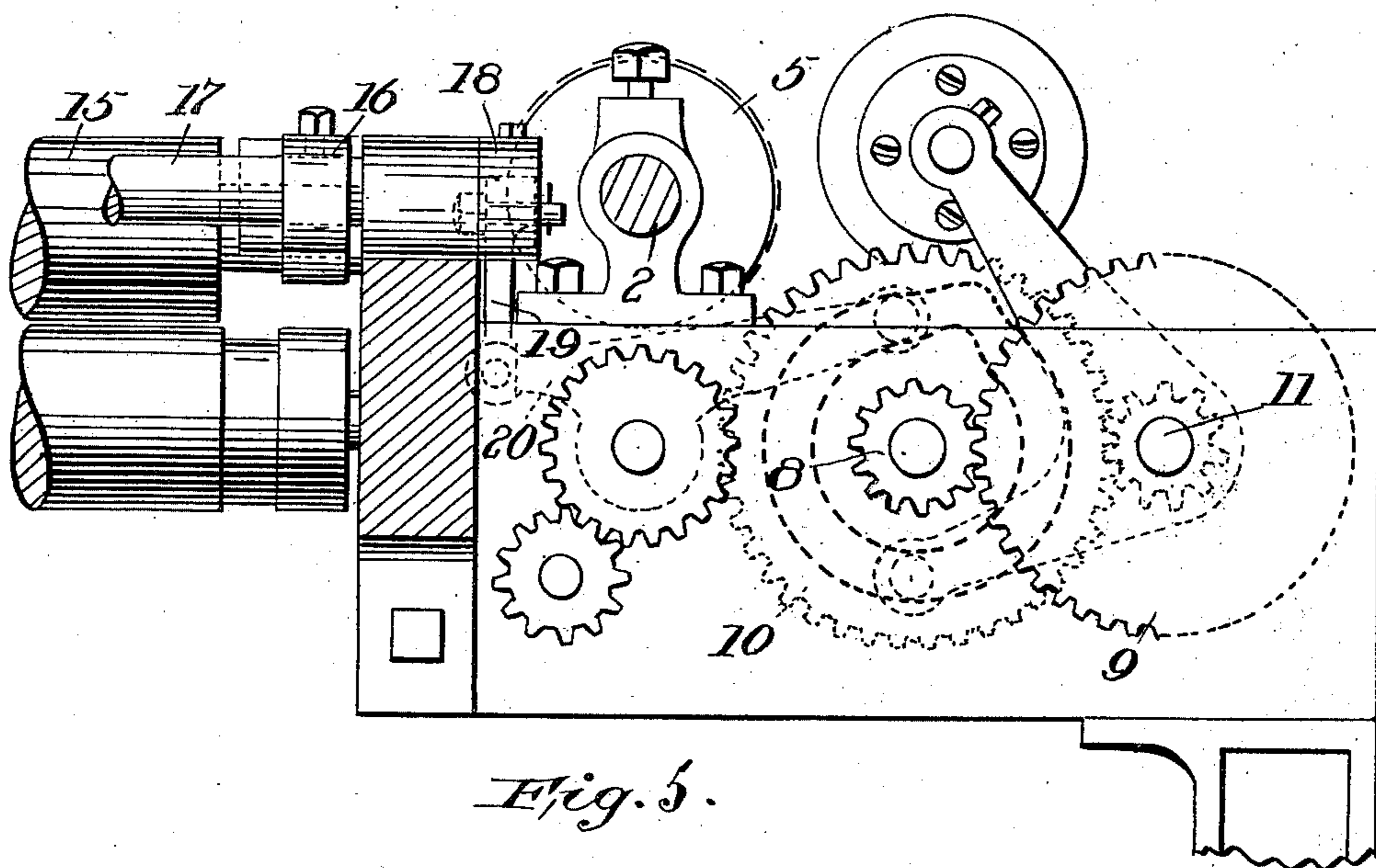


Fig. 5.

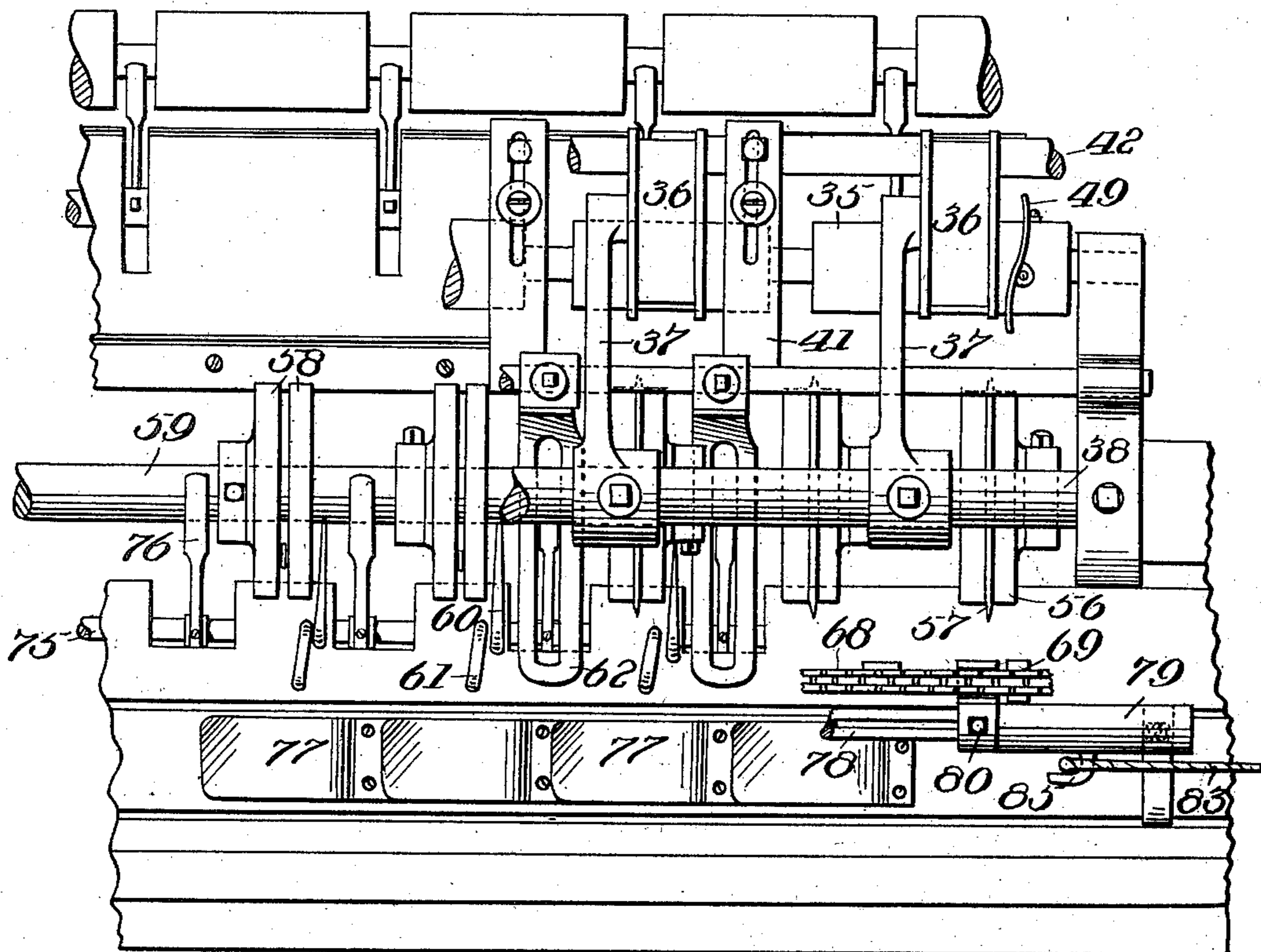


Fig. 3.

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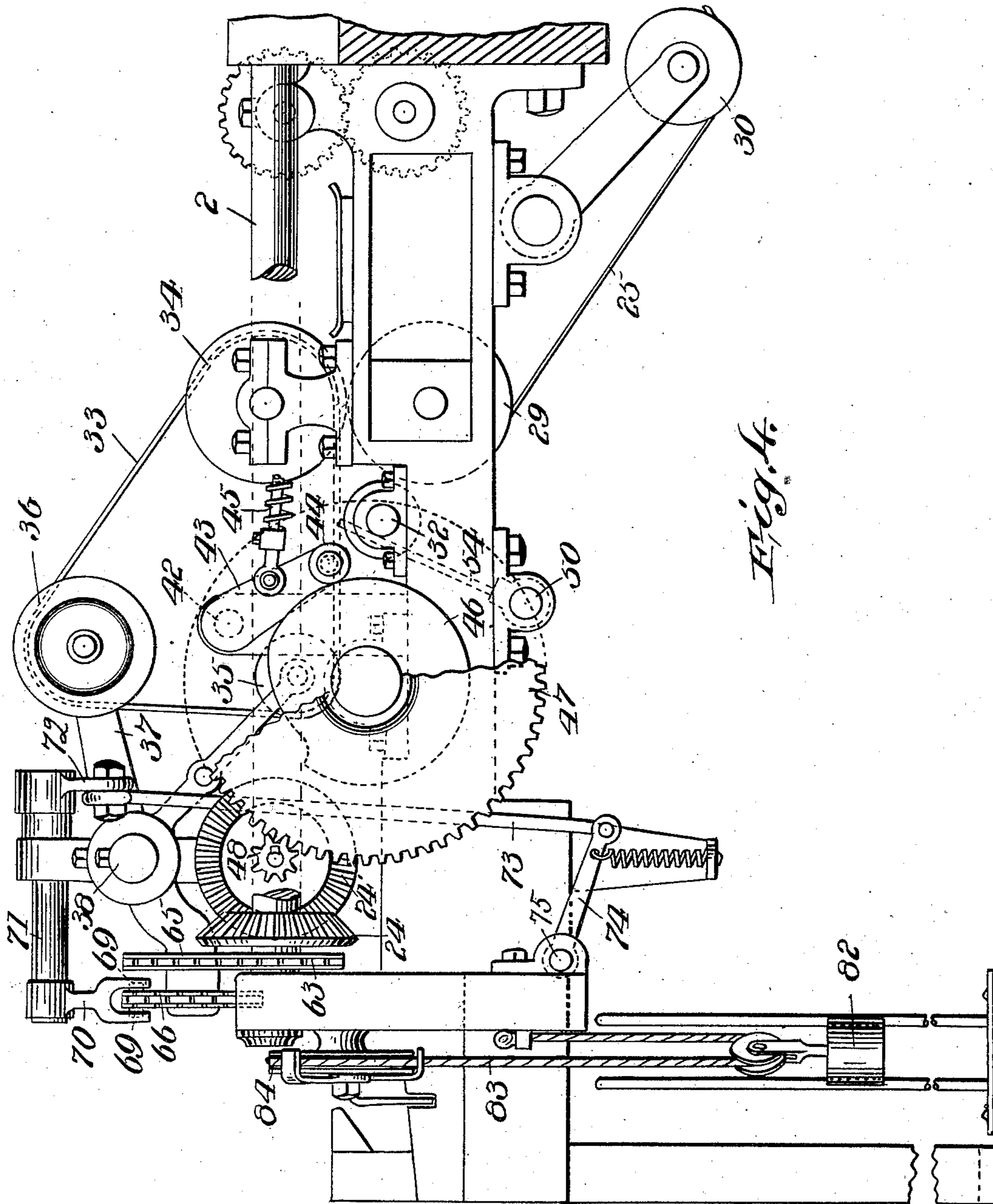
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4 Sheets—Sheet 4.



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WILLIAM Y. DEAR, OF JERSEY CITY, NEW JERSEY.

MACHINE FOR CUTTING AND COLLATING PAPER.

SPECIFICATION forming part of Letters Patent No. 704,472, dated July 8, 1902.

Application filed December 31, 1900. Serial No. 41,658. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM Y. DEAR, a citizen of the United States, residing in Jersey City, county of Hudson, and State of New Jersey, have invented a new and useful Improvement in Machines for Cutting and Collating Paper, of which the following is a specification.

My invention relates to certain new and useful improvements in machines for cutting and collating paper, and has for its object to produce a machine which will automatically perforate a large sheet of printed or other paper in equidistant parallel lines, tear the paper along these perforated lines into a number of strips, collect the successive strips into an even block, then cut the block into sections, and finally gather the several sections in their regular order into a single pile of properly-arranged leaves.

With these and other objects in view my invention consists in the novel details of construction and combination of parts to be clearly described in the following specification and fully set forth in the claims.

Referring to the accompanying drawings, forming a part of this application, in which like characters of reference indicate similar parts throughout, Figure 1 is a plan view of the machine complete. Fig. 2 is an enlarged vertical section on the lines *xx* of Fig. 1. Fig. 3 is an enlarged plan view of a portion of the delivery end of the machine. Fig. 4 is an end elevation of this portion of the machine, and Fig. 5 is an end elevation of the perforating mechanism at the receiving end of the machine.

In the drawings, 1 represents the supporting-frame of the machine, which has the general shape in plan of a hollow rectangle.

2 is the drive-shaft, mounted in suitable bearings on the frame and extending along the sides of one arm thereof and transversely through the other arm, carrying the loose and driving pulleys 3 and 4, respectively. A number of regularly-spaced toothed perforating-disks 5 are mounted on shaft 2 and are adapted to perforate in parallel lines a sheet of paper fed thereunder by any suitable mechanism deriving its motion from the drive-shaft 2. As here shown, the paper is fed by means of the drum 6, geared at one end to the gear-

wheel 7, mounted on drive-shaft 2, and having a pinion 8 at its other end meshing with gear-wheel 9, which imparts rotation to a grooved cam-gear 10 by means of a pinion 11, carried on the same shaft therewith. As this specific form of feeding and perforating mechanism forms no material part of my invention, description thereof will not be made in detail. As the sheet passes beneath the perforating-rollers it is conveyed rearwardly over guides 12 by tapes 13, passing around idle pulleys 14, mounted in the frame and deriving their motion from the drum 6.

A loose roller 15 is mounted by cranks 16 to a rock-shaft 17, extending across the frame and to which rock-shaft is secured a crank 18, connected by a link 19 to one end of a bell-crank lever 20, pivoted to the frame and having a pin at its other end traveling in the cam-groove of the gear 10, so that when the offset 21 of said cam-groove forces this pin upward the link 19 will throw the crank 18 and roller 15 downward. This downward movement of the roller 15 engages the side edge of the sheet of perforated paper between said roller and roller 22, located directly therebeneath and receiving a constant rotation from the drive-shaft 2 by means of a train of gearing 23 and beveled gears 24 and 24'. Without description to the contrary it will be understood that the rolls and shafts hereinafter referred to are journaled across the frame and derive their motion from the train of gears 23, which are so proportioned and related to each other as to give the several parts the speed and direction of rotation as specified. The sheet is then started by the roller 22 in the direction of the arrows, Fig. 2, and carried by means of tapes 25 between a pair of rollers 26 and 27, thence between a pair of shield-plates 28, and finally over a roller 29, from which the tapes 25 return to roller 22 after having passed beneath the gravity tension-pulleys 30, which are pivotally mounted to swing beneath the frame. On leaving the roller 29 the paper is deflected upward by a plate 31 to pass over a rapidly-driven grooved roller 32, against which it is tightly pressed by tapes 33, passing around rollers 34 and 35 and pulleys 36, mounted on arms 37 of a bar 38, extending across the

frame of the machine. As the pair of rollers 26 and 27 are set close together to tightly pinch the paper therebetween and prevent its passage at a greater speed than their surface velocity and as the rollers 29 and 34 also 5 tightly pinch the paper, are driven at a greater surface velocity than said rollers 26 and 27, the paper on reaching said rollers 29 and 34 is given a greater forward tendency 10 than will be permitted by the speed of rollers 26 and 27, and consequently it is torn along its perforated line into a long strip. This tearing operation is caused to take place when the line of perforation lies between the 15 pair of shield-plates 28, so that the free forward edge of the succeeding strip will be guided in its proper path. The successive strips of paper after passing over roller 32 are neatly piled one upon another on the slot- 20 ted plate 39, with their forward ends guided by the curved guide 40 against the stops 41. These stops 41 are mounted on a rock-shaft 42, which is at intervals reciprocated to elevate said stops from the pile of strips by 25 means of a crank 43, mounted on one end of said shaft and having its roller end 44 pressed by the spring-actuated rod 45 against a cam 46, carried by a large gear-wheel 47, which is journaled on one side of the frame and derives its motion from the pinion 48, mounted 30 on the bevel-gear 24'. The roller 35, beneath which the strips are piled on the toothed plate 39, is provided near each end with projecting inclined curved fins 49, so disposed with relation to the direction of rotation that any sheet 35 passing therebeneath which is not in alignment with the pile already deposited will project into the path of one of said fins, which during its rotation will act as a cam engaging 40 the end of said sheet and pressing it into alignment with the others will be pushed in the proper direction by these fins to assume such alignment. A rock-shaft 50 is journaled beneath the frame and has a projecting lug 45 51, pivotally connected, by means of a rod 52, to an arm 53, carried by rock-shaft 42, so that said rock-shafts 50 and 42 are caused to operate simultaneously in opposite directions. A number of upwardly-extending fingers 54 are 50 carried by the rock-shaft 50, with their top ends normally resting within the grooves of roller 32, but which are adapted when the crank 43 is operated by the cam 46 to be thrown forward within the slots of plate 39 and advance bodily the pile of paper strips 55 which at this time is freed from stops 41.

Connecting the bevel-gear 24' on one side of the machine and the train of gears 23 on the other side of the machine is a shaft 55, 60 having mounted thereon at regular intervals a number of cutter-rolls 56, with central peripheral cutter-blades 57, each adapted to fit between a pair of disks 58, mounted on a shaft 59 directly beneath shaft 55. The pile 65 of strips on leaving plate 39 pass between the cutter-rolls 56 and disks 58, by which it is

cut into a number of blocks of sheets, and each block as it leaves the cutter-rolls is led at one end up the inclined guides 60 and 61, while at the same time the other side of the 70 block is slightly depressed by the lower edge of the slotted presser-foot 62, suspended from the frame.

A sprocket-wheel 63 is mounted on the drive-shaft 2 and is connected by a chain 64 75 with a sprocket-wheel 65, mounted on an arm of the frame carrying therewith a sprocket-wheel 66. The sprocket-wheel 66 is connected to a sprocket-wheel 67 at the opposite side of the machine by the chain 68, carrying thereon 80 oppositely-projecting lugs 69. A depending fork 70 is mounted on a rock-shaft 71 with its arms embracing the chain 68, so that each time the lugs 69 pass therebetween the rock-shaft 71 is given a short reciprocation. A 85 crank-arm 72 is secured to the other end of rock-shaft 71 and is connected by a rod 73 to a spring-retracted crank 74, mounted on a shaft 75, which carries a number of upwardly-extended flattened fingers 76, normally rest- 90 ing against shaft 59 between the pairs of disks 58, but when actuated by the before-described engagement of the lugs 69 with the fork 70 are adapted to swing up through the slots in the presser-feet 62 and engage 95 the rear ends of the blocks of cut paper and drive them from the inclined guide-pins 60 and staples 61 onto their respective inclined plates 77, where they all rest inclined in the same direction. The plates 77 are inclined 100 at such an angle that the cut edges of the several blocks lie alternately above and below each consecutive block of paper, so that the blocks are relatively in such a position to each other as would be the case if they 105 were laid out in a line, each block lying with its edge projecting over the next consecutive block in such a position that beginning at one end of the line of blocks a sweeping motion would slide the blocks one on top of the other, 110 making a single pile of blocks.

A longitudinally-slotted guide-rod 78 extends across the machine above the line of inclined plates 77 and has slidably mounted 115 thereon a tubular frame 79, provided with a screw fitting in the slot of guide-rod 78 to prevent rotation of the frame. An angular arm 81 projects from the frame 79 into the path of the lugs 69, so as to be engaged by said lugs and carried to the other end of the 120 guide-rod 78, where it is released by said lugs passing up over the sprocket-wheel 67. When thus released, the frame 79 is rapidly retracted to its original position by the descent of a pulley-weight 82, mounted on a rope or chain 125 83, passing over a grooved pulley 84 and connected by hook 85 to the frame 79. To prevent a sudden jar on arriving at its destination, the frame 79 is caused to strike against a spiral buffer-spring 86, mounted on the 130 guide-rod 78. A rake 87 is carried by the frame 79 and has its depending prongs arched

over the line of inclined plates 77 and traveling in parallel grooves 88 in the receiving-table 89, so that as the frame is driven forward it collects one block of sheets after another 5 and piles them in regular order at one end of the receiving-table.

Though the process of operation has been traced piece by piece in the foregoing description to enable the functions of the several 10 parts to be better understood as they were described, the entire course may be summarized as follows: Paper in large sheets, usually printed in pages suitably imposed and arranged, is fed beneath the perforating-rolls, 15 where it receives perforations in parallel lines, and travels therefrom onto a table, where it is automatically engaged by one edge and driven sidewise between the pairs of rollers 15 and 22 and 26 and 27, respectively, which tightly grasp it and prevent 20 any slipping. As one line of perforations clears the pair of rollers 26 and 27 the front edge of the sheet is engaged between the more rapidly driven grooved rollers 34 and 29, which results in tearing said front edge of the sheet into a long strip by severing it 25 from the remainder along the first line of perforations while said line of perforations is located between the shield-plates 28. This operation is continued with each successive line of perforations, and the several strips are neatly piled one upon another in regular succession on the slotted plate 39 and beneath the curved guide-strip 40 against the stops 35 41, where they are adjusted endwise by the projecting curved guide-fins 49 of roller 35. The mechanism is so timed that when the entire sheet has thus been divided into strips and these strips evenly piled on plate 39 the 40 stops 41 are elevated from their path and the series of fingers 54 are swung forward, delivering the pile of strips in a body to the cutter-rolls 56 and their bearing-disks 58, where it is cut transversely by the blades 57 into a number of blocks of sheets. Each block on issuing 45 therefrom is inclined at one end by traveling upon the inclined guide-pin 60 and the inclined staple 61 while at the same time being held against displacement by the slotted presser-feet 62. At this point of the procedure the series of flattened fingers 76 are caused to throw the blocks forward onto the inclined plates 77 by the engagement of the lugs 69 with the fork 70, and shortly thereafter the 50 frame 79 is conveyed by these lugs 69 from one side of the machine to the other, meanwhile collecting the several blocks of sheets one upon another in their regular order and depositing them in a single orderly pile at 60 one end of the delivery-table. As each part performs its function it resumes its normal position, ready to repeat its operation on the following sheet, so that the feeding is practically continuous, the second sheet being fed 65 to the perforating-roll as the rear end of the first sheet disappears beneath roller 15, so

that two sheets are in course of operation at one time.

Having thus fully described my invention, what I claim as new and useful, and desire 70 to secure by Letters Patent, is—

1. In a device of the character described, means for perforating paper in lines, in combination with a device for tearing the paper in strips along said perforated lines, and an 75 apparatus for piling said strips and cutting them into blocks of sheets, substantially as described.

2. In a device of the character described, in combination with a device for tearing a 80 sheet of paper along perforated lines into strips, apparatus for piling the said strips and cutting them into a number of blocks of sheets, and means for collecting the said blocks of sheets in their regular order, sub- 85 stantially as described.

3. In a device of the character described, a pair of rollers adapted to tightly press against a sheet of perforated paper passed therebetween, shield-plates; or guides, receiving the 90 paper from the pair of rollers, and a second pair of rollers operated at a greater surface speed than the said first pair of rollers, for receiving the paper from the shield-plates and tearing it along the perforations while 95 said perforations lie between the shield-plates, substantially as described.

4. In a device of the character described, a pair of rollers adapted to tightly press against a sheet of perforated paper passed therebetween, a second pair of rollers also tightly 100 pressing said sheet between them and operated at a greater surface speed than the said first pair of rollers, and thus adapted to tear the paper in strips along the lines of perforations, a plate adapted to receive the strips 105 from the said roller and tapes, and a roller around which the tapes travel provided with projecting fins for adjusting the pile of strips on the said plate, substantially as described. 110

5. In a device of the character described, a pair of rollers adapted to tightly press against a sheet of perforated paper passed therebetween, a second pair of rollers also tightly 115 pressing said sheet between them, and operated at a greater surface speed than the said first pair of rollers, to tear the paper in strips along the lines of perforation, a slotted plate adapted to receive the strips from the said 120 roller and tape, a stop against which the strips are piled, and a number of fingers operating within the slots of the plate for ejecting the pile of strips when the stop is removed, substantially as described.

6. In a device of the character described, a 125 suitably-driven roller, tapes bearing thereon, and adapted to act with the roller to advance and pile on each other strips of paper fed therebetween, a plate upon which the strips of paper are piled on leaving the roller and tapes, 130 a stop against which the strips are piled, a second roller with projecting helical fins there-

on for evening the pile of strips, a number of fingers for discharging the pile of strips from the plate, and means for removing the stop and operating the fingers, substantially as described.

7. In a device of the character described, a suitably-driven roller, tapes bearing thereon and adapted to act with the roller to advance strips of paper fed therebetween, a slotted plate upon which the strips of paper are piled on leaving the roller and tapes, stops against which the strips are piled, a guide beneath which the front edges of the strips are led, a second roller around which the tapes travel having projecting helical fins thereon for evening the pile of strips therebeneath, a number of fingers operating within the slots of the plate to discharge the pile of strips thereon, and a cam for removing the stop and operating the fingers simultaneously, substantially as described.

8. In a device of the character described, a pair of rollers adapted to tightly press against a sheet of perforated paper passed therebetween, shield-plates receiving the paper from the pair of rollers, a second pair of rollers also tightly pressing said sheet between them and operated at a greater surface speed than the said first pair of rollers and adapted to tear the paper in strips along the lines of perforation, a slotted plate to receive the strips of paper from the said roller and tapes, stops against which the strips are piled, a roller around which the tapes pass with projecting helical fins thereon for evening the pile of strips, a number of fingers operating within the slots of the plate to discharge the pile of strips therefrom, and means for removing the stop and operating the fingers simultaneously, substantially as described.

9. In a device of the character described, a shaft, a number of cutter-rolls mounted thereon, annular projecting cutting-blades located in the center of the peripheries, a pair of disks journaled beneath each cutter-roll and adapted to receive the cutter-blade therebetween, a number of pivoted arms operating between the pairs of disks, and means for operating the arms, substantially as described.

10. In a device of the character described, a shaft, a number of cutter-rolls mounted thereon, a pair of disks journaled beneath each cutter-roll and adapted to support a pile of paper strips while being cut in blocks by the cutter-rolls, a number of pivoted arms located between the pairs of disks and adapted

to remove the blocks from the cutter-rolls when cut, and an inclined guide in one side of the path of each block, substantially as described.

11. In a device of the character described, a shaft, a number of cutter-rolls mounted thereon, a pair of disks journaled beneath each cutter-roll and adapted to support a pile of paper strips while being cut into blocks by the cutter-rolls, a number of pivoted arms located between the pairs of disks and adapted to remove the blocks from the cutter-rolls when cut, an inclined guide at one side of the path of each block, a number of inclined plates for receiving the blocks from the guides, and means for collecting the blocks from the inclined plates, substantially as described.

12. In a device of the character described, a shaft, a number of cutter-rolls mounted thereon, a pair of disks journaled beneath each cutter-roll and adapted to support a pile of paper strips while being cut into blocks by the cutter-rolls, a number of pivoted arms located between the pairs of disks and adapted to remove the blocks from the cutter-rolls when cut, an inclined guide in one side of the path of each block, a slotted guide located above each pivoted arm and adapted to retain the blocks in position previous to their discharge by said arms, a number of inclined plates for receiving the blocks from the guides, a suitably-operated endless chain, a lug carried thereby, a guide-rod, a sleeve slidable thereon, means on the sleeve to be engaged by the lug, and arms on the sleeve to collect the blocks from the inclined plates in regular order, substantially as described.

13. In a device of the character described, a number of inclined plates adapted to support blocks of paper sheets, a guide-rod, a sleeve slidable thereon, arms on the sleeve clearing the inclined plates, a suitably-driven endless chain, a lug thereon, an arm on the sleeve for engaging the lug to carry the sleeve along the inclined plates and collect the blocks therefrom, and a weight connected to the sleeve to retract it to its normal position on being disengaged from the lug, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WM. Y. DEAR.

Witnesses:

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