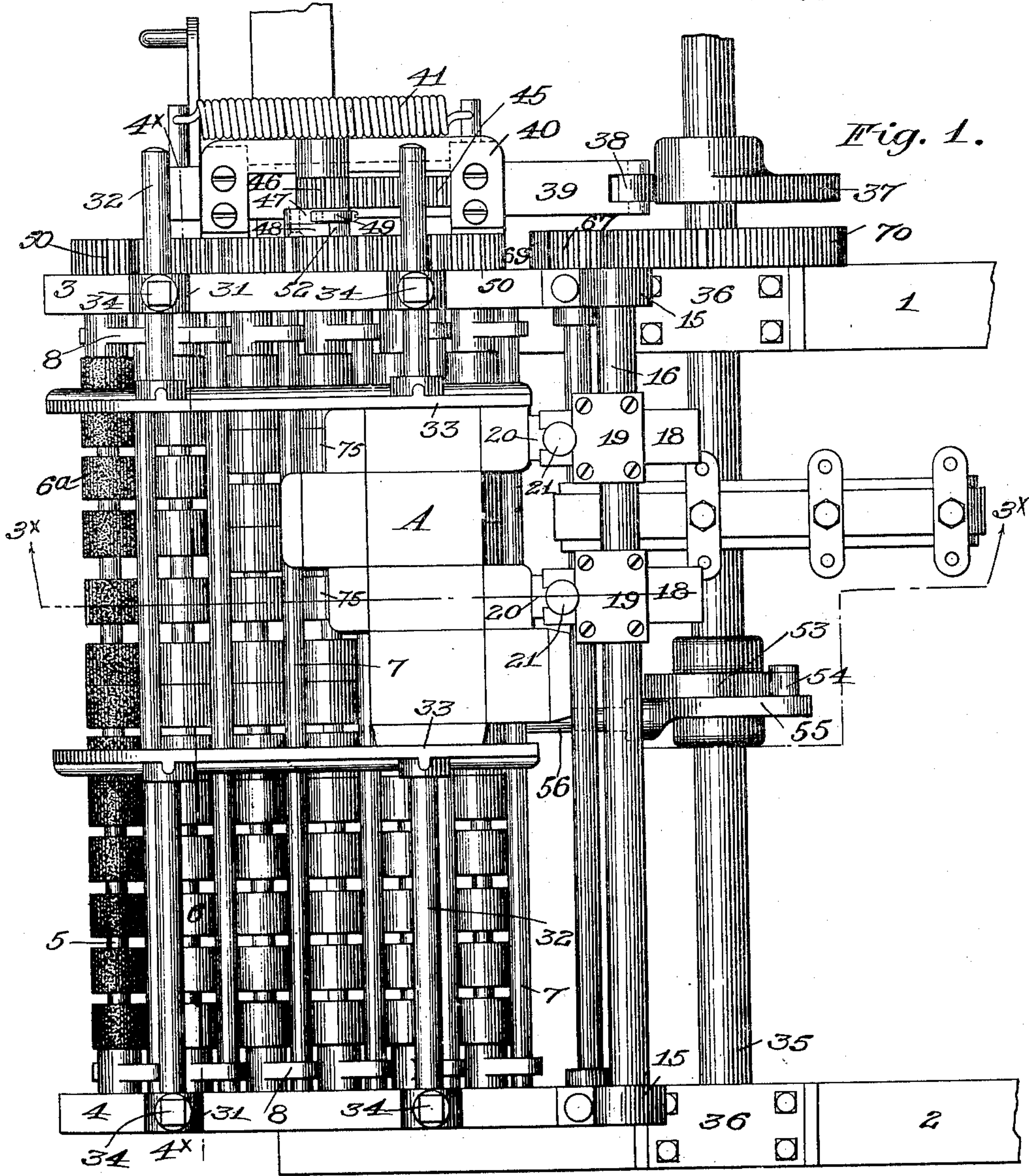


A. B. COWLES.
SHEET FEEDING MECHANISM.
APPLICATION FILED MAR. 18, 1907.

976,640.

Patented Nov. 22, 1910.

3 SHEETS—SHEET 1.



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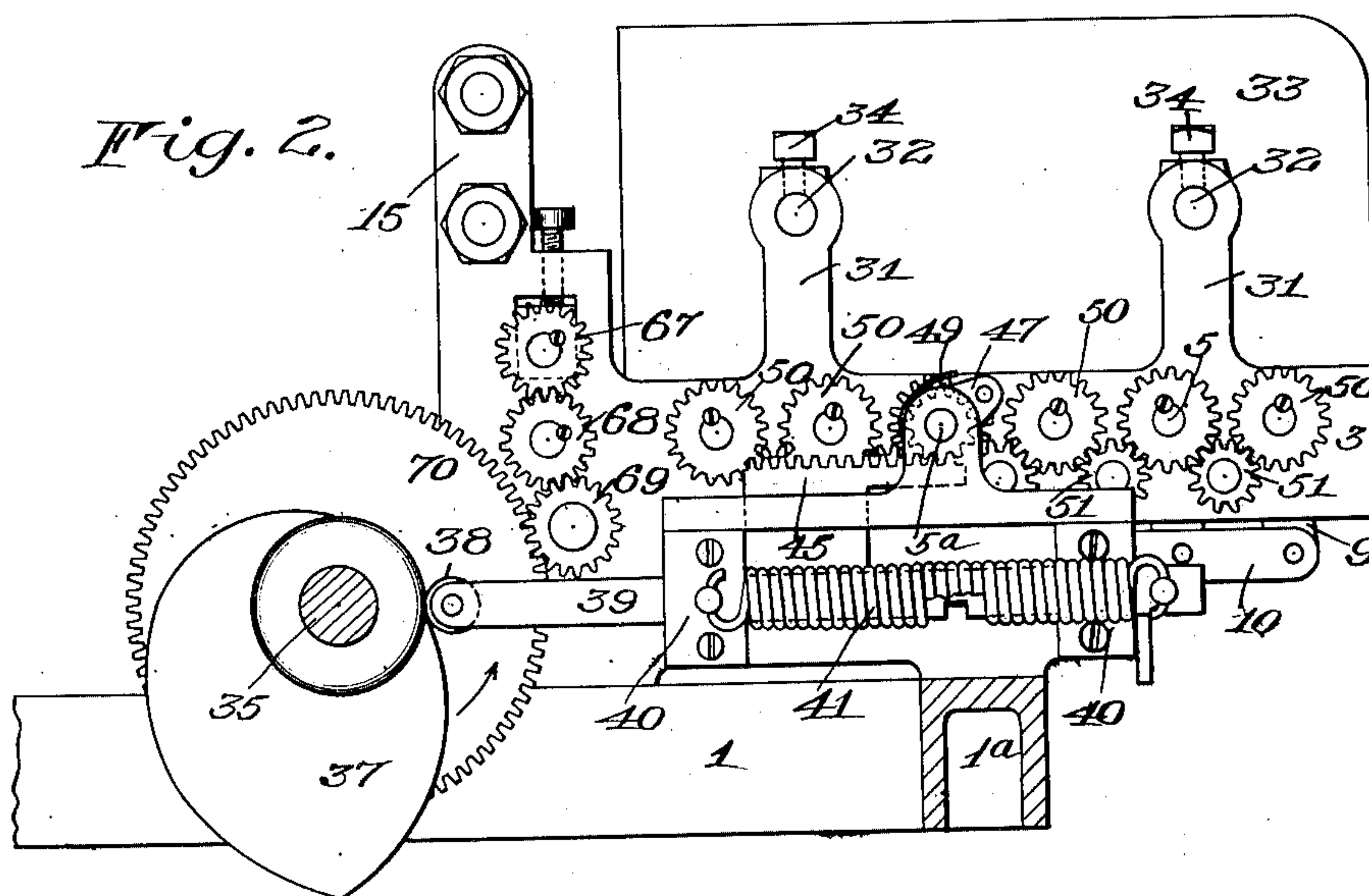
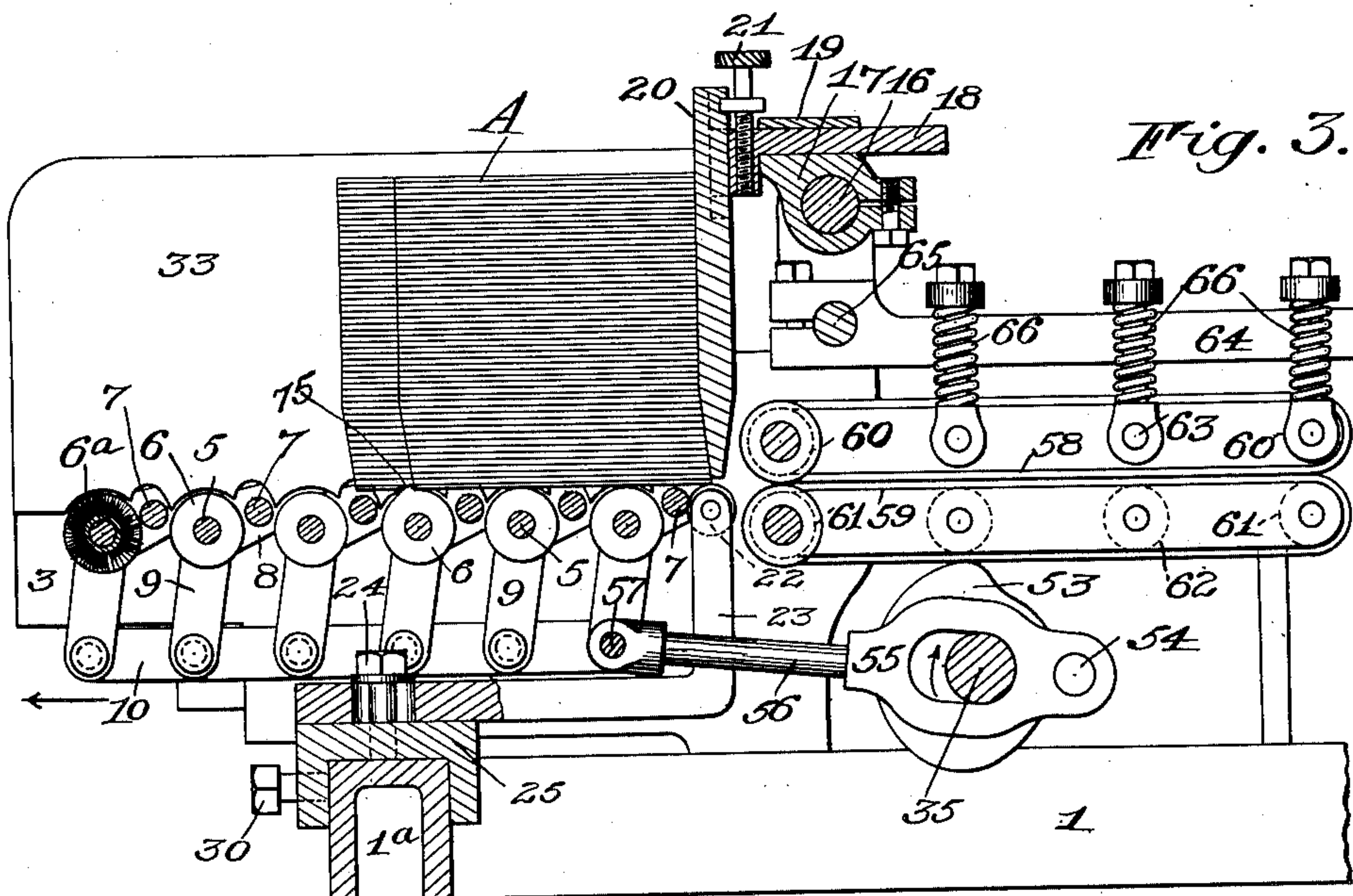
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3 SHEETS—SHEET 2.



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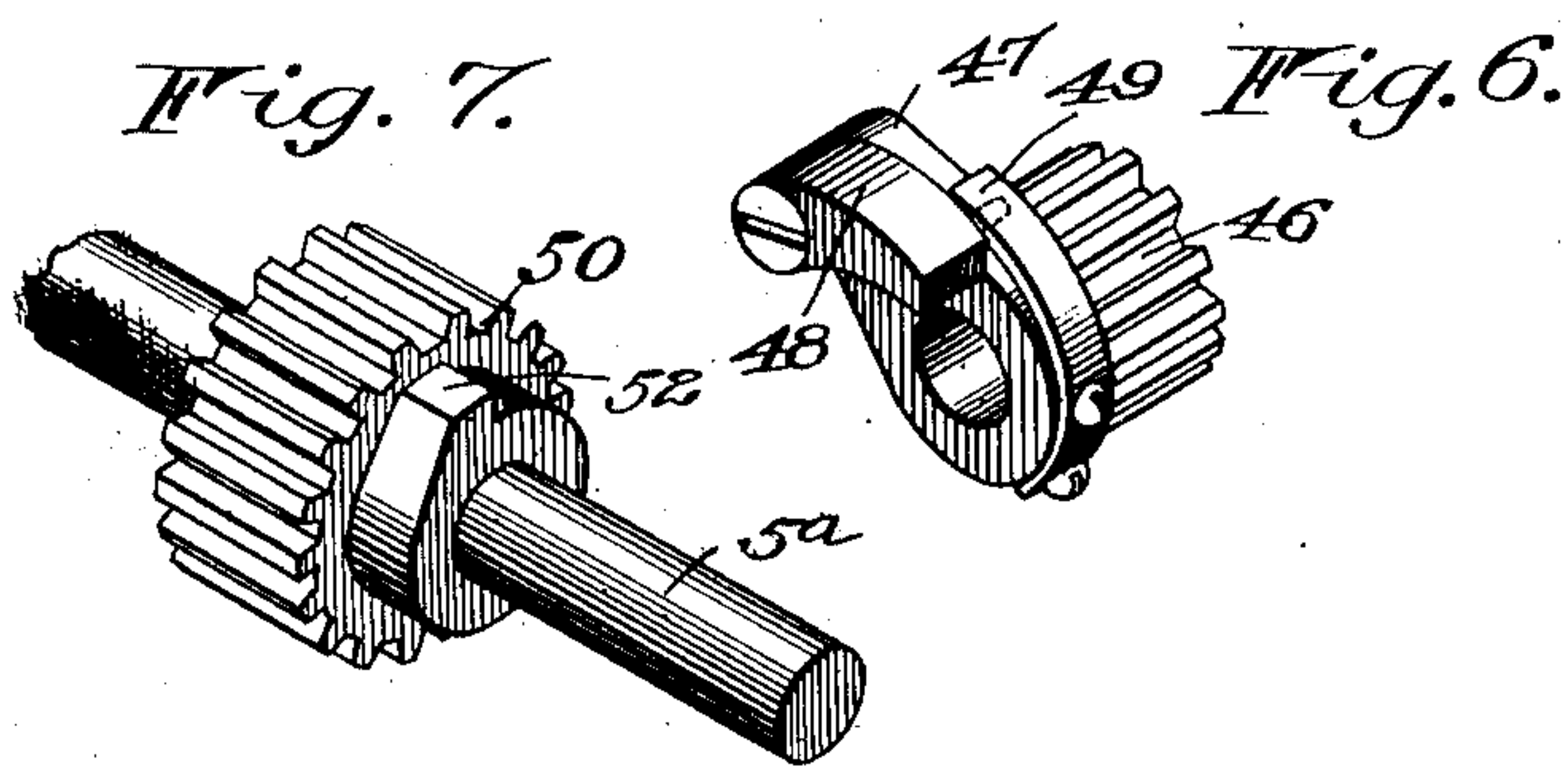
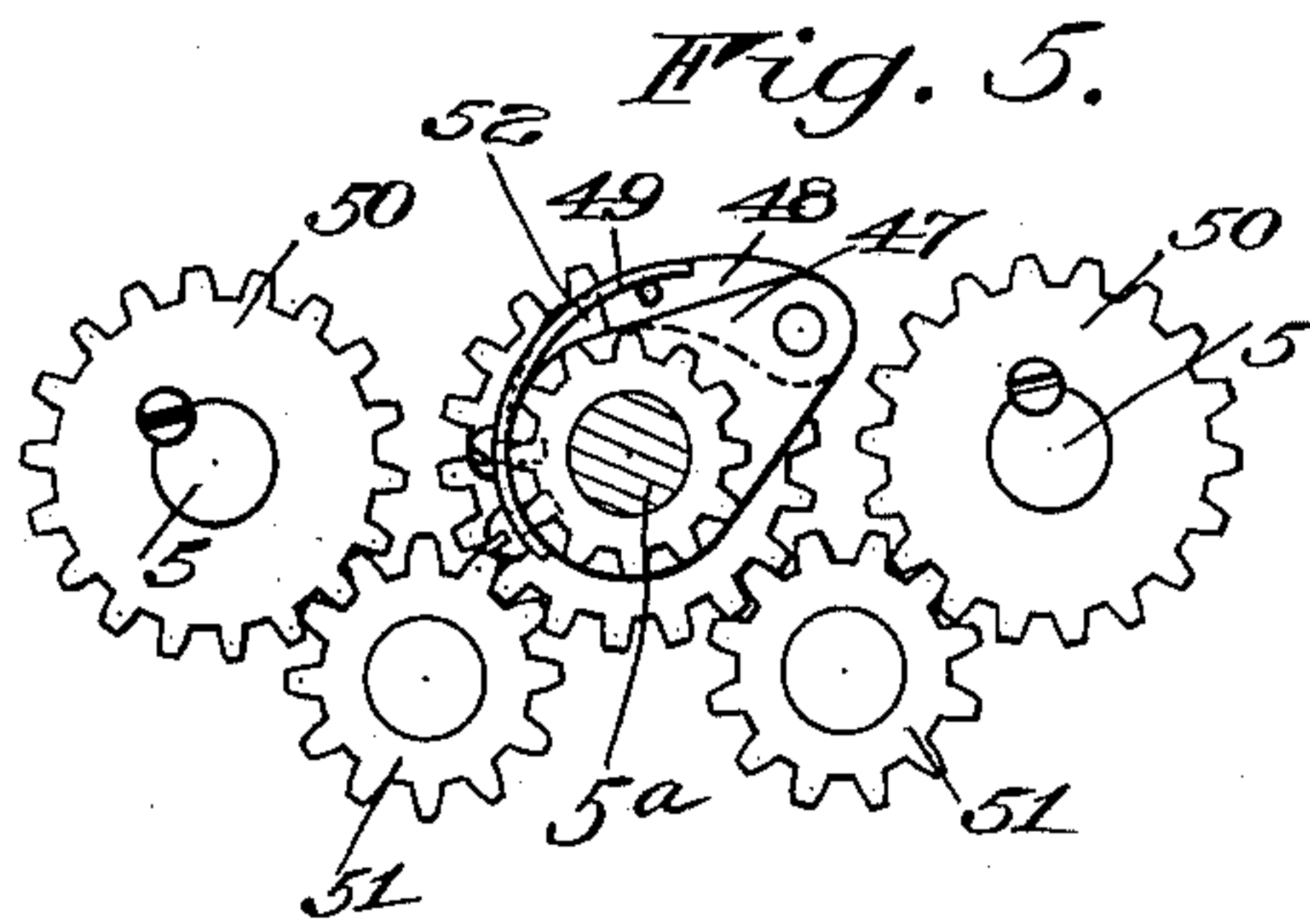
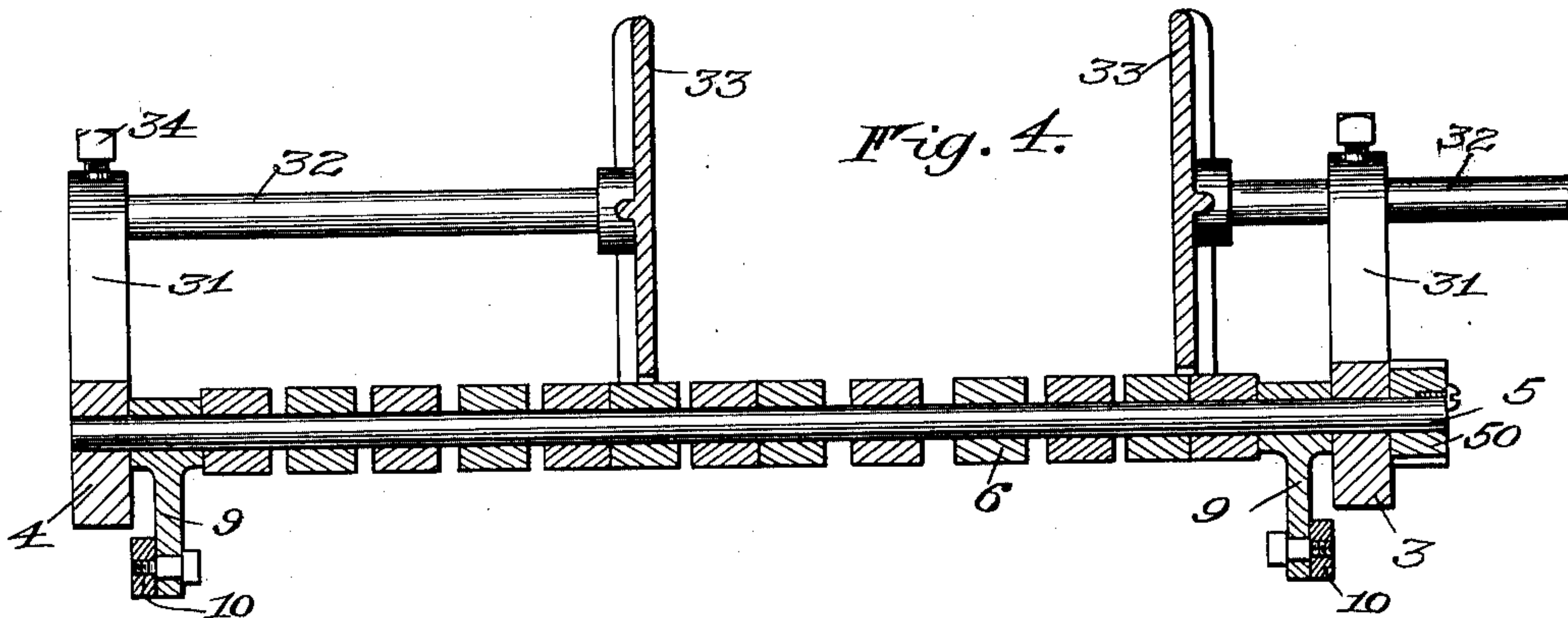
Church & Dick
His Attorney,

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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

ARTHUR B. COWLES, OF ROCHESTER, NEW YORK.

SHEET-FEEDING MECHANISM.

976,640.

Specification of Letters Patent. Patented Nov. 22, 1910.

Original application filed April 21, 1906, Serial No. 312,957. Divided and this application filed March 18, 1907. Serial No. 362,913.

To all whom it may concern:

Be it known that I, ARTHUR B. COWLES, of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Sheet-Feeding Mechanisms; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the reference numerals marked thereon.

My present invention relates to feeding devices adapted to be employed in connection with machines adapted for performing certain operations upon sheet material such as printing or folding them, and it has for its object to provide means whereby sheets may be discharged successively from a pile or stack at regular intervals of time in relation to the subsequent operations to be performed on them.

To these and other ends the invention consists in certain improvements and combinations of parts, all as will be hereinafter more fully explained, the novel features being pointed out in the claims at the end of the specification.

In the drawings: Figure 1 is a top plan view illustrating a mechanism constructed in accordance with my invention. Fig. 2 is a side elevation thereof showing the driving devices. Fig. 3 is a sectional view taken on the line 3^x 3^x of Fig. 1. Fig. 4 is a similar view taken on the line 4^x 4^x of Fig. 1. Fig. 5 is a detail view of the operating mechanism. Figs. 6 and 7 are detail perspective views of two of the parts of the mechanism shown in Fig. 5.

Similar reference numerals in the several figures indicate similar parts.

A feeding mechanism constructed in accordance with my invention is capable of use in connection with a variety of machines, but it is adapted particularly to be used in connection with machines for folding and gluing knock-down paper boxes after they have been cut and scored, a machine of this character having been shown in a previous application filed by me under date of April 21st, 1906, bearing Serial No. 312,957, of which this application is a division. I have, therefore, merely shown the feeding devices for projecting the lowermost sheet or blank at the bottom of the stack and the co-

machine for performing subsequent operations thereon, and it will be understood that the present invention is applicable to machines other than the one mentioned.

The feeding device which I have illustrated as showing the present embodiment of my invention comprises a frame consisting of side pieces 1 and 2 mounted upon any suitable form of support on which are upwardly-extending brackets 3 and 4 supporting a bottom and feeding devices which constitute a rack adapted to contain a pile of sheets indicated by A, which for the purposes of illustration and description, are shown as box blanks. Extending between the brackets 3 and 4 are a plurality of shafts 5 arranged in horizontal alinement and spaced equidistantly from each other, as shown in Fig. 3. Each shaft is provided with a plurality of feeding rolls 6, preferably constructed of elastic material such as rubber or radially-extending bristles, as indicated by 6^a in Fig. 1. The bottom of the rack is composed of a plurality of rods 7 located between the rollers 6 on adjacent shafts and adapted to be moved upwardly and downwardly to agitate the stack of sheets or blanks and normally support them out of engagement with the roll 6 and only allow the stack to descend into engagement with them at proper intervals when it is desired to feed or project a blank. This movement of the bottom of the rack is accomplished by supporting the extremities, of each of the rods 7 on arms 8, of bell crank levers pivoted on the shafts 5, having downwardly-extending ends 9 which are connected for simultaneous operation by a rod 10 which is shifted intermittently, as will be further described. The forward edges of the brackets 3 and 4 extend upwardly as indicated at 15 and supported upon said extensions is a guide rod 16 on which are adjustably supported two or more heads 17, carrying arms 18 adjustably secured beneath cap plates 19, the ends of said arms being provided with ways in which are mounted gages 20 which are adjustable vertically by screws 21 to position their lower ends relatively to the bottom or floor of the rack. Coöperating with each of the gages is a roll or guide 22 mounted on an arm 23, and supported in alinement with the tops of the feed rolls 6. The rear ends of the arms 23 extend laterally beneath the rack

and are adjustably secured by a bolt 24 to a head 25 which is adjustable in a transverse direction beneath the rack on the cross piece 1^a of the frame to which it is normally secured by a bolt 30. The brackets 3 and 4 are also provided with upwardly-extending arms 31 having perforations guiding the rods 32 supporting the side pieces or walls 33 of the rack which are secured in adjusted position by means of set screws 34.

35 indicates a driving shaft for operating the feed mechanism intermittently, which it will be understood, is connected by suitable devices by the main driving shaft of the machine with which this mechanism is to be associated, said connections being arranged to rotate the shaft at the desired speed to actuate the feeding mechanism to advance the sheets or blanks at the required frequency. The shaft 35 is supported in bearings 36 and mounted thereon is a cam 37 cooperating with a roller 38 to reciprocate the rod 39 in the guides 40 against the tension of a coil spring 41. Mounted on the bar 39 is a rack 45 which oscillates a pinion 46, journaled on one of the shafts 5^a, provided with an arm 47 carrying a pawl 48 operated upon by the spring 49. Each of the shafts 5 is provided at one end with a gear wheel 50 all of which are connected to rotate simultaneously in the same direction by idlers 51. The gear wheel 50 on the shaft 5^a is provided with a hub having a single ratchet tooth 52 with which the pawl 48 engages when the pinion 46 is rotated in one direction. The shafts 5 of the rollers 6 might be rotated continuously, but it is preferable to rotate them intermittently, as it facilitates the successive ejection of the sheets or blanks at regular intervals.

The intermittent raising and lowering movement of the bottom of the rack heretofore mentioned is caused by a cam 53 on the shaft 35 which cooperates with a pin 54 on a yoke 55 connected by a bar 56, to the cross bar 57 connected at its ends to the bars 10—10.

In front of the stack rack suitable transporting devices may be located for drawing the blanks from beneath the stack when the forward ends have been projected, which also serve as means for conducting them to the mechanism operating upon them. In the present instance I have shown a conveyer comprising a pair of upper and lower belts 58 and 59 supported at their ends upon rollers 60—60 and 61—61 respectively, and at intermittent points by rollers 62. The rollers of the lower belt are rigidly mounted in suitable bearings, and those of the upper belt are carried in movable bearings 63 supported on an arm 64 extending rearwardly from a bar 65 and operated downwardly by coil springs 66. The adjacent stretches of the belts 58 and 59 are arranged in alinement with the

tops of the feed rolls 6 and the shafts carrying the rollers 60 and 61 at the forward ends of the belts are provided at their outer ends with gear wheels 67 and 68 respectively, which are driven at the desired speed by a pinion 69 meshing with a gear wheel 70 mounted on the shaft 35.

The operation of the feeding mechanism will be readily understood. In the first instance the operator adjusts the side pieces 33, gages 20 and the guide arms 23 of the stack rack to receive the sheet or blank which it is desired to feed, and the conveying devices are also positioned to engage a particular portion of the blank when it is projected. The pile of sheets or blanks indicated by A is then stacked in the rack and rotary motion being imparted to the shaft 35, the cam 53 will cause the rods 10—10 to be operated in the direction of the arrow indicated in Fig. 3, causing the arm 8 of the bell crank levers and the rods 7 carried thereon, to move downwardly permitting the stack to descend into engagement with the feeding rolls 6. When the stack is resting on the feed rolls, the cam 37 engages the arm 39 and moves the rack 45 outwardly to rotate the pinion 46, which is connected by the pawl 48 to the gear wheel 50 on the shaft 5^a, thereby rotating each of the feed rolls 6 a sufficient distance to project the lowermost blank into engagement with the transporting devices or conveyer belts 58 and 59 which are moving continuously. As soon as the blanks are projected, the cam 53 begins to elevate the stack of sheets so that by the time the lowermost sheet has been stripped, the stack is moved upwardly out of engagement with the feed rolls, thereby preventing the too rapid feeding of the sheets.

In instances where a feeding device of this character is employed for operating upon sheets or blanks of appreciable thickness, such as pasteboard stock, one or more of the shafts 5 may be provided with what is termed a kicker for imparting the initial movement to the blanks. This kicker is made by providing one of the rolls 6 with a small shoulder or tooth 75 as shown in Fig. 3, which is positioned to engage the rear end of the lowermost blank when the stack of blanks descends into engagement with the feeding devices.

The devices embodying my invention are simple in construction and consist of few parts which may be readily assembled and are capable of being applied for feeding sheets or blanks to machines heretofore constructed.

I claim as my invention:

1. In a sheet feeding mechanism, the combination with a stack rack, and a plurality of equidistantly spaced parallel rods extending transversely and comprising the bottom of the rack, of a plurality of revoluble feed-

ing rolls located beneath the rods and parallel therewith and means for intermittently changing the relative position of the rods and rolls to engage all of the latter simultaneously with various points of the underlying sheet of the stack forming the contents of the rack.

2. In a sheet feeding mechanism, the combination with a stack rack, and a series of spaced parallel transversely extending rods adapted to support a stack of blank sheets by engaging a plurality of points on the bottom of the stack, of a plurality of revoluble shafts arranged parallel with the rods and located between them having feeding rolls located beneath the rods and means for depressing the rods to allow the blanks throughout their entire area to be lowered into engagement with all of the underlying rolls simultaneously.

3. In a sheet feeding mechanism, the combination with a frame, shafts journaled on the frame, feed rollers on the shafts, a plurality of pivoted arms and rods supported on the latter and extending parallel with

the shafts forming a bottom adapted to support blank sheets, of a driving shaft, connections between it and the arms for intermittently depressing the rods below the feed rolls and driving connections between said shaft and rolls.

4. In a sheet feeding mechanism, the combination with a rack having a bottom and adapted to contain a stack of blank sheets and a support located in front of the rack, of a gage mounted on the support and adjustable relatively to the bottom of the rack, an arm supported beneath the rack and adjustable longitudinally and laterally thereof, said arm being provided with an upwardly projecting end adapted to form a guide and to be located beneath the gage and means for discharging a blank from the bottom of the rack and between the gage and guide.

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