No. 846,945 PATENTED MAR. 12, 1907.

G. H. PIERCE.

DEVICE FOR FEEDING SHEET MATERIAL.

APPLICATION FILED FEB. 12, 1906.

3 SHEETS—SHEET 1.

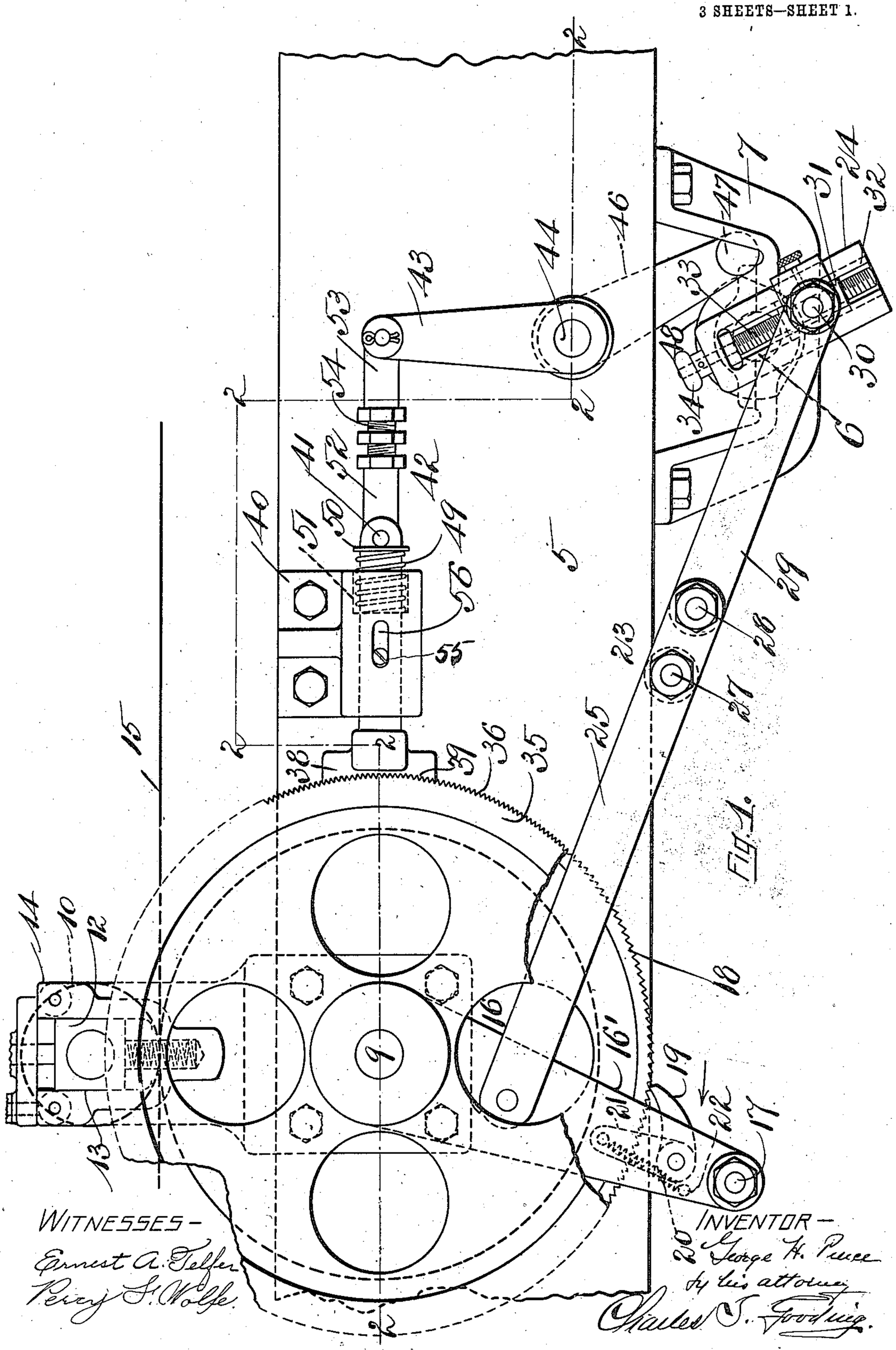

FIG. 1.

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3 SHEETS—SHEET 2.

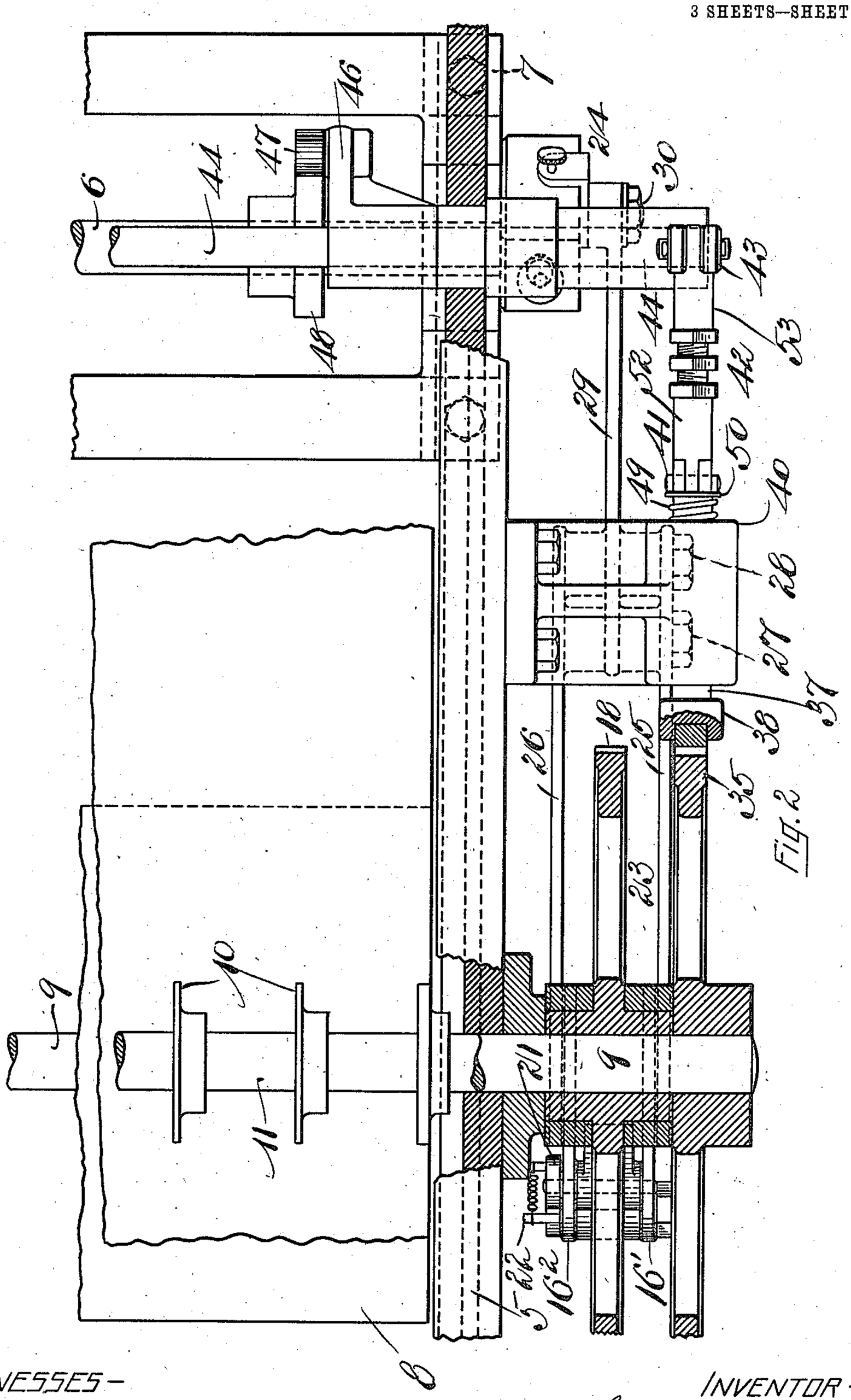

FIG. 2

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3 SHEETS—SHEET 3.

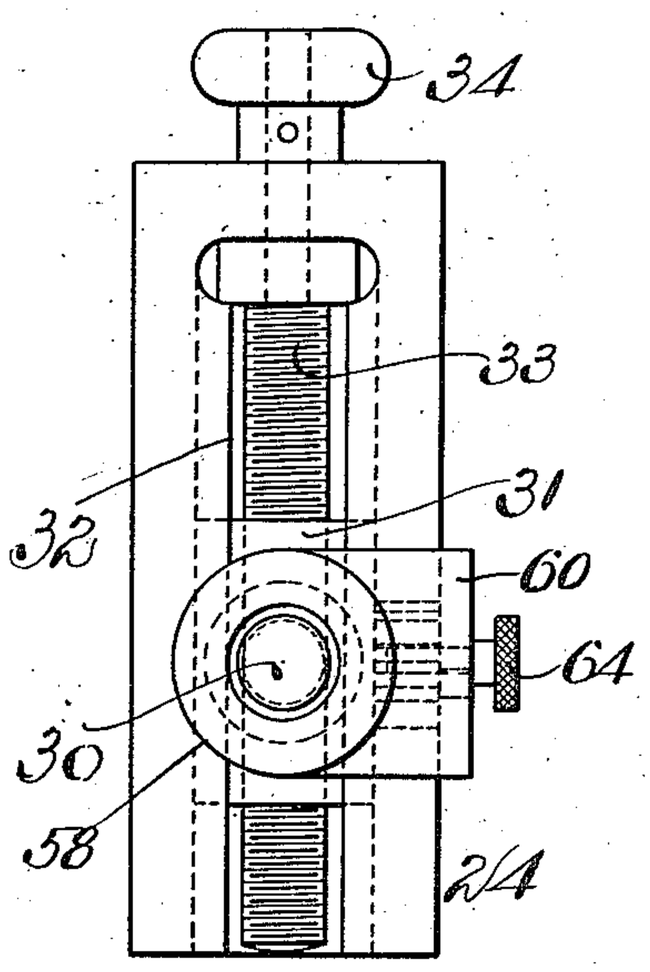

Fig. 3.

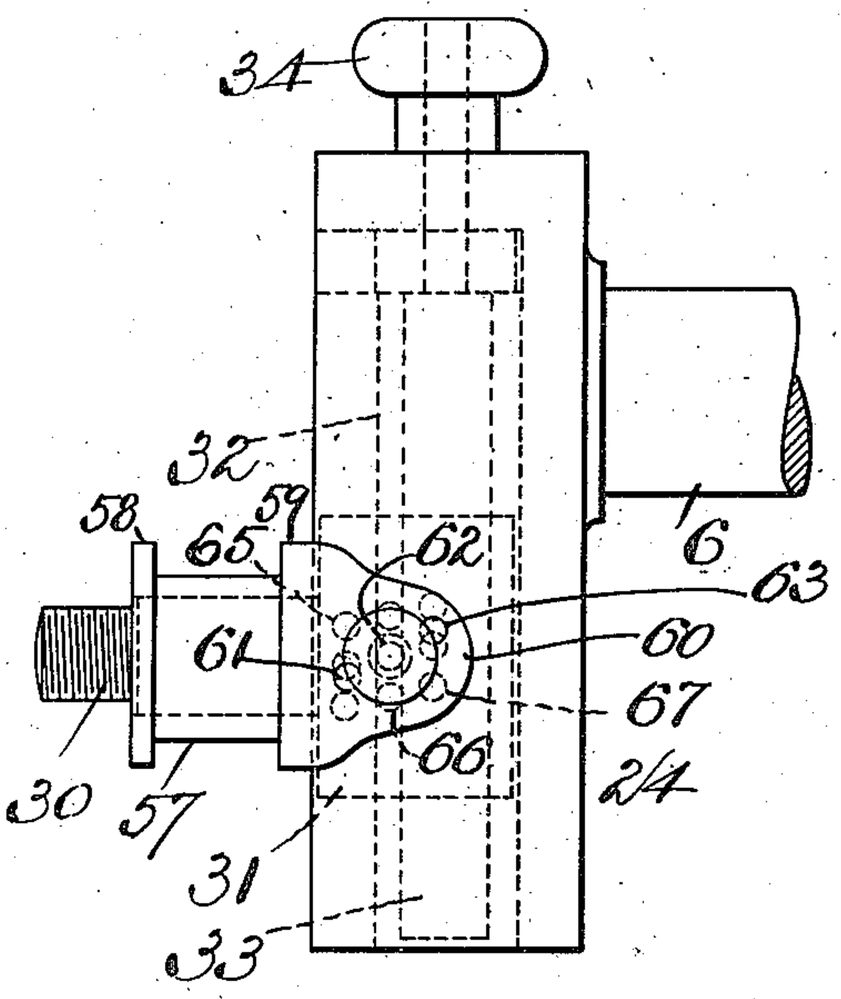

Fig. 4.

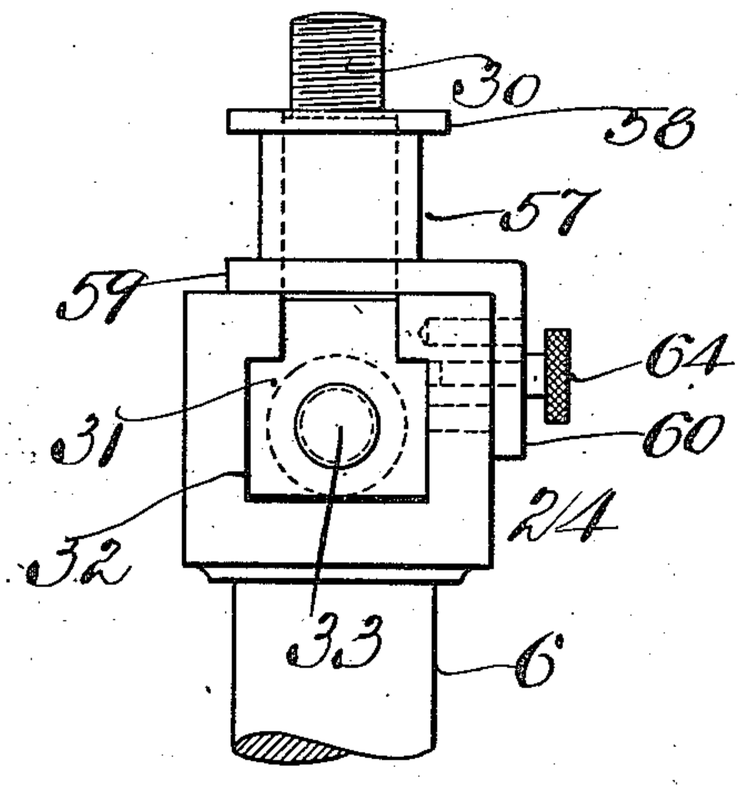

Fig. 5.

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UNITED STATES PATENT OFFICE.

GEORGE H. PIERCE, OF QUINCY, MASSACHUSETTS, ASSIGNOR TO NEW ERA MACHINERY COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF NEW JERSEY.

DEVICE FOR FEEDING SHEET MATERIAL.

No. 846,945. Specification of Letters Patent. Patented March 12, 1907.

Application filed February 12, 1906. Serial No. 300,621.

To all whom it may concern:

Be it known that I, GEORGE H. PIERCE, a citizen of the United States, residing at Quincy, in the county of Norfolk and State of Massachusetts, have invented new and useful Improvements in Devices for Feeding Sheet Material, of which the following is a specification.

This invention relates to an improved device for accurately feeding sheet material, such as paper, and is particularly adapted for use in printing-machines in which the paper is fed from a continuous web and is printed upon in different colors at one impression.

The object of the invention is to provide a device which will lock one of a pair of feed-rolls at the end of its forward feeding movement and prevent the same from moving either forward or backward from the point to which said feed-roll is rotated by the feeding mechanism.

The invention consists in the combination and arrangement of parts set forth in the following specification, and particularly pointed out in the claims thereof.

Referring to the drawings, Figure 1 is a side elevation, partly broken away, of a portion of a printing-press with my improved feeding device attached thereto. Fig. 2 is a plan section, partly in elevation, taken on line 2 2 of Fig. 1 and broken away. Fig. 3 is a front elevation of a crank-arm. Fig. 4 is a side elevation of the same with shaft broken off, and Fig. 5 is a plan view of the same with shaft broken away.

Like numerals refer to like parts throughout the several views of the drawings.

In the drawings, 5 is the frame of a printing-press; 6, the main driving-shaft journaled upon brackets 7, fast to the under side of said frame. The main feed-roll 8 is fastened to a shaft 9, journaled to rotate in bearings in the sides of the frame 5. A series of small feed-rolls 10 is fastened to a shaft 11, journaled to rotate in vertical sliding boxes 12, which are guided in ways 13, formed in brackets 14, fast to the frame 5 of the machine. The small feed-rolls 10 are idlers and coact with the large roll 8 to feed a web of paper 15 therebetween. An intermittent rotary motion is imparted to the feed-roll 8 by a pawl-and-ratchet mechanism consisting of a lever 16, formed of two arms 16′ 16^2, pivoted to the shaft 9 and joined together at their outer ends by a stud 17. Said arms 16′ and 16^2 lie upon opposite sides, respectively, of a ratchet-wheel 18, fast to the shaft 9.

A pawl 19 is held in engagement with the ratchet-wheel 18 by a spring 20, one end of which is fastened to an arm 21, fast to the pawl 19, the other end of said spring being fastened to a pin 22, which is fastened to the arm 16^2. The arms 16′ and 16^2 are connected by a link 23 to a crank-arm 24, fast to the shaft 6. Said link 23 is formed of two plates 25 and 26, which are pivotally connected at one end to the arms 16′ and 16^2, respectively, and at the other end are fastened rigidly by bolts 27 and 28 to a plate 29, it being understood that the plates 25, 26, and 29 are rigidly joined together and form, in effect, a single rigid piece 23, constituting a link, one end of which is pivotally connected to therm as 16′ and 16^2, and the opposite end is pivotally connected to block 57, supported on a stud 30, fast to a sliding block 31, constructed to slide in ways 32, formed in the crank-arm 24 and adjustably secured to said crank-arm and moved toward or away from the center of the shaft 6 by means of a screw 33, which is journaled to rotate in said crank-arm and has screw-threaded engagement with said sliding block, so that by rotating the handle 34 in the proper direction the screw 33 will be rotated and the block 31, together with the stud 30, will be moved toward or away from the center of the shaft 6, thus diminishing or increasing, respectively, the throw of the crank-arm and the distance to which the pawl 19 will be moved over the periphery of the ratchet 18, and consequently the distance through which the feed-roll 9 will be rotated and the length of paper fed at each rotation of the machine.

The block 57, to which the link 23 is pivotally connected at one end thereof, is provided at its opposite ends with flanges 58 and 59. The flange 59 has an ear 60 integral therewith and projecting therefrom partly across the front face of said crank-arm and thence backwardly along the right-hand side face of said crank-arm. This rearward projection 60 is provided with three holes 61, 62, and 63, adapted to receive a locking-pin 64. In alinement with the hole 61 are holes 65 65, formed in the side of the crank-arm, and in alinement with the hole 62 are holes 66, and in alinement with the hole 63 are holes 67, said holes 66 and 67 being formed also in the right-hand side of the crank-arm 24. It

will be noticed that the holes 65, 66, and 67 are not in alinement with each other, but are "staggered" relatively to each other, so that the pin 64 may be introduced through one of the holes 61, 62, or 63 and enter one of the series of holes 65, 66, or 67, respectively, for a slight movement of the screw 33, the sliding block 31, stud 30, and locking plate or block 57. It will be seen that by the construction hereinbefore described the right-hand end of the link 23 may be adjusted toward or away from the median axial line of the crank-shaft 6, and thus diminish or increase, respectively, the throw of the feed-roll 8 at each of its intermittent forward rotary movements, the block 57 being firmly locked in position by means of the locking-pin 64.

In roll-feeds for sheet material driven by a pawl-and-ratchet mechanism it is a well-known defect that the momentum acquired by the feed-roll is liable to carry the same beyond the point to which it is driven by the pawl, and especially is this the case where the speed of the machine is great. To overcome this defect in a feed mechanism driven by a pawl and ratchet, I have rigidly attached to the shaft 9 a locking-disk 35, provided upon its periphery with corrugations 36 and adapted to engage a plate 38, fast to a slide 37, and preferably formed of hardened steel, which has corrugations 39 formed upon one face thereof adapted to engage the corrugations 36 upon the periphery of the locking-disk 35 when said slide is moved toward the left, as illustrated in Fig. 1.

The slide 37 is constructed to slide in ways formed in a bracket 40, fast to the frame of the machine, and has pivotally connected at one end thereof, as at 41, an extensible link 42, the other end of said link being pivotally connected to an arm 43, fast to a rock-shaft 44, said rock-shaft journaled to rock in bearings provided in the frame 5. Said link 42 is made extensible by being formed in two parts 52 and 53, joined together by a right and left screw-threaded bolt 54 in a well-known manner. Said rock-shaft has another arm 46 fast thereto and extending downwardly therefrom, and rotatably supported upon said arm is a cam-roll 47, adapted to bear against the periphery of a cam 48, fast to the main driving-shaft 6. The cylindrical slide 37 is prevented from rotating or turning in the bracket 40 by a screw 55, which has screw-threaded engagement with said slide and projects therefrom through a slot 56, provided in the front side of the bracket 40.

A spiral spring 49 bears at its right-hand end, Fig. 1, against a collar 50, fast to the slide 37, and at its left-hand end in said figure against the bottom of a recess 51, formed in the bracket 40. Said spiral spring 49 encircles the slide 37 and acts to move said slide away from the locking-disk 35 and also serves to hold the cam-roll 47 in engagement with the cam 48.

The general operation of my improved device for feeding sheet material is as follows: The web of paper 15 is placed between the feed-roll 8 and the idler feed-rolls 10, and as the shaft 6 rotates the crank-arm 24 through the link 23 imparts a rocking movement to the lever 16 and through the pawl 19 imparts an intermittent rotary motion to the ratchet-wheel 18. As soon as the ratchet-wheel 18 has been rotated to the full extent of the movement of the pawl 19 the slide 37 is moved in time by means of the cam 48 so that the corrugated surface 39 upon the plate 38 engages the corrugations 36 upon the periphery of the locking-disk 35 and prevents said locking-disk from rotating through any greater angle than is imparted thereto by the pawl 19 through the mechanism hereinbefore described. The cam 48 is so timed that said locking-disk is held firmly in position during the return movement of the pawl by the slide 37 and corrugated plate 38 and is released from engagement with said locking-disk just as the pawl 19 begins its forward movement. As soon as the pawl 19 commences its forward movement the cam 48 releases the lever 43 and the spring 49 moves the slide 37 and locking-plate 38 toward the right, Fig. 1, and the corrugations of said locking-plate are removed from contact with the corrugations upon the periphery of the locking-disk 35, so that said locking-disk is free to be rotated, together with the shaft 9, to which it is fastened, and the feed-roll 8.

Having thus described my invention, what I claim, and desire by Letters Patent to secure, is—

1. In a device for feeding sheet material, a pair of feed-rolls, a pawl-and-ratchet mechanism adapted to impart an intermittent rotary motion to one of said rolls, a locking-disk having corrugations upon its periphery fast to said last-named feed-roll, a lock-plate having corrugations upon one face thereof, and mechanism to move the corrugated face of said lock-plate into and out of engagement with the corrugated periphery of said disk.

2. In a device for feeding sheet material, a pair of feed-rolls, mechanism adapted to impart an intermittent rotary motion to one of said rolls, a locking-disk having corrugations upon its periphery fast to said last-named feed-roll, a lock-slide having corrugations upon one end thereof, and mechanism to impart a reciprocatory motion to said slide to move the corrugated end thereof into and out of engagement with the corrugated periphery of said disk.

3. In a device for feeding sheet material, a pair of feed-rolls, mechanism adapted to im-

part an intermittent rotary motion to one of said rolls, a locking-disk having corrugations upon its periphery fast to said last-named feed-roll, a lock-slide having corrugations upon one end thereof, a cam-lever, an extensible link connecting said slide and lever, and a cam adapted to impart a rocking motion to said lever and a reciprocatory motion to said slide to move the corrugated end thereof into and out of engagement with the corrugated periphery of said disk.

4. In a device for feeding sheet material, a pair of feed-rolls, a pawl-and-ratchet mechanism adapted to impart an intermittent rotary motion to one of said rolls, means to vary the throw imparted to said last-named roll at each of its forward rotary movements, a locking-disk having corrugations upon its periphery fast to said last-named feed-roll, a lock-plate having corrugations upon one face thereof, and mechanism to move the corrugated face of said lock-plate into and out of engagement with the corrugated periphery of said disk.

5. In a device for feeding sheet material, a pair of feed-rolls, a pawl-and-ratchet mechanism adapted to impart an intermittent rotary motion to one of said rolls, a crank-pin operatively connected to said pawl-and-ratchet mechanism, a crank-shaft, means to adjust said crank-pin toward and away from the median axial line of said crank-shaft, a locking-disk having corrugations upon its periphery fast to said last-named feed-roll, a lock-plate having corrugations upon one face thereof, and mechanism to move the corrugated face of said lock-plate into and out of engagement with the corrugated periphery of said disk.

6. In a device for feeding sheet material, a pair of feed-rolls, a pawl-and-ratchet mechanism adapted to impart an intermittent rotary motion to one of said rolls, a crank-pin operatively connected to said pawl-and-ratchet mechanism, a crank-shaft, means to adjust said crank-pin toward and away from the median axial line of said crank-shaft, means to lock said crank-pin against radial movement relatively to said crank-shaft, a locking-disk having corrugations upon its periphery fast to said last-named feed-roll, a lock-plate having corrugations upon one face thereof, and mechanism to move the corrugated face of said lock-plate into and out of engagement with the corrugated periphery of said disk.

7. In a device for feeding sheet material, a pair of feed-rolls, a pawl-and-ratchet mechanism adapted to impart an intermittent rotary motion to one of said rolls, a shaft, a crank-arm fast thereto, a crank-pin adjustable longitudinally of said arm, a block fast to said pin, means to fasten said block to said arm, a link operatively connecting said pin to said pawl-and-ratchet mechanism, a locking-disk having corrugations upon its periphery fast to said last-named feed-roll, a lock-plate having corrugations upon one face thereof, and mechanism to move the corrugated face of said lock-plate into and out of engagement with the corrugated periphery of said disk.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

GEORGE H. PIERCE.

Witnesses:
CHARLES S. GOODING,
ANNIE J. DAILEY.