(No Model.) 4 Sheets—Sheet 1.

# W. E. WILLIAMS.

## FEEDING MECHANISM FOR PAPER BOX AND PRINTING PRESS MACHINERY.

No. 552,947. Patented Jan. 14, 1896.

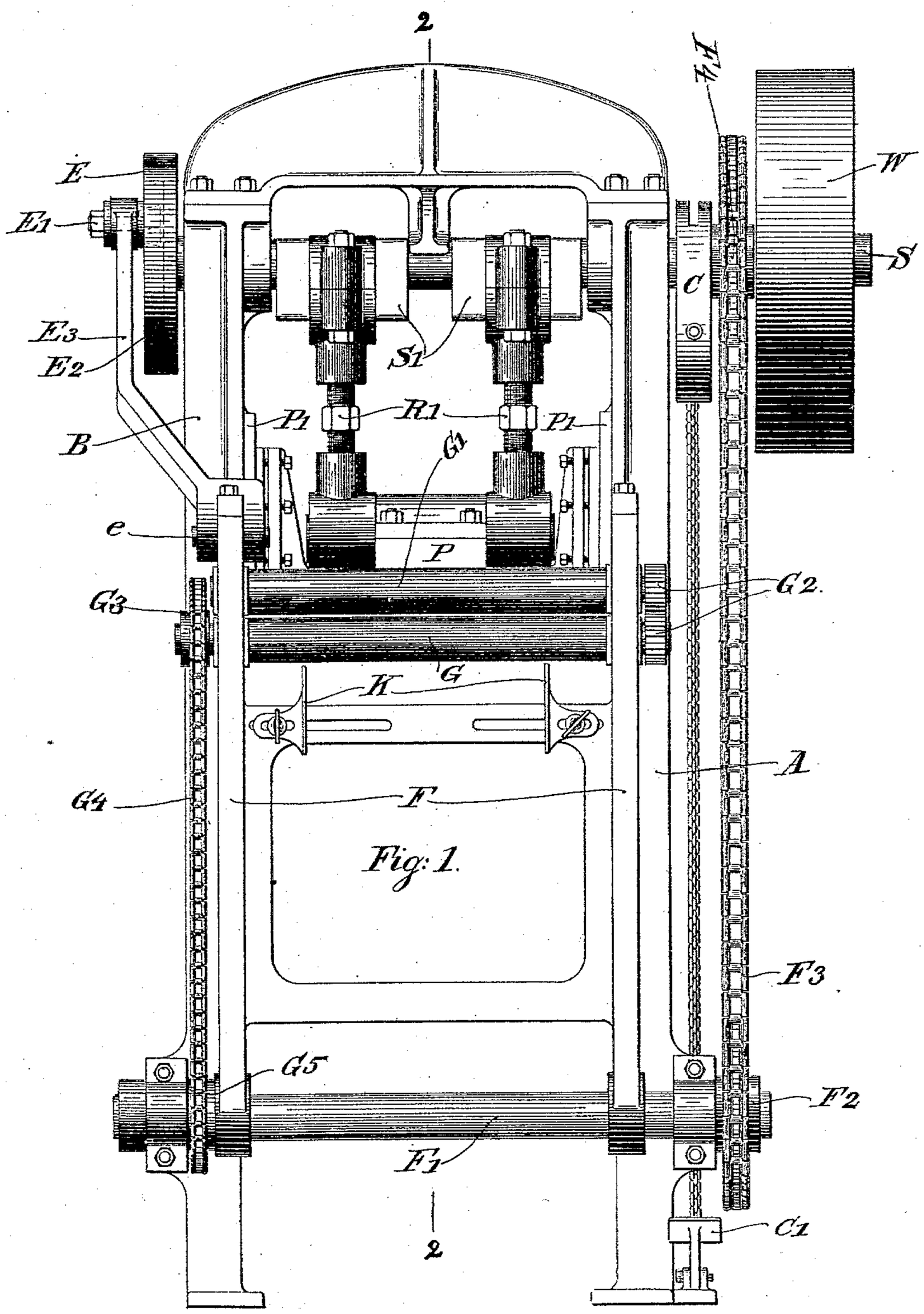


Fig: 1.

Witnesses:
Fred. Borg
Frank. Murphy.

Inventor:
W. E. Williams

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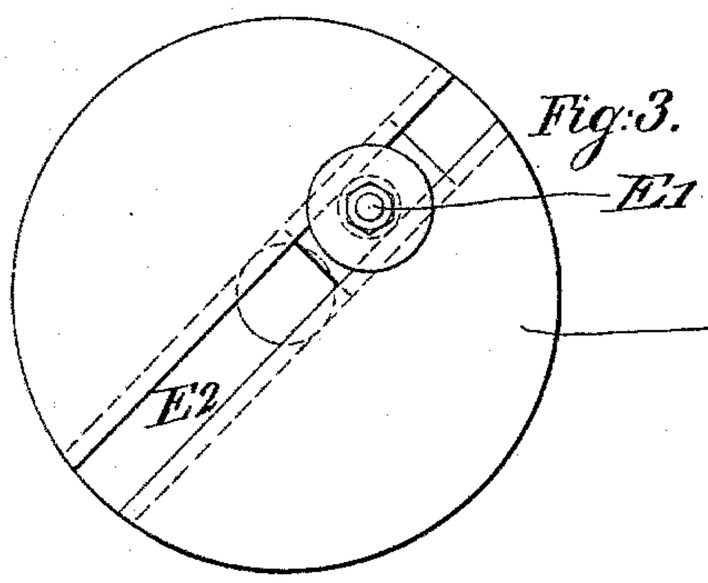



Fig: 3.




Fig: 2

Witnesses:
Fred Borg
Frank E. Murphy.

Inventor:
W. E. Williams

(No Model.) 4 Sheets—Sheet 3.

# W. E. WILLIAMS.

## FEEDING MECHANISM FOR PAPER BOX AND PRINTING PRESS MACHINERY.

No. 552,947. Patented Jan. 14, 1896.

Fig: 4.

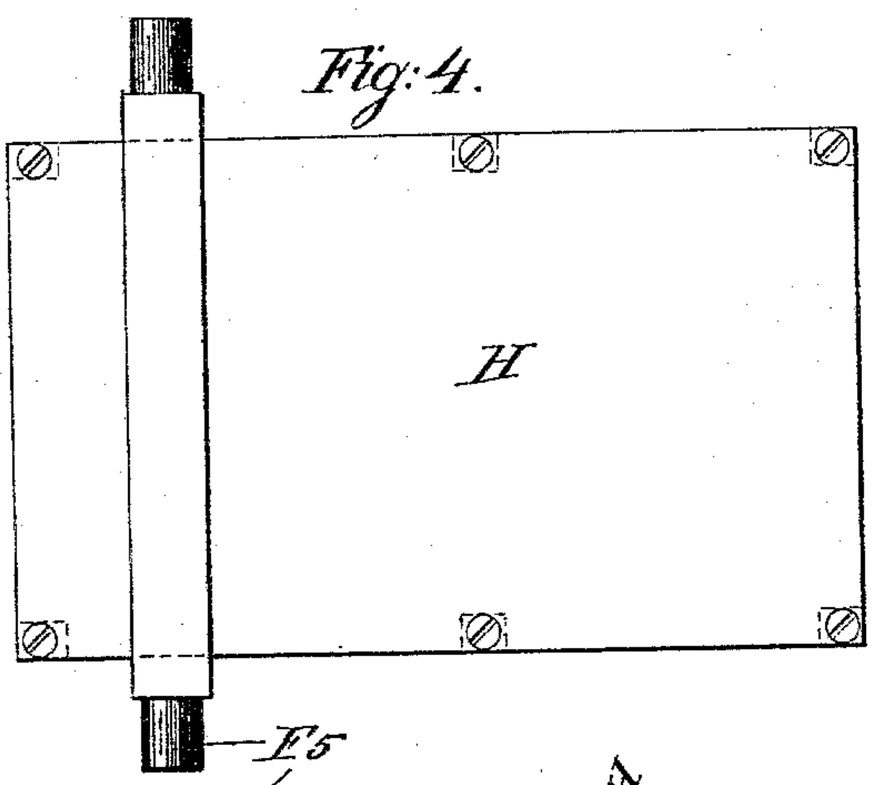



Fig: 5.

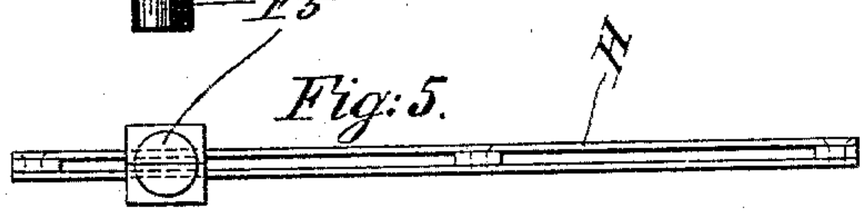
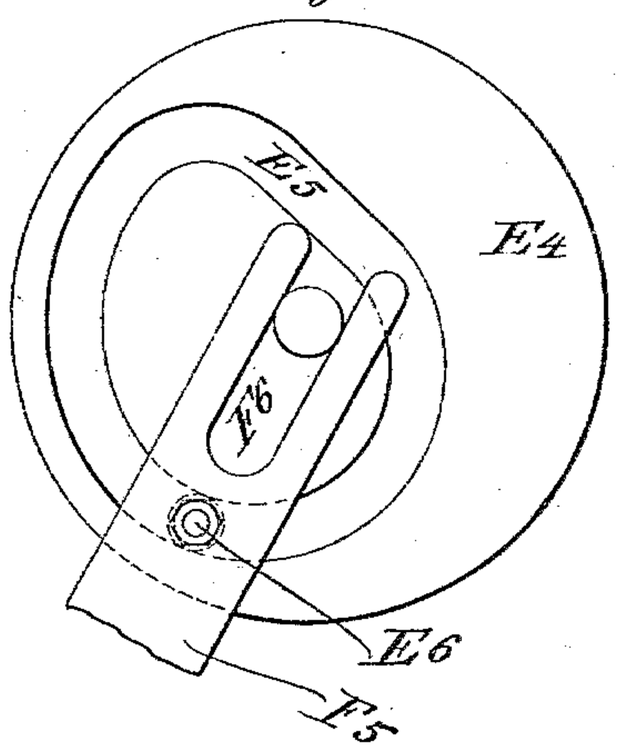



Fig: 6.



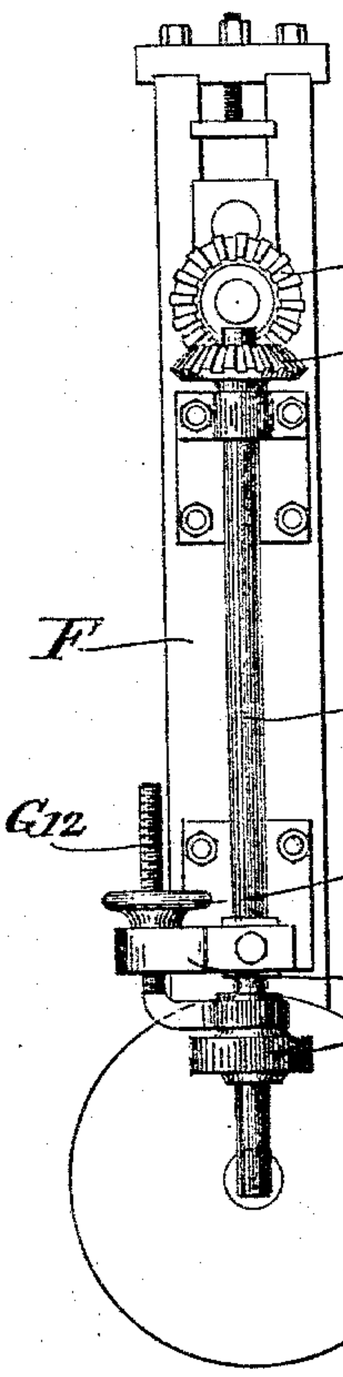




Fig: 8.

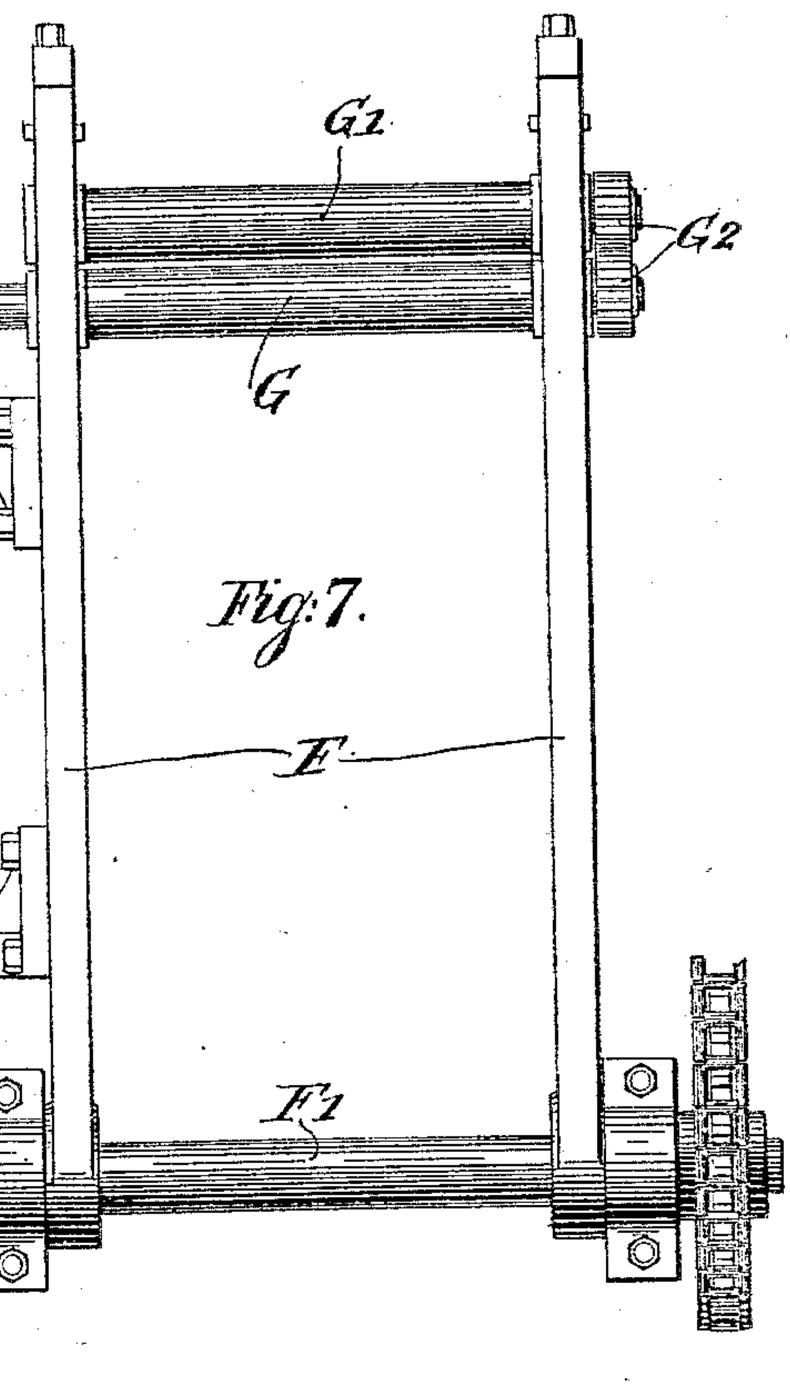



Fig: 7.

Witnesses:
Fred Borg
Dan't Murphy.

Inventor:
W. E. Williams

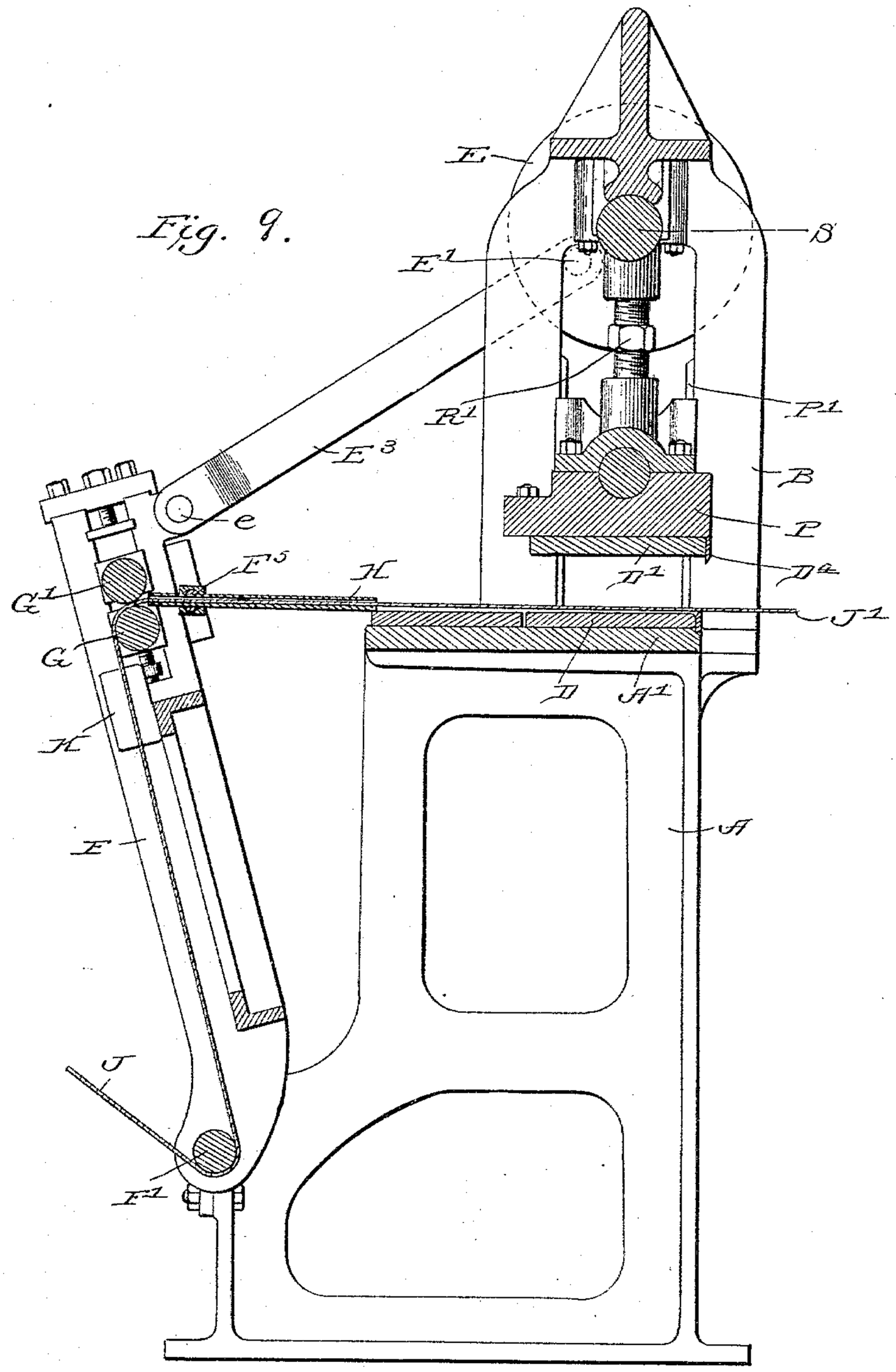
(No Model.) 4 Sheets—Sheet 4.

# W. E. WILLIAMS.

## FEEDING MECHANISM FOR PAPER BOX AND PRINTING PRESS MACHINERY.

No. 552,947. Patented Jan. 14, 1896.

Fig. 9.




Witnesses:
Harry S. Rohrer.
Robt. Aiton

Inventor:
W. E. Williams
by Wallace Greene
atty.

# UNITED STATES PATENT OFFICE.

WILLIAM ERASTUS WILLIAMS, OF CHICAGO, ILLINOIS.

## FEEDING MECHANISM FOR PAPER-BOX AND PRINTING-PRESS MACHINERY.

SPECIFICATION forming part of Letters Patent No. 552,947, dated January 14, 1896.

Application filed March 8, 1895. Serial No. 540,954. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM ERASTUS WILLIAMS, 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 Feeding Mechanism for Paper-Box and Printing-Press Machinery, of which the following is a specification.

The object of this invention is to provide an improved feeding mechanism for machines that operate intermittently upon an endless strip and require that strip to be at rest during such operation. The principal ends sought are to make the feeding devices operable, without danger to themselves, to feed the strip properly to such a machine even when the latter is run at the highest speed consistent with its own strength, and, further, to eliminate danger of the buckling of the strip. These results are attained by employing mechanism that will feed the strip at the average rate at which it is desired that the machine shall use it and by arranging such mechanism to move bodily alternately toward and away from the working point of the machine.

In the accompanying drawings, Figure 1 is a side elevation of a machine embodying my invention. Fig. 2 is a section on the line 2 2, Fig. 1. Figs. 3, 4, and 5 are detail views of the same machine. Figs. 6, 7, and 8 are detail views of modified constructions adapted to meet different requirements. Fig. 9 is a view like Fig. 2, except that certain operating parts are in different position.

For illustration, a machine adapted for forming box-blanks from paper or the like has been selected, but the invention is by no means restricted to machines for this purpose.

In the various figures where the letters appear, A B is the frame of the machine and A′ is a bed-plate supported thereby and bearing a scoring and cutting die D. Above the plate is a crank-shaft S, supported in suitable bearings and actuating through adjustable rods R′ a platen P, directed by suitable guides P′ upon the frame and carrying blank forming and separating devices at D′. These devices consist of a punch $D^2$, which cuts or punches out portions of the strip, knives $D^3$, which score the blank along the folding-lines of the box, and a knife $D^4$, which at each descent of the plate cuts off the blank that was formed during the last preceding descent. The shaft S is driven by a pulley W, which engages the shaft by means of clutch mechanism C, operated by a treadle C′, but presenting no novelty herein claimed. At the other end of the shaft is a crank-plate E, having a wrist-pin E′, adjustable in a slot or way $E^2$ to vary its eccentricity.

Near the bottom of the frame is a parallel shaft F′, driven from the shaft S by sprocket-wheels $F^2$ $F^4$ and a chain belt $F^3$. Feed-rolls G G′ are mounted just above the plane of the bed-plate upon a frame or broad arm F, pivoted upon the shaft F′, and one of them is driven from this shaft by sprocket-wheels $G^3$ $G^5$ and a chain belt $G^4$.

It is evident that although the arm and feed-rolls be swung bodily about the shaft F′ the rolls will rotate continuously whenever the shaft S is rotating. A strip-guideway H (shown in plan and edge view in Figs. 4 and 5) is pivoted at $F^5$ to the arm F in such position that its free end may rest upon the bed-plate, and the strip J, coming from a roll, (not shown,) is trained beneath the shaft F′, up between guides K upon the arm F, between the feed-rolls, and through the guide H to the die-plates at D′. When, as in the devices illustrated, the bodily movement of the rolls is not in a plane, as for simplicity of construction will usually be the case, the pivoting of the guideway is essential, for otherwise the strip would vibrate vertically. In the case hereinafter mentioned, where the guideway is made to pass beneath the platen, the machine could not operate if the guideway were not pivoted. The arm is swung toward and away from the dies by a bar $E^3$, having its ends pivoted, respectively, to the wrist-pin E′ above mentioned and to the arm F at *e*. When, during the rotation of the shaft S, the bar is at its dead-points—that is, when the points *e* E′ S are in line—the arm F is at rest, and as the wrist-pin passes from one dead-point to the other the speed of the arm passes from zero to zero through a maxi-

mum, at the middle of the interval, corresponding to a movement of ninety degrees by the wrist-pin. The crank-plate E is so adjusted that as the cranks at S′, and consequently the platen, approach their lowest point, the wrist-pin has just passed the dead-point corresponding to the inward limit of the arm's movement, and the eccentricity of the wrist-pin is so adjusted that at this time the outward speed of the arm is practically equal to the inward speed imparted to the strip by the rotation of the rolls G G′. It follows that the end of the strip is at this time stationary, and for an interval at least equal to the short time that the strip is being acted upon by the platen; but as the rotation of the rolls is uniform while the speed of the arm is accelerated as the wrist-pin passes away from the dead-point, the arm presently moves outward faster than the strip is fed inward by the rotation of the rolls, and hence just after the platen has released the strip the latter is drawn backward and freed from any attachment or adhesion that may have occurred beneath the platen. This result is of great practical moment, for there is a very annoying tendency of the strip to stick to the mechanism which operates upon it and to buckle and clog the machine if, as is usual, it is pushed forward directly after each operation; but it may be pulled free from such mechanism with perfect certainty, and being free it may then be fed forward with equal safety. As the wrist-pin approaches the other dead-point, its motion is retarded until its rate is slower than the normal feed of the strip and the latter again begins to advance. After this dead-point is passed the arm swings toward the dies and the strip now advances with a velocity equal to the sum of the arm's rate and its own normal rate; but this velocity gradually drops to zero as the wrist-pin approaches its dead-point, passes it, and begins the return movement. By this acceleration occurring while the arm is swinging inward, the time lost by the rest and the retardation during the outward movement is exactly made up or recovered, and the total advance of the strip is exactly that which the rolls would produce in rotating at the same speed in stationary bearings. Practically, the capacity of this machine thus fed is far beyond that of analogous machines now widely used, for the path of the platen is short and it may be run at very high speed, since the momentum of the feeding mechanism is insignificant and the danger of clogging is eliminated.

For making one specific kind of box-blanks from suitable uniform stock, the devices thus far described are satisfactory, but it is sometimes desirable to have an interval of rest different from that permitted by the crank-plate with an adjustable wrist-pin, and to be able to vary the length of the portion of the strip that is fed for each operation of the machine to which it passes. With thin stock, it is also desirable to have the guideway H slide over the whole surface of the die, or the like, while the latter is not in action. To attain these results, devices shown in Figs. 6, 7, and 8 are substituted for the mechanism E E′ E³ G⁴ G⁵, Fig. 1.

Any desired movement of the arm F and guide H may be obtained by substituting for the crank-plate a cam-plate E⁴, having a suitable groove E⁵, to guide a roller E⁶, mounted upon a bar F⁵, which replaces the bar E³, and is slotted to pass over the projecting end of the shaft S.

To permit adjusting the rate of rotation of the feed-rolls, a shaft G⁸, Figs. 7 and 8, is mounted, with its lower end laterally adjustable, in suitable bearings upon the arm F and in the plane of the shaft F′. Upon the lower end of the shaft G⁸ a friction-roller G⁹ is mounted to slide without rotation and to impinge upon the face of a friction-plate upon the end of the shaft F′. The roller is adjusted toward and away from the center of the plate G¹⁰ by a nut G¹¹ working against the bearing G¹³ and upon the threaded portion of a bent arm G¹², projecting from a collar upon the hub of the roller.

It is evident that the feeding mechanism acts in the same way whatever the character of the strip and whatever the nature of the operation intermittently performed by the machine, whether, for example, it cuts, stamps, prints, folds, or embosses. It is further plain that the rollers are not necessarily mounted on a swinging arm, but may be arranged to reciprocate bodily in a variety of ways that will suggest themselves to the mind of any mechanic. I do not, therefore, wish to limit myself to the specific machine and constructions shown and described.

What I claim is—

1. In strip feeding devices, the combination with a set of suitably mounted feed rolls, of means for continuously rotating said rolls, and means for moving the rolls bodily in the direction of the feed and then rearward at a rate exceeding the rate at which the strip is fed by the rotation of the roll whereby the strip is retracted after each advance.

2. In strip feeding devices, the combination with a set of feed rolls mounted upon a swinging arm, of means for rotating said rolls continuously, means for oscillating said arm in approximately the plane of the feeding, a strip guide pivoted to said arm in position to receive a strip from said rolls, and means for supporting the delivery end of said guideway in a fixed plane.

3. In strip feeding devices, the combination with the frame bearing the bed plate and the driving shaft, of the reciprocating platen carried by said shaft and co-acting with the bed plate, a set of feed rolls mounted upon an arm pivoted to swing in the plane of the feeding, means for continuously rotating said rolls, a

bar connected at one end to said arm and at the other to devices, upon said shaft, arranged to oscillate said arm with a rearward rate exceeding the rate at which the strip fed by the rolls is advanced by the rotation of the latter.

In witness whereof I have hereunto subscribed my name, on this 1st day of February, A. D. 1895, in the presence of two subscribing witnesses.

WILLIAM ERASTUS WILLIAMS.

Witnesses:
FRANK. MURPHY,
FRED BORG.