

J. W. ENNIS.
MECHANICAL MOVEMENT.
APPLICATION FILED AUG. 25, 1902.

NO MODEL.

4 SHEETS—SHEET 1.

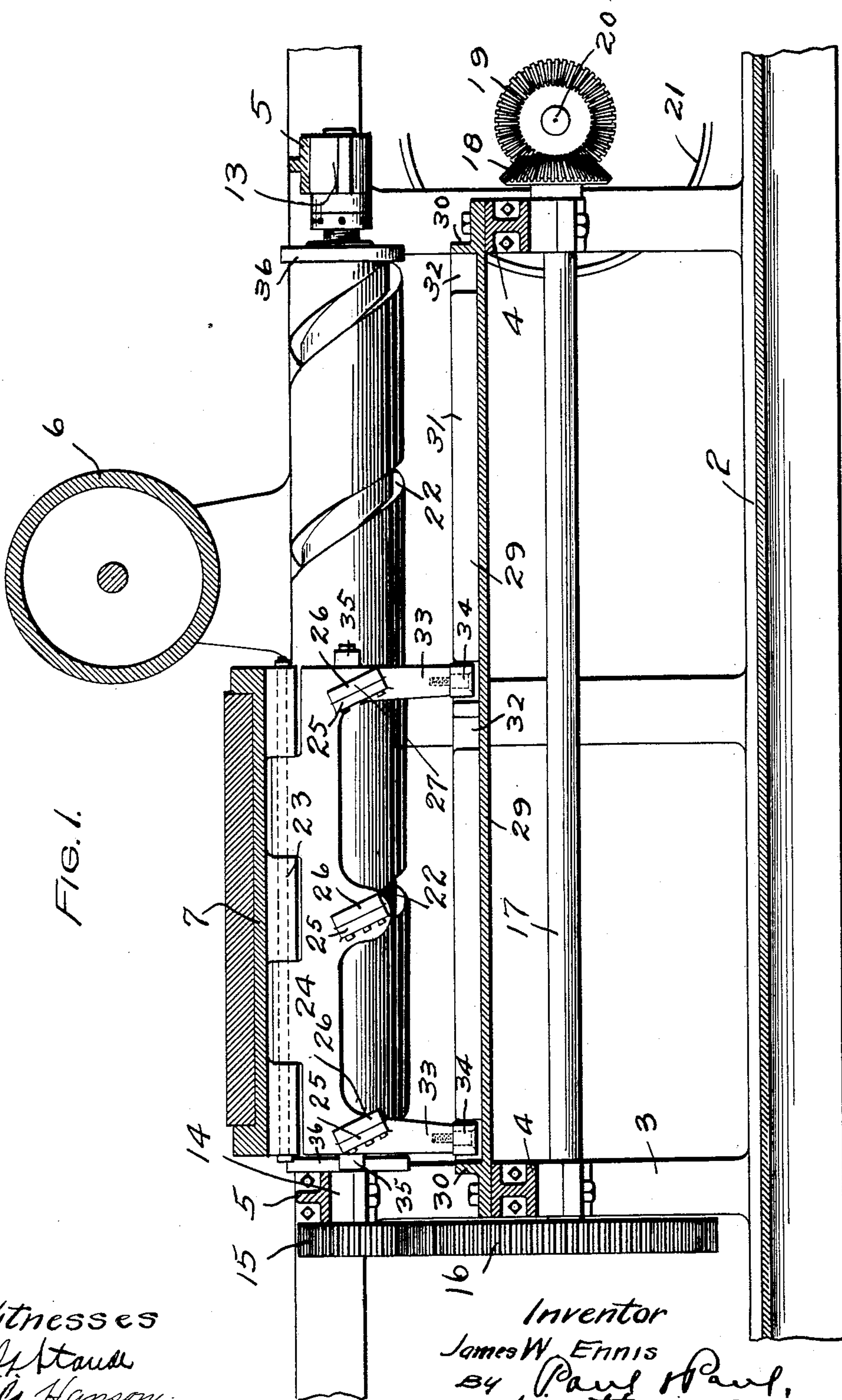


FIG. 1.

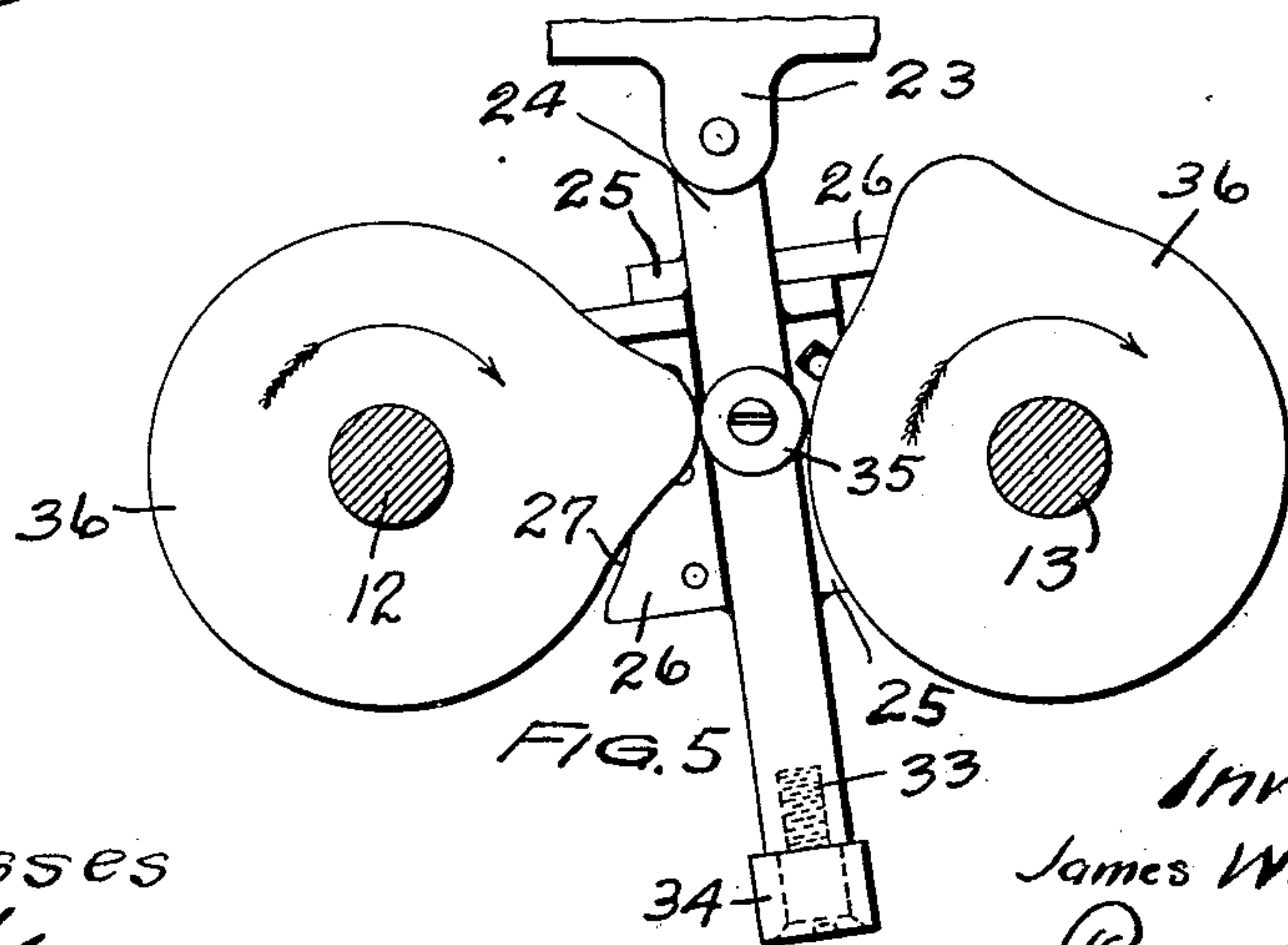
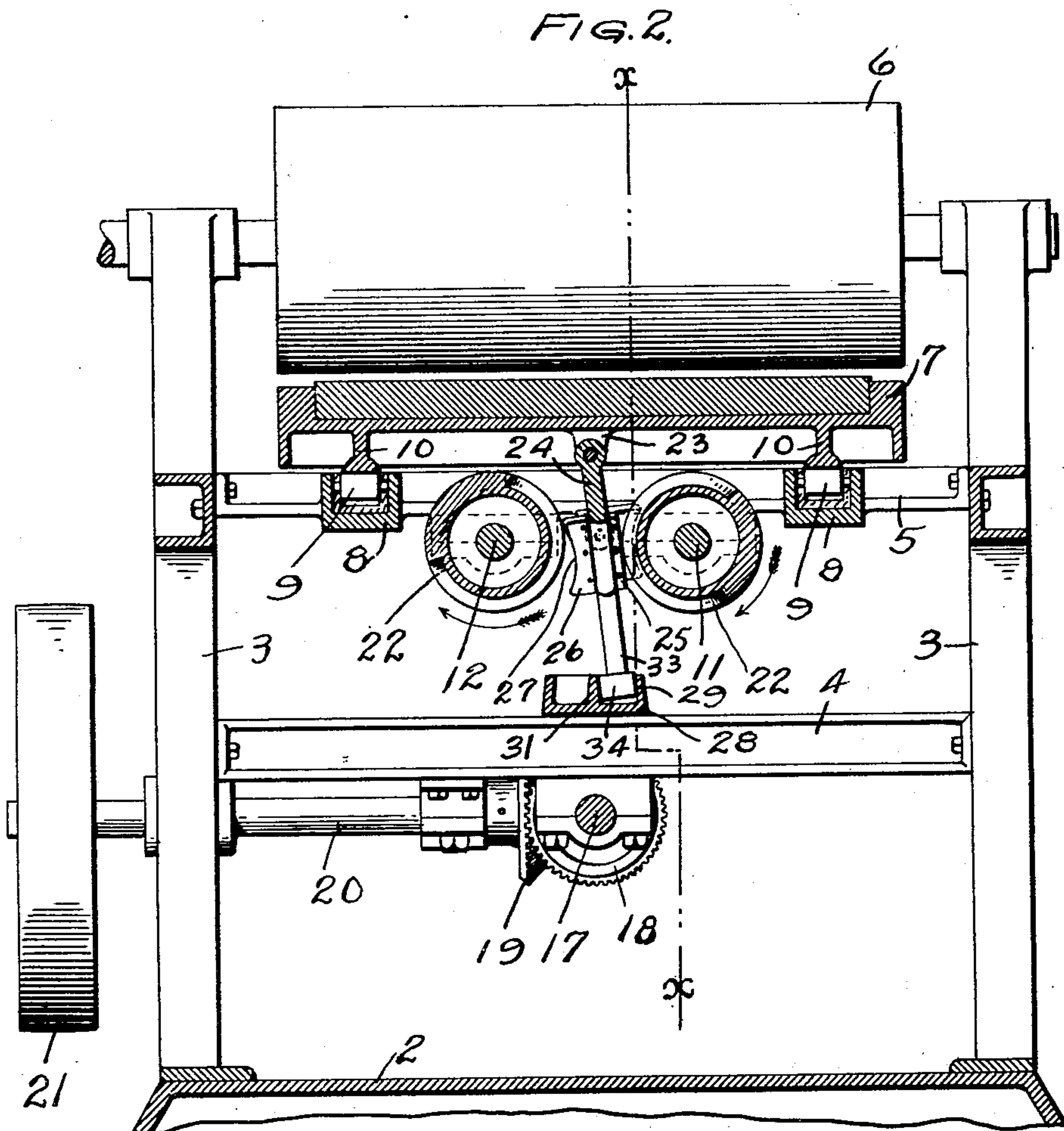
Witnesses
E. J. Stauder
O. G. Hanson.

Inventor
James W. Ennis
By Paul H. Paul,
his attorneys

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4 SHEETS—SHEET 2.



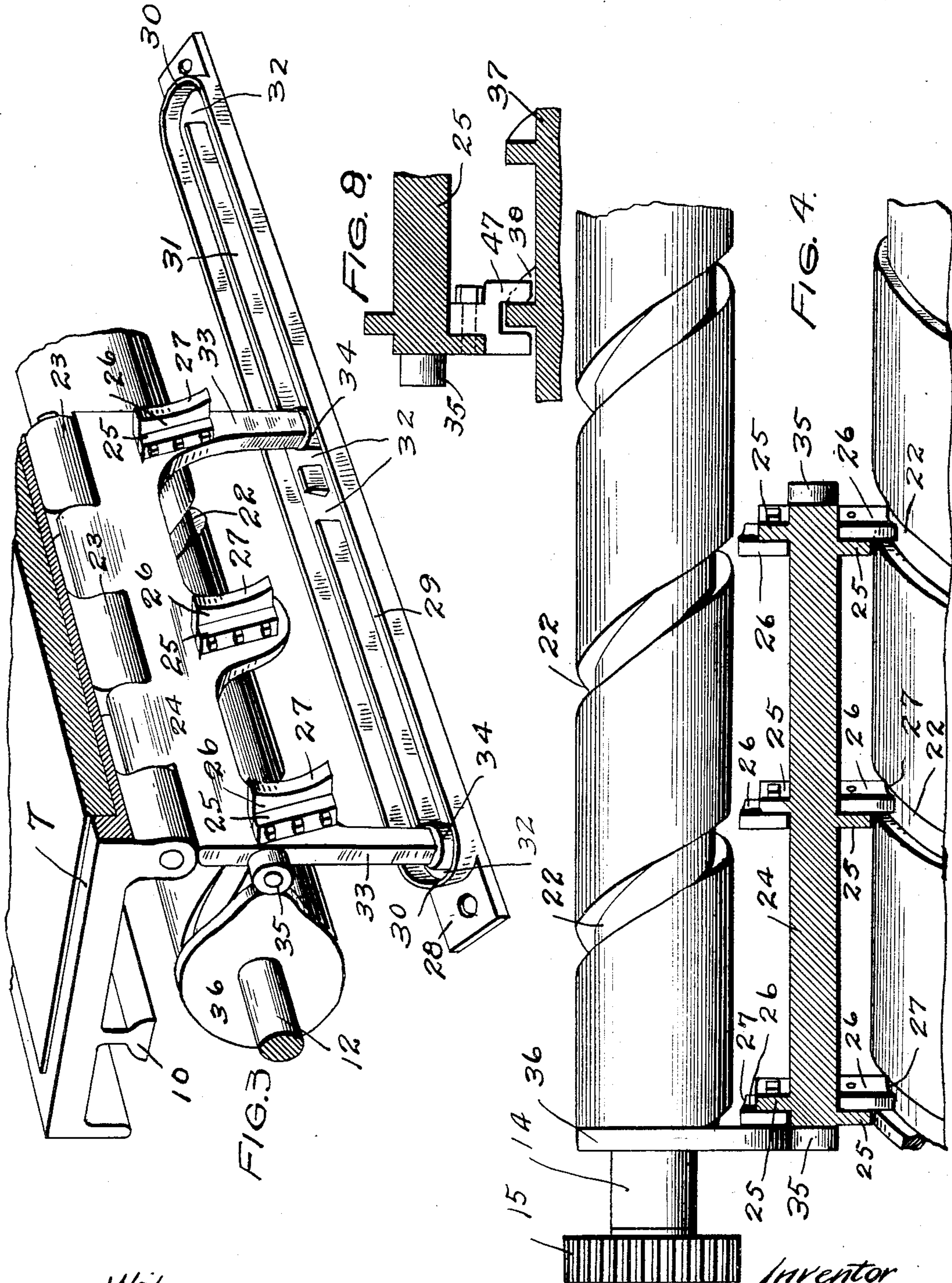
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4 SHEETS—SHEET 3.



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4 SHEETS—SHEET 4.

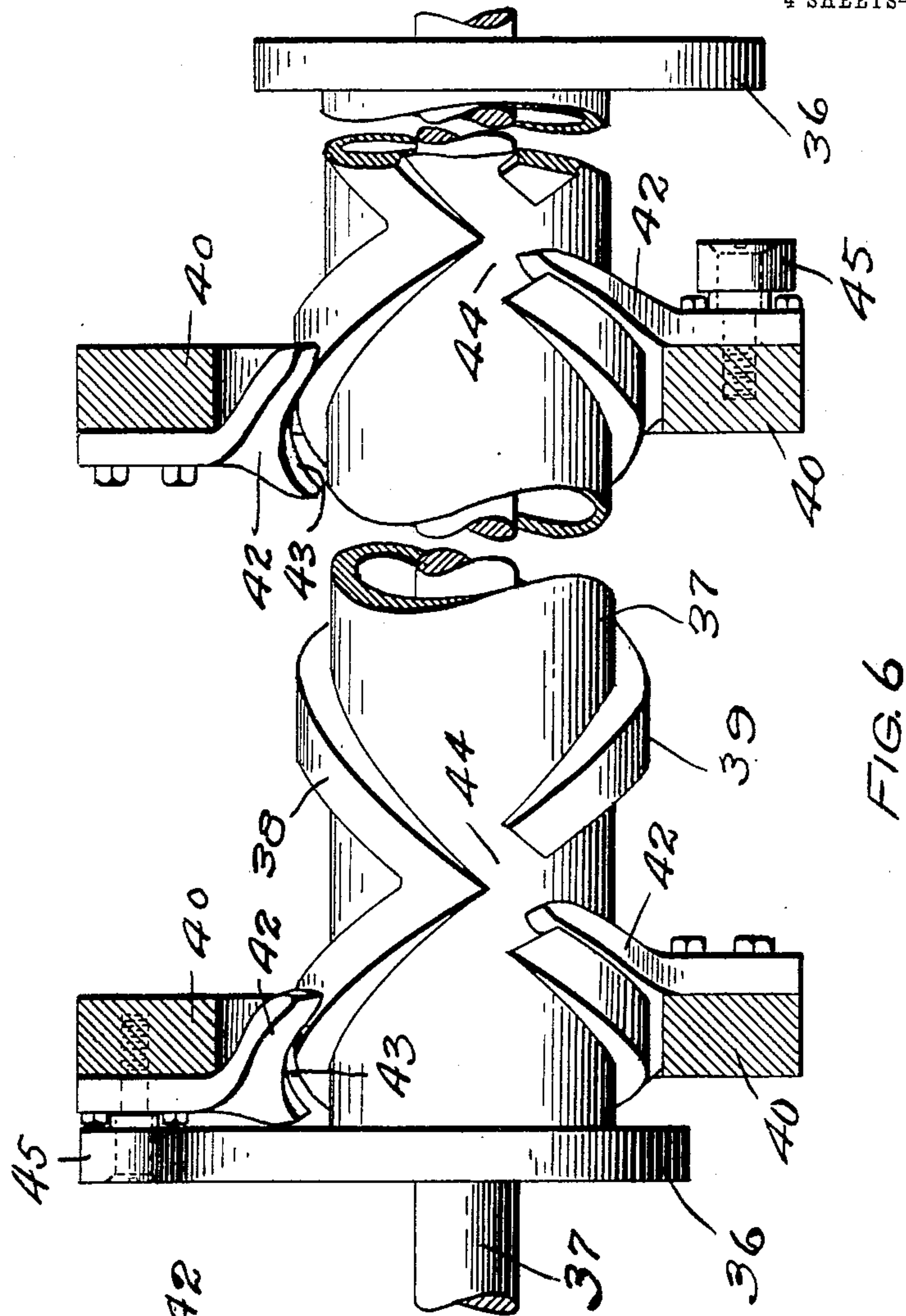


FIG. 6

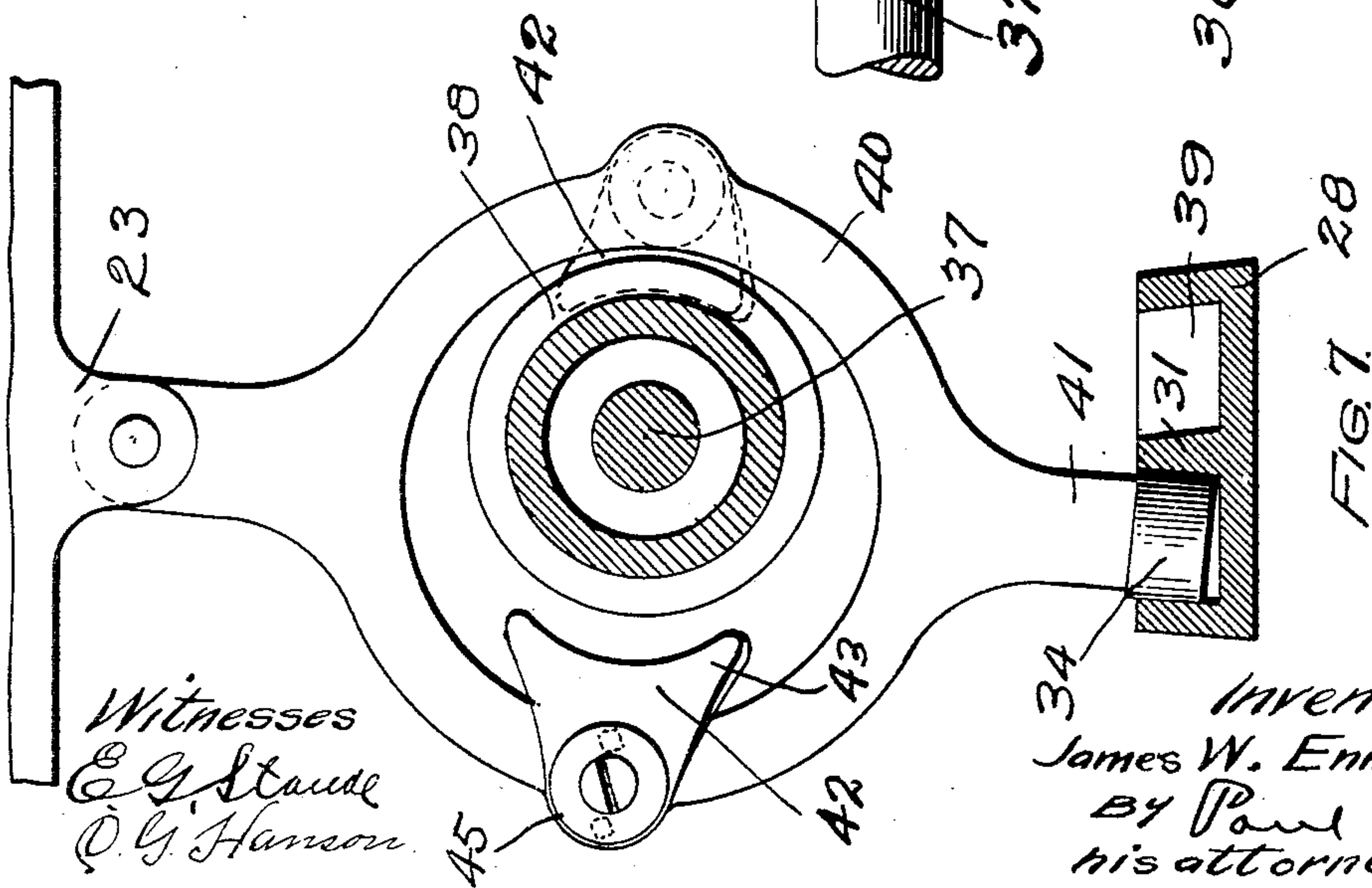


FIG. 7

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UNITED STATES PATENT OFFICE.

JAMES W. ENNIS, OF MINNEAPOLIS, MINNESOTA.

MECHANICAL MOVEMENT.

SPECIFICATION forming part of Letters Patent No. 735,075, dated August 4, 1903.

Application filed August 25, 1902. Serial No. 120,915. (No model.)

To all whom it may concern:

Be it known that I, JAMES W. ENNIS, of Minneapolis, county of Hennepin, State of Minnesota, have invented certain new and
5 useful Improvements in Mechanical Movements, of which the following is a specification.

The invention relates to mechanical movements for changing rotary to a reciprocating
10 rectilinear motion, and is designed particularly for use in connection with the bed or carriage of a printing-press, though equally applicable to many other classes of machinery.

15 The object of the invention is to provide a mechanism for reciprocating the bed of a printing-press which will impart a smooth, even, and practically noiseless movement to the bed without tilting or tipping it and be
20 capable without danger of breakage of operation at a higher speed than the mechanisms usually employed for this purpose.

A further object is to provide a mechanism that will cause a perfect register of the
25 printing-press bed at all times and one in which no complicated reversing-gears are necessary.

A further object is to provide a mechanism that is of very simple but strong and
30 durable construction and one that will require but little attention for adjustment or repairs.

The invention consists generally in the various constructions and combinations, all as
35 hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, forming part of this specification, Figure 1 is a longitudinal section through the press-bed and
40 between the revolving shafts which operate said bed substantially on the line *x x*. Fig. 2 is a transverse section. Fig. 3 is a detail perspective view showing the oscillating yoke suspended on the bed and the shoe secured
45 thereto and also the stationary guide for the yoke. Fig. 4 is a plan section of one shaft and a portion of the other. Fig. 5 is a detail of the cam mechanism. Fig. 6 is a plan view of a modified form of shaft where both the
50 right and left hand threads are provided on the same shaft, and Fig. 7 is a detail of the yoke mechanism suspended on the bed and

used in connection with the modification shown in Fig. 6. Fig. 8 is a detail showing a modified form of shoe.

In the drawings, 2 represents the base of the press, and 3 the frame, whereon the cylinder and bed are supported. This frame is connected at suitable intervals by cross-bars
4 and 5.

6 represents the cylinder, supported in suitable bearings in the upper part of the frame in the usual way, and below the cylinder is the usual bed 7, whereon the electrotypes or stone is placed. 8 represents channel-bars
65 supported upon the cross-bars 5 and provided with rolls 9, upon which rails 10, arranged on the under side of the bed 7, are supported. These rolls form an antifriction bearing-surface for the rails and permit the bed to be
70 easily moved back and forth toward and beneath the cylinder. Beneath the bed 7 are provided shafts 11 and 12, that are mounted in bearings 13 and 14 in said frame, the former being adjustable, as shown, to allow
75 any longitudinal movement of the shafts in their bearings, due to wear, to be taken up, and said shafts at the opposite ends from their adjustable bearing are provided with
80 gears 15, that mesh with a large gear 16 on a shaft 17, that is supported upon suitable bearings in the lower part of the frame parallel with the shafts 11 and 12 and has a beveled
85 gear 18, that meshes with a smaller gear 19 on a driving-shaft 20, provided with a suitable driven pulley 21. Power being applied to the pulley, the shafts 11 and 12 will be driven in the same direction, as indicated by the arrows in Fig. 2. Each of the shafts 11
90 and 12 is provided with a spiral groove 22, extending lengthwise thereof, said groove making substantially two revolutions of each shaft to the foot and the groove in one shaft being oppositely cut from that of the other, one being right and the other left hand.

The bed 7 on its under side and near the middle thereof is provided with a series of lugs 23, whereon a yoke 24 is pivotally supported and suspended between the shafts 11 and 12. The yoke is provided on each side
100 with a series of lugs 25, and secured to these lugs I provide a corresponding number of shoes 26, preferably of brass and having concave faces 27, which when the shoes enter the

grooves in the shafts will fit the bottom thereof, and the sides of the shoes engaging the sides of the grooves will cause the printing-bed to be reciprocated toward or from the cylinder, according to which shaft the shoes are in engagement with. Beneath the yoke 24, supported upon the frame of the machine, I provide a plate 28, whereon a guideway 29 is provided, having rounded ends 30 and a central rib 31, between the ends of which and the grooved ends of the guideway passages 32 are provided, and similar passages are provided in said rib at a point substantially midway between its ends and extending from one side of the guideway to the other. The yoke 24 is provided with legs 33, depending therefrom and having antifriction-rollers 34 at their lower ends, that are adapted to fit within said guideway and travel along the same either upon one side of the rib 31 or on the other, and each end of said yoke has an antifriction-roller 35, that is in position to be engaged by cams 36, secured on each end of the shafts 11 and 12. The passages 32 allow the legs 33 to pass from one side of the central rib 31 to the other when the yoke is oscillated to change the direction of movement of the bed. These cams are so arranged that upon the revolution of the shaft one of them will engage the antifriction-roller 35 at one end or the other of the yoke and oscillate the yoke to move the shoes on one side out of engagement with the groove in one of the shafts and move the shoes on the other side into engagement with the groove in the other shaft. This oscillation of the yoke, owing to the position of the cams, will occur only when the bed approaches either one end or the other of the shafts and when the legs 33 and the rollers 34 thereon are opposite the open places or passages in the rib 31, leading from one side of the guide to the other. Thus, as shown in Fig. 3, one of the cams is in engagement with the roller 35 and has just oscillated the yoke, swinging the shoes on one side thereof out of engagement with the groove in the shaft on which said cam is secured and pushing the rollers 34 through the openings leading from one side of the guide to the other, and the opposite shaft having an oppositely-cut groove will consequently drive the bed in the other direction until the roll on the other end of the shoe engages the cam at the other end of the shaft. The grooves in the shafts are made of sufficient width only to receive the shoes and allow a little play therein, and the oscillation of the yoke and shoes can be so timed by building up the cams that the shoes will always drop into the groove in the shaft when swung toward the same, and the movement of the shoe and the shape of the cam will of course be determined largely by the speed with which it is desired to drive the grooved shafts.

In Figs. 6 and 7 I have shown a modification which consists in providing a shaft 37, which instead of having right and left hand

grooves in its surface is provided with correspondingly-arranged ribs 38 and 39. This shaft is inclosed by yokes 40, suspended beneath each end of the printing-press bed and having depending legs 41, provided with antifriction-rolls similar to those provided on the legs 33 and adapted to travel in a guide corresponding to the one above described. Each yoke is provided with shoes 42, having concave faces 43, which fit the surface of the shaft, and the ribs or threads engaging the shoes will cause the reciprocation of the bed at a speed corresponding to that of the shaft. The threads on the shaft 39 are cut at their points of intersection, leaving spaces 44 to allow the shoes to follow the threads during the revolution of the shaft. Cams will be provided on each end of the shaft corresponding to those heretofore described, and antifriction-rolls 45 are arranged on the pivots of the shoes 42 in position to be engaged by the cams to oscillate the yokes 40 and throw the shoes on one side of the yoke out of engagement with their thread on the shaft and the other shoes into engagement with the oppositely-running thread to drive the yokes and bed in the other direction. It will of course be understood that I may use the grooves in a single shaft, if preferred, and I may make these grooves of any width or pitch desired, according to the size of the press and the speed with which it is desired to reciprocate the bed. I prefer to use the grooves in place of the raised threads or ribs on account of the almost entire absence of lost motion in reversing, as in the shafts employing the spiral threads the shoes would have to travel the entire distance between the sections of the spirals before the bed would begin to move backward.

In Fig. 8 I have shown a modified form of shoe provided with a fork 47 to straddle the spiral rib on the shaft and fitting loosely thereover to insure the immediate engagement of the fork with the thread on the shaft when the yoke is oscillated. This form of shoe will also cause the immediate backward movement of the bed when the shafts are reversed. I have shown but one shoe in Fig. 8; but it will be understood that a series of them are provided on both sides of the yoke.

I have shown my improved mechanical movement for use in connection with the bed of a printing-press; but it will be understood that it is equally applicable to planers and many other classes of machinery.

I claim as my invention—

1. In a mechanical movement, the combination, with a rectilinear reciprocating bed, of oppositely-turned revolving spirals arranged parallel to each other, a yoke pivoted on said bed, shoes provided on opposite sides of said yoke, one set being provided for each spiral and said shoes being arranged to alternately engage their respective spirals, a guide for said yoke, and means for oscillating said yoke to throw one set of shoes out of engage-

ment with their spiral and the other set of shoes into engagement with their spiral.

2. In a mechanical movement, the combination, with a reciprocating bed, of parallel shafts provided beneath the same and having right and left hand spiral grooves, a yoke pivotally suspended on said bed between said shafts, shoes provided on opposite sides of said yoke, and means for oscillating said yoke when said bed is at the limit of its movement in either direction, substantially as described.

3. In a mechanical movement, the combination, with a reciprocating bed, of revolving shafts having respectively right and left hand spirals thereon, a yoke pivotally supported on said bed, shoes carried by said yoke and adapted to engage said spirals respectively, and cams arranged on said shafts to engage and oscillate said yoke when said bed is near the limit of its movement in either direction.

4. In a mechanical movement, the combination, with a reciprocating bed, of revolving shafts provided beneath the same and having respectively right and left spiral grooves in their surfaces, a yoke pivoted upon said bed between said shafts, shoes carried by said yoke upon each side thereof and adapted to engage said spirals respectively, a guide mechanism for the lower portion of said shoes, and cams provided on said shafts in position to engage and oscillate said yoke when said bed is at or near the limit of its movement in either direction.

5. In a mechanical movement, the combination, with a reciprocating printing-press bed, of parallel shafts provided beneath the same, means for revolving said shafts in the same direction, adjustable bearings provided at one end of said shafts, said shafts having in their surfaces respectively right and left hand spiral grooves, a yoke suspended on said bed between said shafts, shoes secured thereon, legs provided on said yoke, a guideway for said legs having a central rib and rounded at the ends, antifriction-rollers provided on said yoke, and cams secured on said shafts and arranged to engage said antifriction-rollers and oscillate said yoke to move the shoes on

one side thereof out of engagement with their shaft and throw the opposite shoes into engagement with their shaft, substantially as described and for the purpose specified.

6. The combination, with revolving right and left hand spirals arranged parallel to each other, of a reciprocating bed, an oscillating yoke connected with said bed, shoes carried by said yoke, one set for each spiral, means for oscillating said yoke to move said shoes into engagement with their respective spirals, and a suitable guiding means for said yoke.

7. The combination, with a reciprocating printing-press bed, of right and left hand spirals arranged parallel to each other beneath said bed, a yoke pivotally suspended on said bed between said spirals, shoes provided on opposite sides of said yoke, a guide for said yoke, antifriction-rollers provided on said yoke, and cams secured on said spirals and arranged to engage said antifriction-rollers to oscillate said yoke and move the shoes on one side thereof out of engagement with their spiral and throw the opposite shoes into engagement with their spiral, substantially as described.

8. The combination, with a reciprocating printing-press bed, of parallel spirals having oppositely-cut threads beneath said bed, a yoke suspended on said bed between said spirals, a guideway, a yoke pivotally supported on said bed between said shafts and engaging said guideway, shoes carried by said yoke, and means provided in connection with said spirals for oscillating said yoke when said bed is near the limit of its movement in each direction and move the shoes out of engagement with their spiral on one side of said yoke and throw the shoes on the other side into engagement with their spiral, substantially as described and for the purpose specified.

In witness whereof I have hereunto set my hand this 22d day of August, 1902.

JAMES W. ENNIS.

In presence of—

RICHARD PAUL,
C. G. HANSON.