L. ANDERSON.

BUNDLE TRANSFER FOR GRAIN BINDERS.

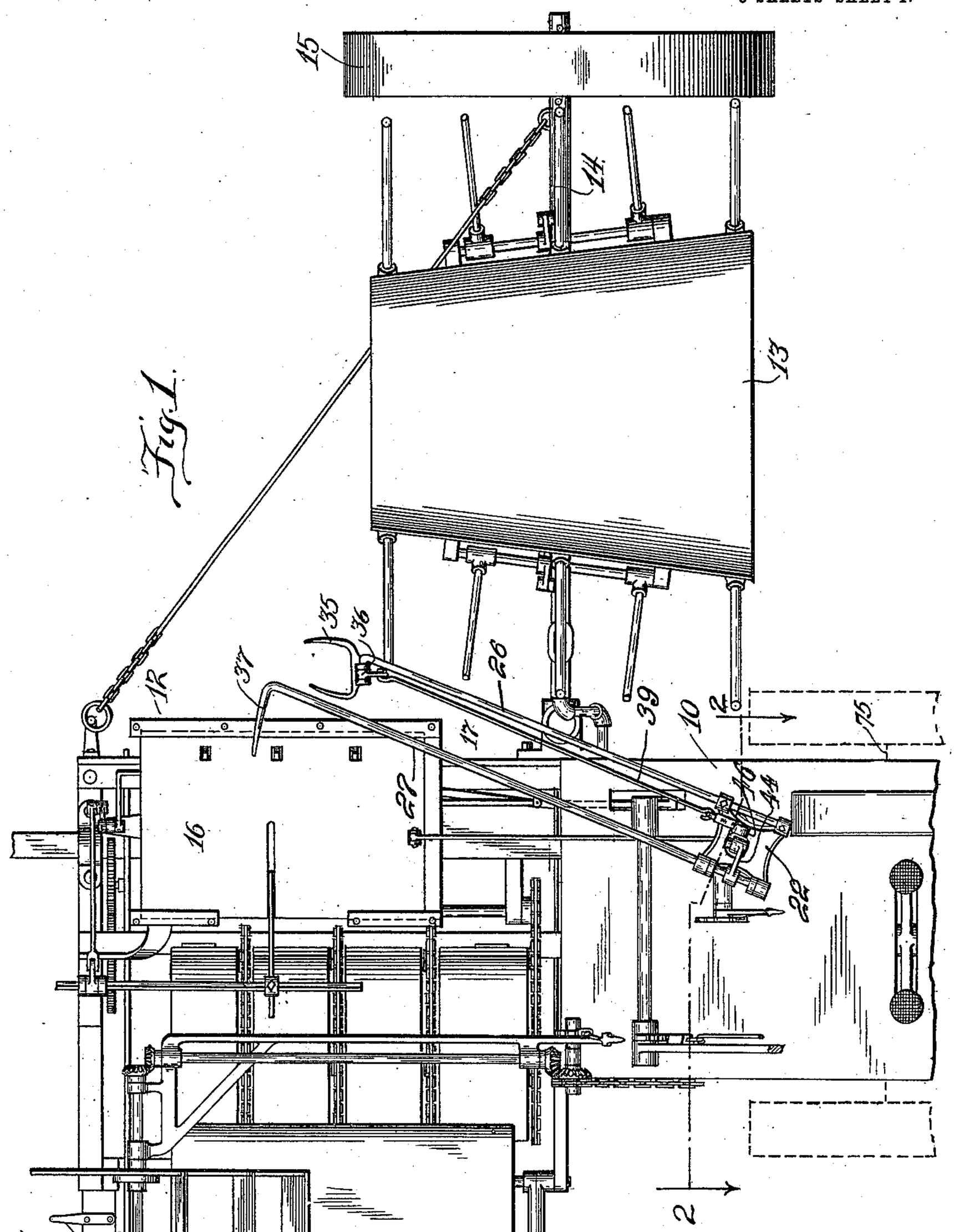
APPLICATION FILED MAY 10, 1909.

989,941.

Patented Apr. 18, 1911.

3 SHEETS—SHEET 1.

Fig. 1.



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3 SHEETS—SHEET 2.

Fig. 2.

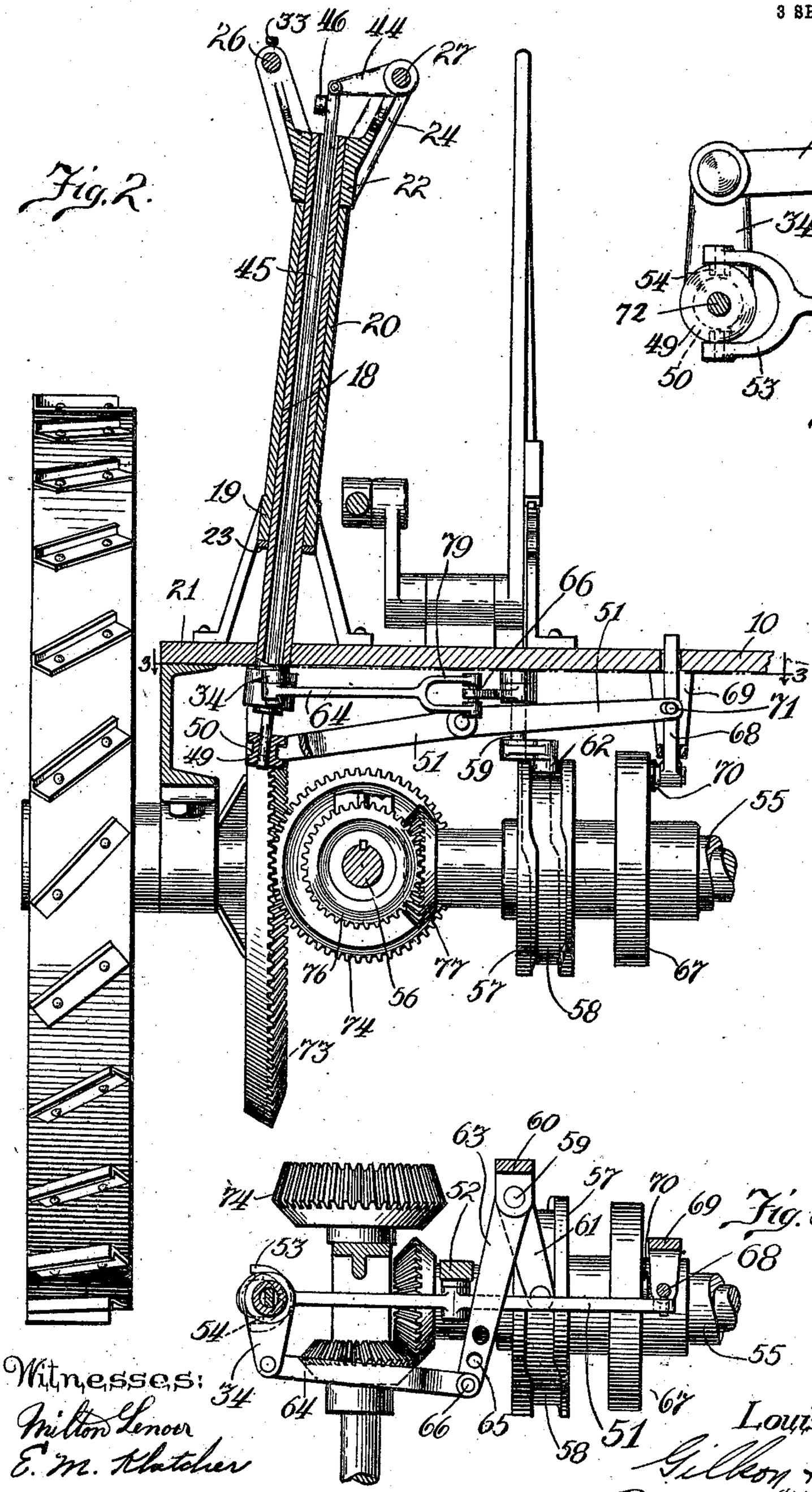

Fig. 4.

Fig. 3.

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3 SHEETS—SHEET 3.

Fig. 5.

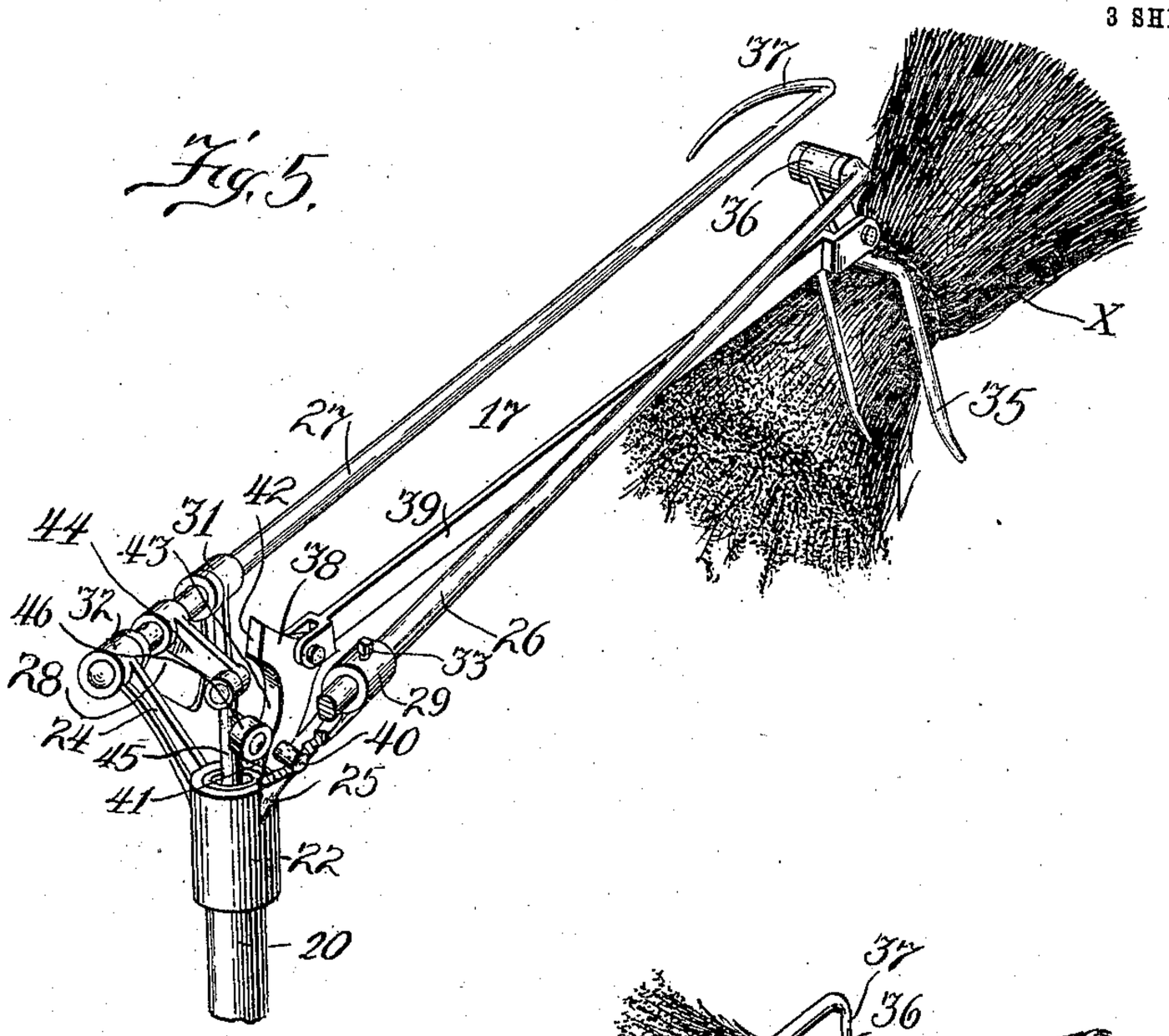

Fig. 6.

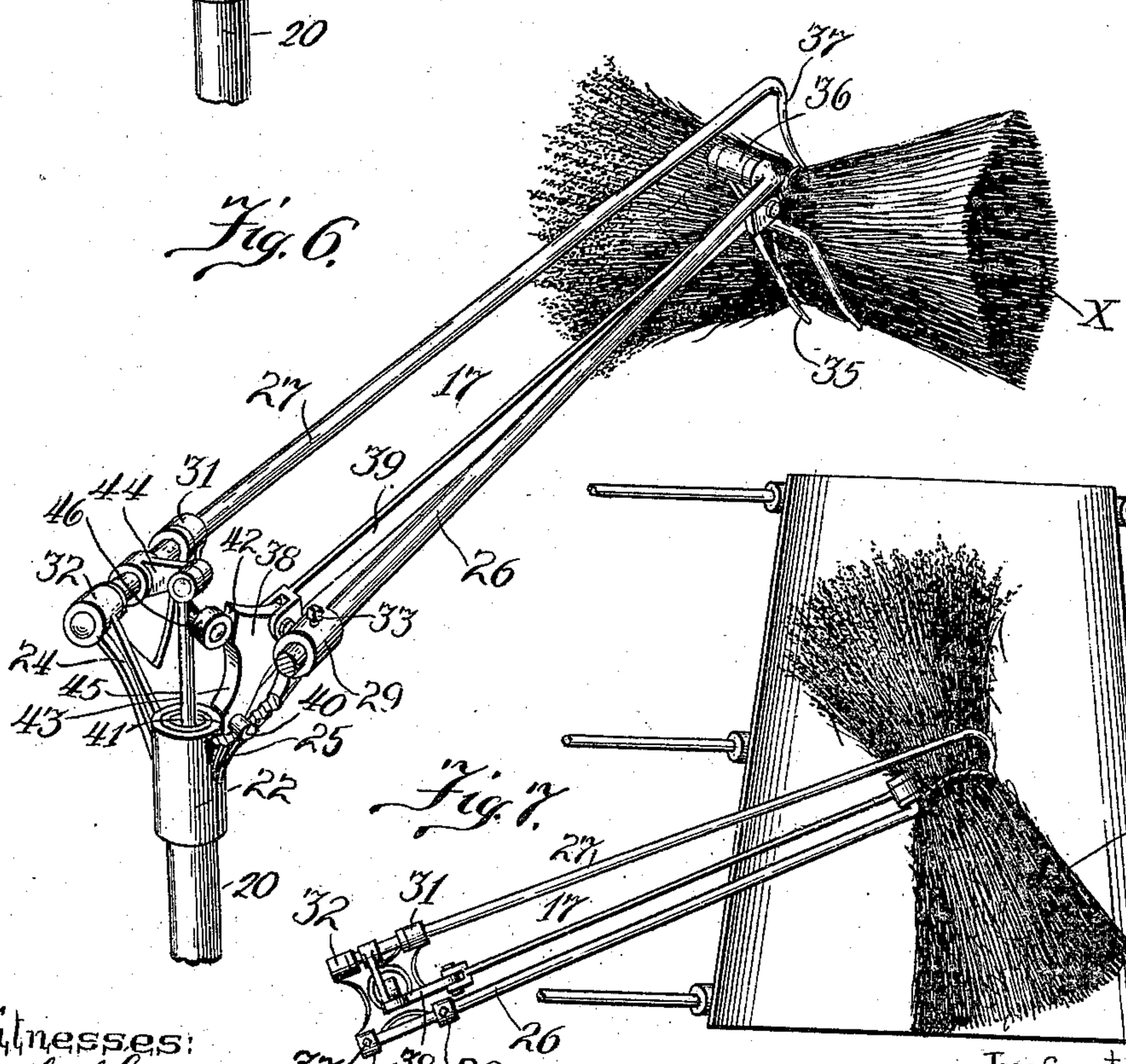

Fig. 7.

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BUNDLE-TRANSFER FOR GRAIN-BINDERS.

989,941. Specification of Letters Patent. Patented Apr. 18, 1911.

Application filed May 10, 1909. Serial No. 495,114.

To all whom it may concern:

Be it known that I, LOUIS ANDERSON, a citizen of the United States, and resident of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Bundle-Transfers for Grain-Binders, of which the following is a specification and which are illustrated in the accompanying drawings, forming a part thereof.

The invention relates to harvesting machines, and more particularly to grain binders wherein a carrier is provided for receiving the bundles of grain produced by the binding mechanism; the object of the invention being to provide improved means for transferring the bundles of grain from the binding mechanism to the carrier.

In machines of the type described the grain is cut during the forward movement of the machine over the field, and is therefore received by the binding mechanism in such a way that the heads of grain are directed backwardly or toward the rear of the machine. It is desirable, however, that the bundles should be deposited upon the ground from the carrier from time to time, as when a predetermined number of bundles have accumulated therein, in an upright position, as in the form of a shock of bundles. To render this possible it is important that the bundles of grain should be held in the carrier with the stalks of grain directed toward the rear of the machine, that is, in a position reversed from that which they occupied in the binding mechanism.

The invention contemplates a transfer adapted to remove bundles of grain, one at a time, from the binding mechanism of grain binders and deposit them in a carrier or shock former with which the machine may be equipped, the movement of the fork and the manner of engaging the bundle being such that the bundle is turned end for end in transit.

In the accompanying drawings, Figure 1 is a detail plan view of a grain binder equipped with a bundle carrier or shock former and with a form of bundle transfer mechanism provided by the invention; Fig. 2 is a detail sectional view taken on the line 2—2 of Fig. 1 some of the parts being shown in elevation; Fig. 3 is a sectional plan view taken on the line 3—3 of Fig. 2; Fig. 4 is an inverted plan view of details of the mechanism illustrated in Fig. 3; Figs. 5 and 6 are perspective views illustrating details of the bundle transfer mechanism and showing two different positions through which this mechanism moves during its operation; and Fig. 7 is a detail plan view illustrating a third position of the bundle transfer mechanism.

The grain binder illustrated in the drawings is provided with a wheeled frame, generally designated by the numeral 10. As is customary in machines of this class, a forwardly-facing reaping blade 11 is located at one side of the line of draft of the machine. Binding mechanism, generally designated by the numeral 12, receiving from the reaping blade 11, is mounted on the frame 10. The machine is also equipped with a bundle carrier 13. As shown, this bundle carrier is a device for depositing bundles of grain which accumulate therein upon the ground in a shock. It is located at that side of the line of draft remote from the reaping blade 11, and it takes the form of a tilting cradle carried by an arm 14 which projects laterally from the frame 10 and is provided at its outer end with a carrying wheel 15. The binding mechanism of the machine includes a table 16, upon which the bundles of grain are formed.

Mechanism is provided by the invention for transferring bundles of grain from the table 16 to the shock former 13, and for turning them end for end in transit. As shown this mechanism is generally designated by the numeral 17 and comprises a pair of horizontally swinging arms 26, 27.

The arms 26, 27 are preferably mounted at the top of a rotatable post 18. This post, as shown, is journaled in a column or standard 19, having a tubular shaft 20, and secured at its base to a platform 21, comprised in the frame 10 of the machine. Vertical movement of the post 18 is preferably prevented by means of collars 22, 23, applied to the post 18 and engaging the upper and lower ends, respectively, of the tubular shaft 20 of the standard. As shown, the collar 22 constitutes a head for the post, and has bracket arms 24, 25, formed thereon for receiving the arms, as 26, 27, of the

transfer 17. Preferably each of the bracket arms 24 and 25 is bifurcated, as shown at 28 (Fig. 5), whereby a two-point support, as 29, 30 and 31, 32 is provided for each of the arms 26, 27. As shown, one of the arms, as 27, is rotatable in the supports 31, 32, provided therefor, while the arm 26 of the transfer is fixed against rotation as by means of set-screws 33, which bear upon it through the bifurcated ends 29, 30, of the bracket 25.

The transfer 17 is oscillated between positions in which its outer free end is located over the table 16 of the binding mechanism 12, and over the bundle carrier 13, by turning the post 18. To this end the post 18 preferably extends downwardly through the platform 21 and is provided at its lower end with a crank-arm 34, located beneath the platform. The arms 26, 27, of the transfer 17 coöperate at their outer ends for grasping a bundle of grain. As shown, a swinging forked member 35 is hung from the outer end of the non-rotatable member 26 of the transfer 17, as at 36, and the rotatable arm 27 is provided at its outer end with a hook or finger 37, which is moved in front of the forked member 35 by the turning of the arm 27. For swinging the forked member 35 upon the outer end of the arm 26, a cam block 38 is connected to the forked member by a link 39, preferably provided at the top of the post 18. As shown, the cam-block 38 is pivotally secured at 40 to the bracket 25, and has formed upon that face remote from its connection with the link 39 a pair of cam-bearing surfaces 41, 42, separated by a notch 43.

The rotatable arm 27 of the transfer 17 is provided with a crank-arm 44, preferably located between the arms 31, 32, of the bifurcated end of the bracket member 24, whereby the free end of the crank-arm is substantially in line with the axis of the post 18.

A vertically-movable plunger 45 extends through the post 18 for rotating the arm 27 of the transfer 17, and for swinging the forked member 35 provided upon the outer end of the arm 26. As shown, this plunger is directly connected to the crank-arm 44 of the arm 27 and carries a cam roller 46 for coöperating with the cam-block 38. Preferably the post 18 is made tubular to receive the plunger 45. As shown, the inside diameter of the post 18, throughout the greater portion of its length, is enough larger than the plunger 45 to permit of that lateral movement of the higher end of the plunger which is incident to its moving through an arc by reason of its connection with the crank arm 44. At its extreme lower end the inside of the post 18 is of reduced diameter to provide a sliding bearing 72 (Fig. 4) for the plunger. Preferably the cam-bearing surfaces 41, 42, of the cam-block 38, and the cam roller 46 cooperating therewith, are of sufficient width to prevent a disengagement of these parts by the lateral movement of the higher end of the plunger 45 just described.

The plunger 45 preferably projects from the lower end of the post 18 beyond the crank arm 34, and is there provided with a collar 49, having a circumferential groove or channel 50. A vertically-swinging lever 51, pivotally secured to a bracket 52 mounted upon the under side of the platform 21, has at one end a fork 53, the arms of which straddle the collar 49 and have inwardly-directed lugs 54 which enter its circumferential channel 50.

The operative parts of the machine are preferably driven from a driving shaft 56, having gear connections 73, 74, with the carrying axle 75 of the wheeled frame 10. A cam shaft 55, adapted to be intermittently rotated through gears, 76, 77, from the driving shaft 56, as when a bundle of grain has been completed upon the table 16, is most conveniently provided for reciprocating the plunger 45 and for rotating the post 18. As shown, a cylindrical cam member 57, having a circumferential cam groove 58, is mounted on the cam shaft 55 for turning the post 18. Operative connection between the cam 57 and the crank-arm 34 of the post 18 is preferably established through a vertically-disposed rock shaft 59, and a link 64. The rock shaft 59, as shown, is journaled in a bearing bracket 60, secured to the under side of the platform 21. This rock shaft carries at its lower end a crank-arm 61, having at its outer end a cam roller 62, which runs in the cam groove 58 of the cam 57. At its higher end the rock shaft 59 carries a crank arm 63, and the link 64 connects this crank arm with the crank-arm 34. In order that the extent of turning of the post 18 may be suitably adjusted, the connection between the link 64 and the crank-arm 63 is of a form adapted to be shifted along the length of the crank-arm. As shown, a plurality of apertures 65 are formed in the crank arm, and the link 64 is connected thereto by means of a pin 66 adapted to enter any one of these apertures.

A plate cam 67 mounted on the cam shaft 55, serves for swinging the lever 51. As shown, a slide-rod 68, mounted for vertical movement in a bracket 69 secured to the under side of a platform 21, carries a cam roller 70 for operatively engaging the plate cam 67. This slide rod has a pin and slot connection 71 with the lever 51.

In the operation of the machine, the transfer 17 is preferably maintained in a position of rest intermediate the table 16, and

the bundle carrier 13, during the formation of a bundle in the binder mechanism 12. This position of the parts is illustrated in Figs. 1, 2 and 5 of the drawings. When in this position the forked member 35 is partially lifted by contact of the cam roller 46 with the lower cam-bearing surface 41 of the swinging cam-block 38. When a bundle of grain has been completely formed upon the table 16, the post 18 is first turned to the left, as viewed in Fig. 1, by the operation of the cam 57. The plunger 45 is now raised by the cam 67, and during the raising of the plunger the cam roller 46 passes the notch 43 in the pivoted cam-block 38, thereby permitting the forked member 35 to fall until its tines contact with the table 16. The further raising of the plunger 45 causes the arms 26, 27, of the transfer 17 to close upon a bundle of grain at their outer ends by advancing and elevating the forked member 35 and swinging the overturned end 37 of the arm 27. This movement of the forked member 35 is effected by contact of the cam roller 46 with the cam-bearing surface 42 of the cam-block 38, and the swinging of the part 37 is effected by a rotation of the arm 27 through a swinging of the crank 44.

A bundle of grain, designated X, is conventionally shown in Fig. 5 of the drawings, in that position which it occupies upon the table 16 prior to being grasped by the arms of the transfer 17. In this position of the parts the heads of grain are directed toward the rear of the machine, but during the closing of the forked member 35 and overturned end 37 of the arm 27 upon the bundle of grain, it is turned to the position illustrated in Fig. 6, wherein the length of the grain extends transverse to the machine with the heads of grain directed toward the left. The post 18 is now rotated by the cam 57 to the right, as viewed in Fig. 1, and by the consequent swinging of the transfer 17 the bundle X of grain is brought to a position in which it is over the carrier 13 with the stalks of grain directed toward the rear of the machine. The plunger 45 is now lowered by the cam 67, causing the overturned end 37 of the arm 27 of the transfer 17 to swing outwardly and permitting the forked member 35 to fall as the cam roller 46 passes the notch 43 in the cam-block 38. The bundle of grain is thereby released and permitted to fall into the carrier 13. When the plunger 45 reaches its lowermost position, the cam roller 46 engages the cam-bearing surface 41 of the cam-block 38 to partially elevate the forked member 35. The transfer 17 is now returned to the position of rest illustrated in Fig. 1, by a partial counter-rotation of the post 18. This cycle of operations is repeated whenever a bundle of grain becomes completely formed upon the table 16 of the binder mechanism 12.

The initial turning of the bundle of grain is produced by having the finger 37 move in front of the forked member 35 as an abutment. This relative arrangement of the parts is provided for in the structure shown by making the arms 26, 27, of the transfer 17 of unequal length. The turning of the bundle is then completed by the horizontal swinging of the transfer 17 produced by turning the post 18.

If desired the post 18 may be inclined, as shown in Figs. 2, 5 and 6, whereby the transfer 17 swings in an inclined plane and elevates the bundle of grain carried therein as it moves toward the cradle 13. To permit of a turning of the post without binding of the parts because of its inclined relation to the other operative parts of the machine, that end of the link 64 to which the connecting pin 66 is applied is forked, as indicated at 79 (Fig. 2) to loosely straddle the crank-arm 63, while the pin 66 may have a loose fit in the apertures 65.

I claim as my invention—

1. In a bundle transfer for grain binders, in combination, a pair of swinging arms of unequal length one thereof being rotatable, a fork depending from the end of the non-rotatable arm, and a finger on the end of the rotatable arm movable in front of the fork by the turning of the arm.

2. In a bundle transfer for grain binders, in combination, a pair of swinging arms of unequal length, the longer arm being rotatable, an outwardly-facing fork hung from the end of the shorter arm to swing in the direction of length of the arm, and a finger on the end of the longer arm movable in front of the fork by the turning of the arm.

3. In a bundle transfer for grain binders, in combination, a rotatable tubular post, a pair of laterally-directed bundle-grasping arms carried by the post, one thereof being rotatable, a crank on the rotatable arm, a rod housed within the post and connected to the crank, a cam for turning the post, and a cam for shifting the rod.

4. In a bundle transfer for grain binders, in combination, a rotatable tubular post, a pair of laterally-directed arms of unequal length carried by the post, the longer arm being rotatable, an outwardly-facing fork hung from the end of the shorter arm to swing in the direction of length of the arm, a tilting cam block carried by the post, a link connecting the cam-block and the fork, a finger on the end of the longer arm movable in front of the fork by the turning of the arm, a crank on the rotatable arm, a rod engageable with the tilting cam block

housed within the post and connected to the crank, a cam for turning the post, and a cam for shifting the rod.

5. A bundle reversing mechanism for grain bundles comprising in combination an abutment bodily movable through a quadrant, a rotatable arm perpendicular to and extending beyond the face of the abutment and movable with it, and a finger projecting laterally from the arm and movable in front of the abutment by the turning of the arm.

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