

No. 742,061.

PATENTED OCT. 20, 1903.

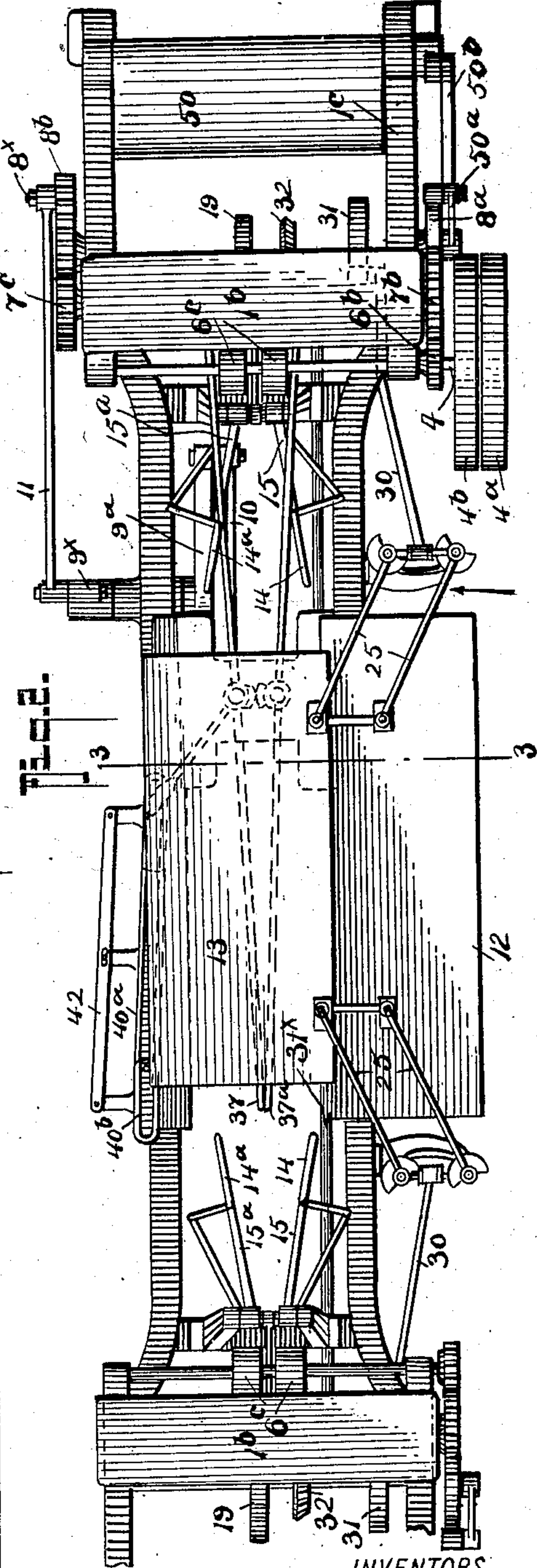
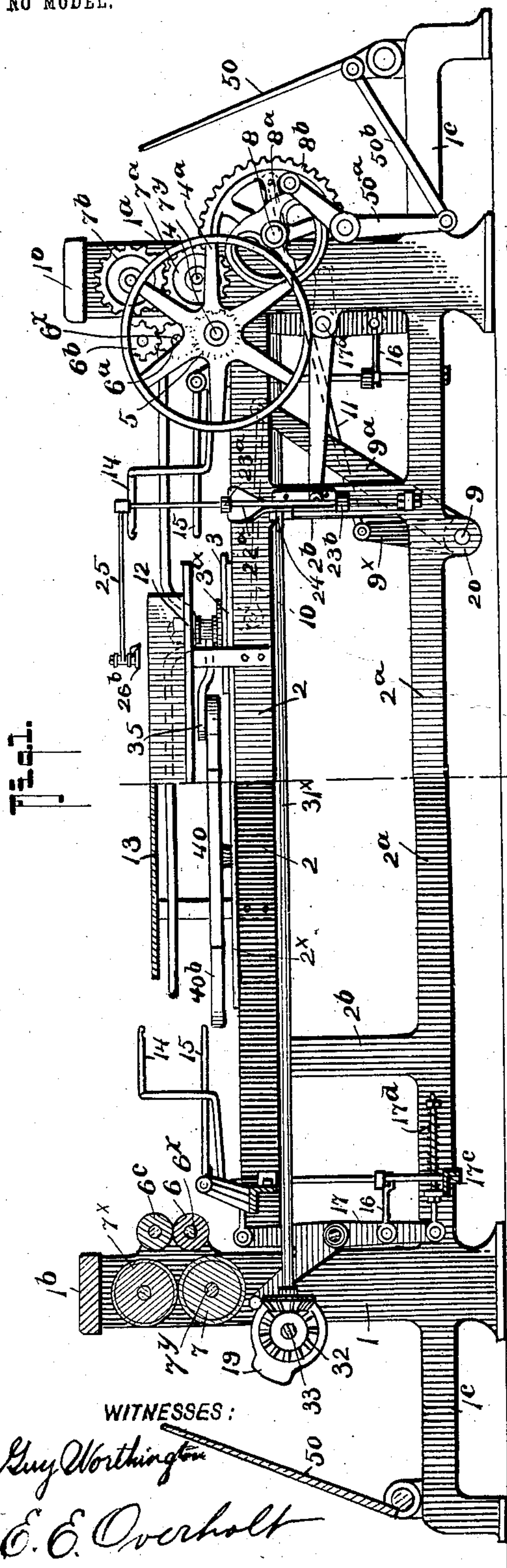
S. M. PHILBRICK & L. C. COULTER.

BAG TURNING MACHINE.

APPLICATION FILED APR. 21, 1902.

3 SHEETS—SHEET 1.

NO MODEL.



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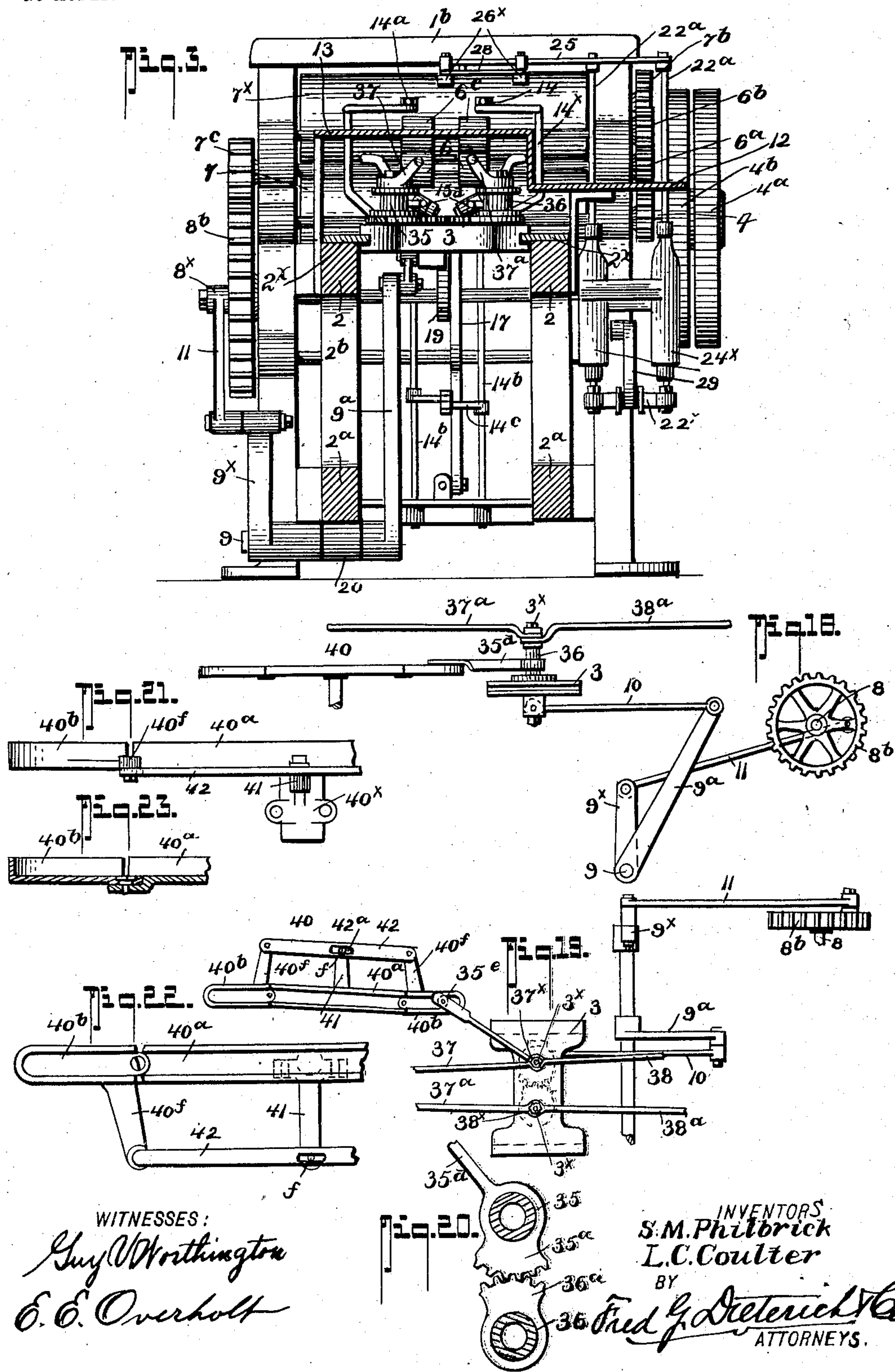
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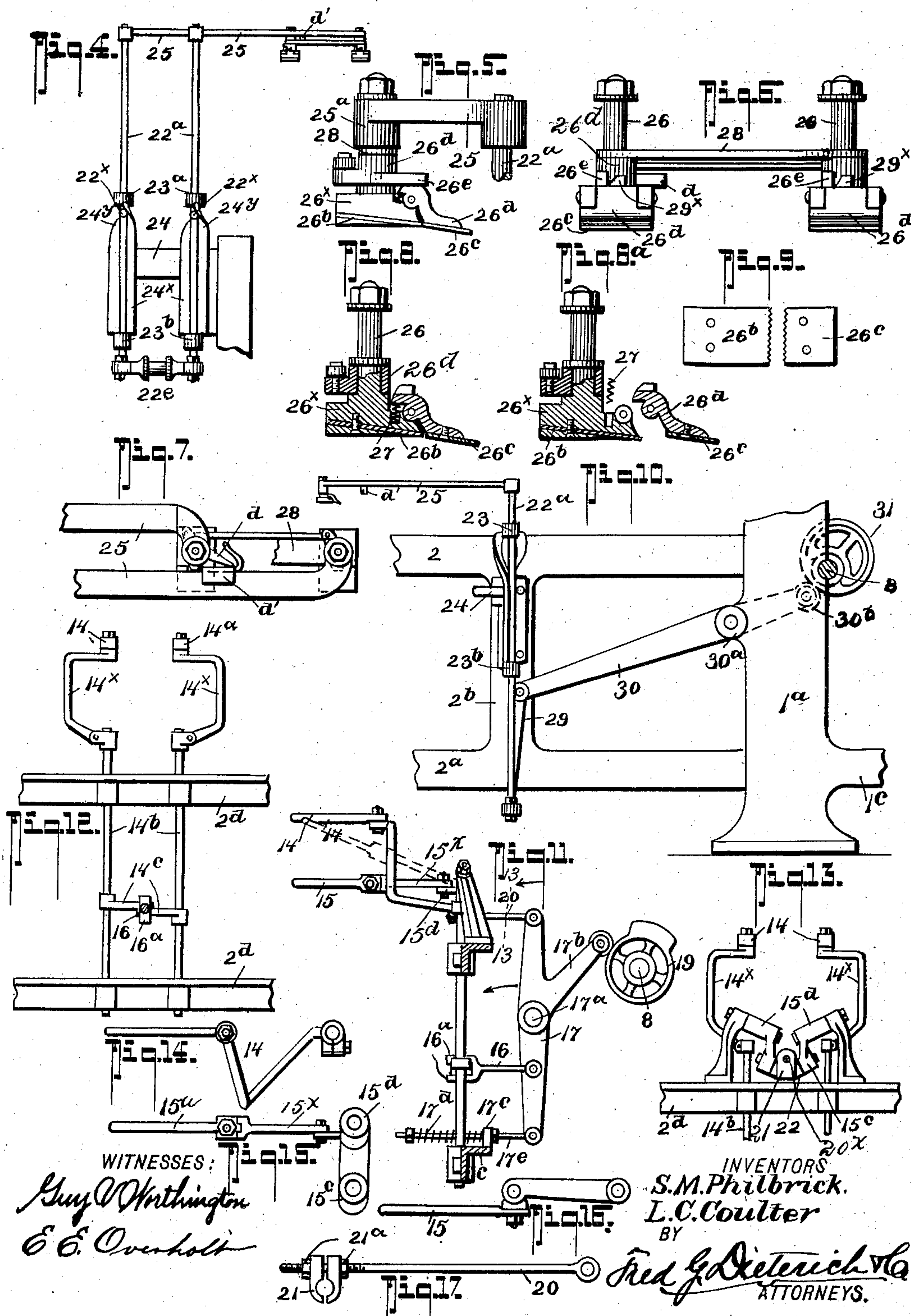
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3 SHEETS—SHEET 3.



UNITED STATES PATENT OFFICE.

SAMUEL M. PHILBRICK AND LOUIS C. COULTER, OF PORTLAND, OREGON.

BAG-TURNING MACHINE.

SPECIFICATION forming part of Letters Patent No. 742,061, dated October 20, 1903.

Application filed April 21, 1902. Serial No. 104,067. (No model.)

To all whom it may concern:

Be it known that we, SAMUEL M. PHILBRICK and LOUIS C. COULTER, residing at Portland, in the county of Multnomah and State of Oregon, have invented a new and Improved Bag-Turning Machine, of which the following is a specification.

Our invention seeks to provide a new and improved construction of mechanism for turning bags after they are sewed to bring them into a proper position to be engaged by feed-rolls and a flier means for stacking them flat-wise upon each other, and it more particularly relates to that type of bag-turning machine disclosed in the patent to S. T. Lockwood, dated April 22, 1884, No. 297,141.

Our invention primarily seeks to provide an improved machine of the character stated in which the operation of the cooperating parts will be substantially noiseless, positive, and capable of turning the bags quickly and without danger of mutilating or improperly folding them in their final position.

Our invention in its complete make-up includes a novel construction of pick-up devices for feeding the bags automatically in a position to be engaged by the bag-mouth spreading and holding means and a simple and effective means cooperatively joined with the means for effecting the said automatic operation for engaging the loose portion of the bag and turning it back through the mouth end at predetermined intervals.

Again, our invention includes an improved construction of pusher means including a reciprocating cross-head, pusher-arms centrally fulcrumed thereon, and means for spreading that end moving into engagement with the bag whereby to provide a single pusher means for cooperating with a set of bag holding, discharging, and flier or laying devices at each end of the machine and whereby to turn and discharge a bag alternately at each end of our complete machine.

In its more subordinate features our invention consists in certain correlative arrangement and peculiar combination of parts, all of which will hereinafter be fully described, and specifically pointed out in the appended claims, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of our complete double-end machine, one end being shown partly in section. Fig. 2 is a top plan view of the same, the parts being at the position shown in Fig. 1. Fig. 3 is a transverse section of the same on the line 3 3 of Fig. 2. Fig. 4 is a detail side elevation of the pair of combined vertically-shiftable and rocker arms, the cam-guides therefor, and the pick-up members controlled thereby. Figs. 5, 6, 7, 8, 8^a, and 9 are detail views of the several parts constituting the pick-up members, hereinafter specifically referred to. Fig. 10 is a detail side elevation of the pick-up devices and the lever and cam members cooperating therewith. Fig. 11 is a detail side elevation of one set of the bag-mouth-engaging fingers and the operating mechanism connected therewith. Fig. 12 is a front elevation of parts thereof. Fig. 13 is a detail cross-section taken on the line 13 13 of Fig. 11. Fig. 14 is a detail plan of one of the upper bag-mouth-spreader, lever, and finger members. Figs. 15 and 16, respectively, show a top plan and side elevation of one of the lower fingers. Fig. 17 is a view of the clamp-rod that joins the cam-operated lever with the upper fingers. Fig. 18 is a detail side elevation of the sliding cross-head, the drive means therefor, and the pusher-lever and the spreader devices that cooperate therewith. Fig. 19 is a plan view of the mechanism shown in Fig. 18. Fig. 20 is a detail view, on an enlarged scale, of the segmental hubs included in the mechanism shown in Figs. 18 and 19. Figs. 21, 22, and 23 are detail views of a portion of the spreader-frame that cooperates with the segmental hubs aforesaid.

In the practical construction of our machine the same includes a framework comprising end standards 1 1 1^a 1^a, each pair being joined by a cross-head 1^b, and the two sets of standards are also joined by the longitudinally-extending side frames, that include upper and lower members 2 2^a and vertical members 2^b 2^b. The lower ends of each set of standards 1 and 1^a also have integral side extensions 1^c, to which the flier-frames are connected, as will hereinafter be fully explained.

We deem it proper to here state that in the

preferred construction our machine is what is termed a "double-end" machine, for the reason that a set of pick-up offtake-rolls and flier devices are located at each end and which in our construction coöperate with the reciprocally-movable pusher mechanism, so that a bag will be operated on at each stroke of the pusher-arms and fed to the alternate ends of the machine. While we prefer to make our machine a double-end machine, it will be understood but a single set of pick-up offtake-rolls and flier devices may be employed, and in the following detailed description we shall confine the same to one set of pick-up means, the offtake-rolls, and flier devices, as the other set of such devices are constructed and operate in the same manner, and the said other set shall therefore be referred to in a general way only.

At the upper edge the upper side members 2 of the frame have inwardly-projecting horizontal flanges 2^x 2^x , that form the guides for the cross-head 3, whose opposite edges have grooves 3^a to engage the flanges 2^x 2^x , as shown.

At one end of the machine is a drive-shaft 4, that carries a fast and a loose pulley 4^a 4^b at one end, with which a drive-belt can be connected in any well-known manner. At the pulley end the shaft 4 carries a pinion 5, held to mesh with a gear 6^a on the shaft 6^x of the lower offtake-roll 6 and which meshes with a similar gear 6^b on the upper offtake-roll 6^c , as clearly shown in Fig. 1, and the pinion 5 also meshes with another pinion 7^a on the shaft 7^y of the lower guide-rolls 7, and said pinion 7^a in turn meshes with the pinion 7^b on the shaft carrying the upper guide-rolls 7^x , which rolls have their opposing surfaces in a plane with the offtake-rolls 6^b 6^c and serve to guide the turned end of the bag from the said rolls 6^b 6^c onto the flier, as will hereinafter be more fully explained.

At one end of the machine is mounted a transverse shaft 8, upon one end of which is mounted a cam 8^a and at the other end a cog-wheel 8^b , held to mesh with a pinion 7^c on the shaft 7^y of the roll 7.

In bearings 20 on the lower frame members 2^a is mounted a rock-shaft 9, that carries a long crank-arm 9^a , the upper end of which joins with a pitman 10, pivotally connected to the cross-head. (See Fig. 18.) The shaft 9 is also provided with another crank-arm 9^x , connected by the pitman 11 with a wrist or crank pin 8^x on the cog-wheel 8^b .

So far as described it is manifest that rotary motion applied to the wheel 8^b through the gear connections hereinbefore described, and shown in the drawings, is transmitted to effect a reciprocal movement to the cross-head.

At one side the frame is provided with a platform 12, upon which the bags are laid flatwise turned inside out, this being the way the bags are arranged for sewing, and when both ends of the machine are equipped as

hereinbefore stated the bags are laid alternately—that is, with the open end toward the pick-up and mouth-spreading devices.

At a point just above the spreader and pusher members, presently referred to, a shield 13 extends transversely over the combined spreader and pusher members, which forms a guide and support for the rear or sewed end of the bag when it is being automatically moved into position to engage with the mouth spreader and holder devices. The construction of said spreader and holder devices forms an essential feature of our invention and which we shall now describe in detail, previous to which, however, it should be stated the connection between the cross-head, before referred to, and the drive-gear is such as to get a travel of the cross-head great enough to turn long bags.

Each set of mouth spreading and holding devices consists of four fingers, designated by 14 14^a , that operate in harmony and which move in a horizontal plane, and 15 15^a , that operate in harmony and which have a vertical and lateral movement, the reason for which will presently appear, and the said fingers 15 15^a are so disposed relatively to the fingers 14 14^a and their operating means so timed as to cause the fingers 15 15^a to move downward and outward as fast as the horizontally-movable fingers 14 14^a move outward and are always under said fingers 14 14^a when they catch the bag. The fingers 14 14^a 15 15^a are provided to catch the bag when it is moved into position by the "pick-ups," hereinafter described, and when they engage with the bag they provide a rectangular opening or mouth for the bag, and said opening is maintained during predetermined intervals by reason of the strong tension of said fingers on the bag. The horizontal fingers 14 14^a are mounted on arms 14^x 14^x , clamped to the upper end of the vertical shafts 14^b 14^b , mounted on the angle-plate cross member 2^d , as best shown in Figs. 2, 11, and 12, and said arms 14^x 14^x are adjustably mounted on the said shafts to meet the different-sized bags, and to further adapt them for the different widths of bags the fingers 14 14^a are clamped to the arms by a nut-and-bolt connection, so that they can be swung laterally and held to their set positions. The two shafts 14^b near their central point each have a crank 14^c , that lap each other and are secured by a single bolt with the forked end 16^a of a connecting-rod 16, that joins with a vertically-disposed crank-lever 17, (see Fig. 11,) suitably mounted on a cross-shaft, as shown. The shaft designated by 17^a also carries the cranks for actuating the pick-ups. The crank-lever 17 has one arm 17^b held to engage a cam 19 on the shaft 8, which cam is so positioned as to give the required motion to the two upper fingers that swing inward and outward in a horizontal plane. To the upper end of the crank-lever 17 is pivotally joined a connecting-rod 20^x , that carries two claw-clamps 21 21, (see Fig. 17,) se-

cured by nuts 21^a at each side to grip the hub 22, that joins with the pendent sockets 15^c 15^c, that form an integral part of the hubs 15^d, to which the outwardly-extending arms 15^x 15^x are adjustably secured and to which the fingers 15 15^a are connected, as clearly shown in Figs. 15 and 16. By connecting the fingers 15 15^a with the crank-levers 17 in the manner described and shown it will be apparent when the lever 17 is swung forward in the direction of the arrow the hubs 15^d will be rocked and the fingers 15 15^a will be swung up to the position shown in dotted lines in Fig. 11 close up against the under side of the fingers 14 14^a, and thereby make the two sets of fingers as one set of projections to receive the mouth end of the bag as it is moved over toward the center of the machine and in the direction of the said set of fingers 14 14^a 15 15^a, it being also apparent (assuming the cam-operated lever 17 to be moving under a predetermined time action) that when the lever begins to swing back again the fingers 15 15^a will be swung down, and thereby separate the mouth of the bag vertically, while the now forward swing of the lower end of the lever 17 through the link 16^x imparts a rocking motion to the members 14^c and the shafts 14^b, and thereby swings the fingers 14 14^a laterally outward and draws the sides of the bag-mouth tight, so that in connection with the fingers 15 15^a a rectangular opening of the bag is maintained during the operation of pushing the rear or sewed end of the bag through, which operation will be presently explained.

The pick-up devices, one set of which is illustrated in detail in Figs. 4 to 10, inclusive, consists of two vertical parallel rods 22^a 22^a, arranged in a plane at right angles to the main frame, (see Fig. 1,) mounted in upper and lower bearings 23^a 23^b, formed on the upper and lower ends of vertical guide-brackets 24 24. These guide-brackets have parallel straight vertical surfaces 24^x 24^x, extending up for two-thirds of their height, where said surfaces merge with spiral flanges or ways 24^y, and the said rods 22^a 22^a each have a laterally-projecting stud 22^x, that travels over the surfaces 24^x of the guides 24, and by reason of their engagement with the spiral flanges of said guides during the upward movement of the rods 22 a rotary motion is imparted to said rods in the direction indicated by the arrows in Fig. 2, the purpose of which will presently be explained. Fixedly held on the upper end of each rod 22 is a horizontally-disposed inwardly-projecting arm 25 25, and the said arms are parallel, and the outer ends of arms 25 terminate in vertically-apertured hubs 25^a 25^a to receive the spindles 26 26 of the pick-up heads, the peculiar construction of which is best illustrated in Figs. 6 to 9, inclusive, by reference to which it will be noticed the pick-ups each consist of a casting to which is secured a toothed plate 26^b, the points or teeth of

which project just beyond the edge of the casting 26^x and which oppose a second serrated or toothed plate 26^c, secured upon a member 26^d, hinged to the casting 26^x and normally held with the toothed edge of plate 26^c in contact with the plate 26^b by means of a spring or equivalent device 27, as clearly shown in Fig. 8, by reference to which it will also be seen the two plates 26^b and 26^c lie in a plane at an angle to the base of the casting 26^x, the reason for which will presently appear. Each casting 26^x has a spindle 26, which fit the hubs 25^a 25^a and are held in proper fixed relation by a connecting-piece 28. The lower ends of the rods 22^a are joined by a transverse rod 22^e, with which a lever-link 29 connects, (see Fig. 10,) and which also pivotally joins with a long lever 30, fulcrumed at 30^a on the shaft 17^a and provided with a friction-roller 30^b for engaging the operating-cam 31, mounted on the shaft 8. So far as described the operation of the pick-up mechanism is as follows: The cam and lever devices that control the movement of said devices in practice are adjusted to work at proper predetermined times, and in action when the pick-up heads descend their serrated plates in engaging the bags by reason of the angle on which they are disposed in pressing against the bags spread open and their serrated edges sink into the upper half of the cloth of bag. When the pick-ups are raised, the two toothed plates automatically close against and gather the cloth in a tuck and securely hold the bag and raise it with it vertically. The two pick-up heads being held in a fixed relation and movable in unison, they take hold of the bag at the open end near each side. The bag is first lifted vertically until the studs on the rods 22^a engage the spiral guides on which they travel, and by reason thereof the motion of the rods 22^a is then both vertical and inward, it being understood the inward movement does not begin until the front end of the bag is high enough to clear the central platform and when thus brought over the mouth of the bag is held open by reason of the pick-ups gripping the upper part of the bag only, and as at this time the receiving and spreading fingers are closed up to present, as it were, a single line of projecting members the open mouth of the bag can be readily and automatically slid onto the said fingers. This operation done, the serrated plates automatically open to release their grip on the bag and the pick-up devices returned to their other position to pick up another bag as the prior bag is being turned, carried off, and deposited onto a platform or floor, turned. The automatic opening of the bag-gripping plates may be effected in various ways. In the drawings we have shown a sleeve 26^d, mounted upon each spindle 26, and to these sleeves the member 28 is fixedly connected to cause said sleeves to turn in unison on their respective spindles. One of the sleeves 26^d has a projection *d*,

adapted to engage with a pendent lug or member d' on one of the carrying-arms (see Figs. 4 and 10) near the end of the inward travel of said arms, which causes the two sleeves 26^d , they being connected by cross member 28, (see Fig. 6,) to rock in unison on their respective spindles, and by reason of such movement a trip-lug 26^e on each sleeve will engage with a cam projection 29^x (see Figs. 6 and 7) on the heel part of the hinged gripping-plate, and thereby open the gripping edges, release the bag, and permit the pick-ups to move to their return position. The four fingers that engage the mouth end of the bag are all actuated by a single cam mechanism, which operates the fingers to drop and expand the open end of the bag and under a tension, the latter operation being effected by coiled springs 17^d , that coöperate with the inwardly-projecting rods 17^e , connected to the lower end of lever 17 (see Fig. 11) and the guide and stop piece 17^e on the frame-piece c . (See Fig. 11.) To prevent the bag catching on the lower fingers, the upper fingers are recessed, as at 14^x , so the lower fingers can rest flush with the upper fingers, and thereby make the smallest common point to receive the bag and insure a proper entry of the fingers into the open end thereof.

The mechanism at the end of the machine opposite the drive-shaft end is driven from the drive-shaft 7^y by a longitudinal shaft 31^x , having a bevel-gear at each end, one of which gears with a bevel-pinion on the drive-shaft before referred to, and the other one gears with a beveled pinion 32 on the cam-shaft 33 on the other end of the machine, as clearly shown in Fig. 1, the mechanisms at each end and the drive means therefor being relatively arranged to provide for an alternate operation of the two mechanisms.

Upon the cross-head 3 are two studs 3^x 3^x , upon each of which is mounted a hub 35 36, having intermeshing segmental gears 35^a 36^a , and on each hub are held two horizontal arms 37 37^a 38 38^a , secured by nuts 37^x 38^x for the purpose of adjustment for wide and narrow bags. One of the hubs 35 is also formed with an outwardly-extending horizontal arm 35^d , provided with a roller-bearing 35^e for engaging an adjustable device which controls the adjustment of the combined bag-pusher and spreader-arms. The guide 40 consists of a trough-like body having a central portion 40^a and two laterally-movable end portions 40^b 40^b , hinged to the central portion 40^a , as clearly shown. The central portion 40^a has a pendent trunnion 40^x , by which it is swingably mounted on the main frame. The movement of the guide 40 regulates the width the turning-arms open. The hinged ends of the guide 40 each have an outwardly-extending arm 40^f , that pivotally join with a connecting-bar 42, that passes over an arm or extension 41, forming a part of the trunnion-box, and said bar has a longitudinal slot 42^a to receive a stud f on the arm 41 to permit

of a ready adjustment of hinged ends 40^b of the guide, whereby to provide for releasing the tension of the arms 37 38 37^a 38^a on the bag just before the bag enters the large rolls. By reason of the peculiar construction of the guide 40 and its connection with the combined pusher and spreader arms it is manifest that as the cross-head reciprocates the two sets of arms will alternately spread and close at predetermined intervals to effect a spreading and pushing action and force the rear end of the bag out of the mouth and present the rear turned end to the guide-rolls, which guide said bag end into the larger off-take-rolls, from whence the turned bag is delivered onto the flier 50, operated by crank-and-lever devices 50^a 50^b (see Fig. 1) from the cam-equipped shaft in a well-known manner.

From the foregoing description, taken in connection with the accompanying drawings, it is thought the complete construction and operation of our invention will be readily understood by those skilled in the art to which it appertains.

The operation of the machine is entirely automatic and the several parts are especially combined to render the machine one of great capacity.

While we prefer to arrange the details as described and shown, it will be understood the same may be modified and varied without departing from the scope of the appended claims.

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

1. A bag-turning machine, comprising a support for receiving the bags, offtake devices for discharging the turned bag, a means for engaging and spreading the mouth of the bag, plunger devices for forcing the sewed end of the bag through the mouth and into position to be engaged by the offtake devices, and an automatically-operating means for picking up the bags and feeding them onto the mouth-spreading means, and placing the sewed ends in the path of movement of the plunger devices, as set forth.

2. In a bag-turning machine, including holders for engaging and holding the mouth of the bag and plungers for forcing the sewed end through the opened mouth; of automatically-operating pick-up mechanism for conveying the mouth end of the bag onto the holders and the sewed end in the plane of movement of the plungers, as set forth.

3. The combination with the offtake means and a plunger mechanism for turning the closed end of the bag through the mouth thereof; of an upper and a lower set of bag-receiving fingers, means for automatically closing the lower fingers against the upper fingers during the operation of fitting a bag thereon, and for simultaneously spreading the upper and lower fingers and dropping the lower fingers away from the upper, as they are being spread, for the purposes described.

4. In a machine as described, the combination with an offtake for discharging the turned bags, a means for receiving the mouth end of the bag and holding it in the plane of the offtake, and a turning mechanism consisting of a pair of independently-mounted arms movable in the plane of the offtake, and means for spreading said arms as they are moved in the direction of the said offtake and for closing them as the said arms move away from the offtake, all being arranged substantially as shown and described.

5. In a machine as described, the combination with the offtake-rolls, the guide-rolls in advance thereof, and the fingers for receiving the mouth end of the bag; of a cross-head reciprocable in the plane of the opposing surfaces of the offtake-rolls, a pair of horizontally-disposed arms independently fulcrumed on the cross-head to swing laterally in a plane therewith, said arms having a gear connection, an adjustable guide for controlling the lateral sweep of the arms and a connection joining said guide with one of the arms, substantially as shown and for the purposes described.

6. In a machine as described, the combination with the offtake-rolls, the reciprocating plunger-fingers movable in the plane of the offtake-rolls, bag-supporting fingers for receiving the mouth end of the bag, a support for holding the bags to be turned flatwise thereon, and an automatically-operating means for gripping the mouth end of the bag to lift it in the plane of the plunger-fingers, and onto the bag-supporting fingers, substantially as shown and for the purposes described.

7. The combination with the reciprocating plunger-fingers, bag-supporting members for receiving the mouth end of the bag, a support to one side of the plunger-fingers and in a plane below them, and a support over said fingers; of an automatically-operating pick-up mechanism, adapted to grip the bag, elevate it from the lower to the upper support and convey its mouth end onto the supporting-fingers, substantially as shown and for the purposes described.

8. In a machine as described, the combination with a laterally-extended support for receiving the bags flatwise, fingers for receiving

the mouth end of the bag, and a plunger mechanism operating in the plane of said fingers, and adapted to turn the end of the bag through the mouth and between the said fingers; of an automatically-operating pick-up mechanism, said mechanism including a frame, members carried thereby having gripper-jaws, adapted to automatically clamp the bags when pressed into contact therewith, a mechanism for reciprocating the frame vertically during one part of the movement, and laterally and vertically during the remaining portion of its movement, said mechanism also including tripper devices for releasing the grip from the bags after the bag has been conveyed onto the bag-receiving fingers, substantially as shown and for the purposes described.

9. In a mechanism for the purposes described, the combination with means for holding the mouth end of the bag open, and plungers for forcing the sewed part of the bag through the mouth thereof; of a pick-up mechanism having means for gripping the bag and conveying it onto the bag-receiving members, and a means for releasing the grippers when the bag is placed upon the receiving-fingers, substantially as shown and for the purposes described.

10. In a machine for the purposes described, the combination with a plunger for engaging the sewed end of the bag and forcing it through the mouth thereof; of a mechanism engaging the end of the bag, said mechanism including a pair of upper fingers, a pair of lower fingers in the vertical plane of the upper fingers, means for swinging the lower fingers in a vertical plane and for simultaneously lowering the said fingers, and moving them laterally, and also the upper fingers laterally, said means including spring devices for holding the fingers under tension, and intermediate devices including a cam and a cam-operated lever, substantially as shown and for the purposes described.

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