

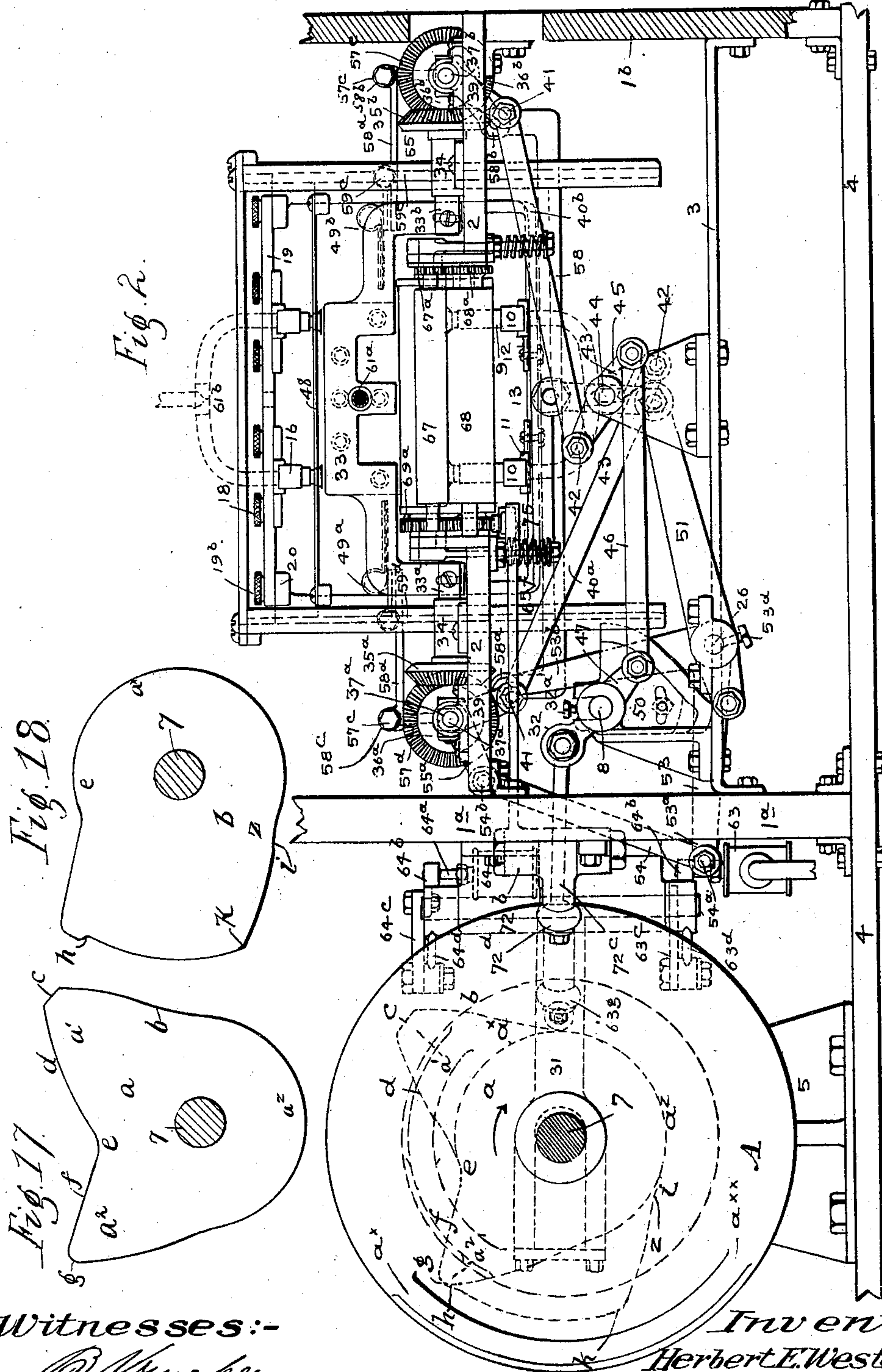
(No Model.)

5 Sheets—Sheet 2.

H. E. WESTERVELT.
MACHINE FOR FOLDING PAPER BAGS.

No. 599,752.

Patented Mar. 1, 1898.



Witnesses:-
B. Kucker
C. H. Schafer

Inventor
Herbert E. Westervelt

By his atty. J. B. Richell

(No Model.)

5 Sheets—Sheet 3.

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Fig. 3

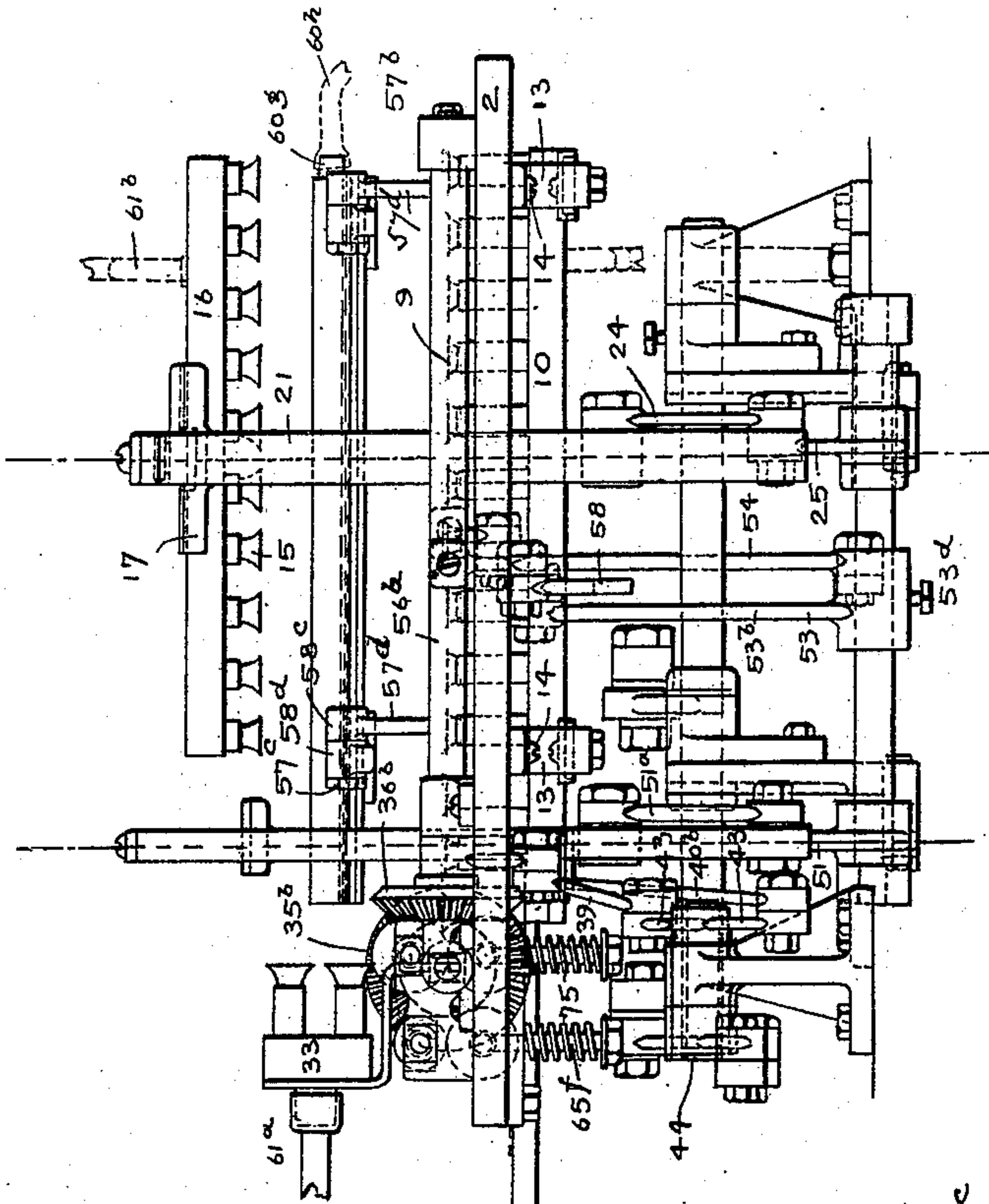


Fig. 8

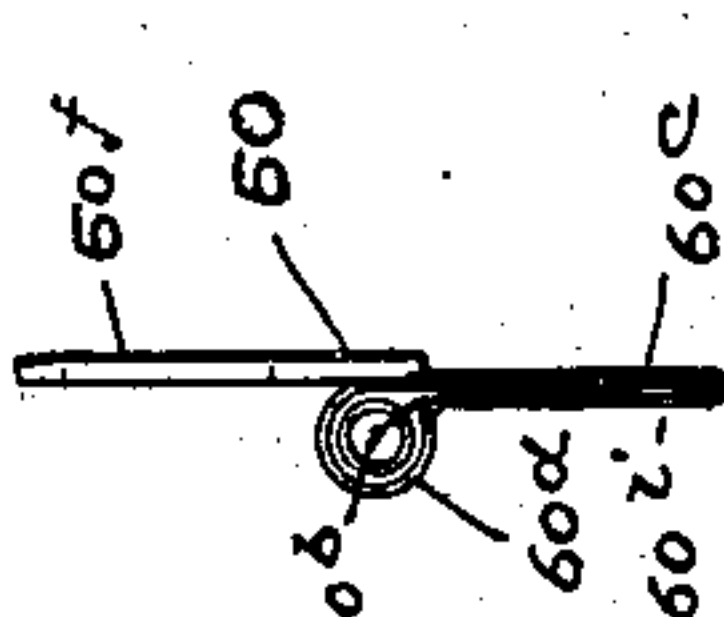


Fig. 7

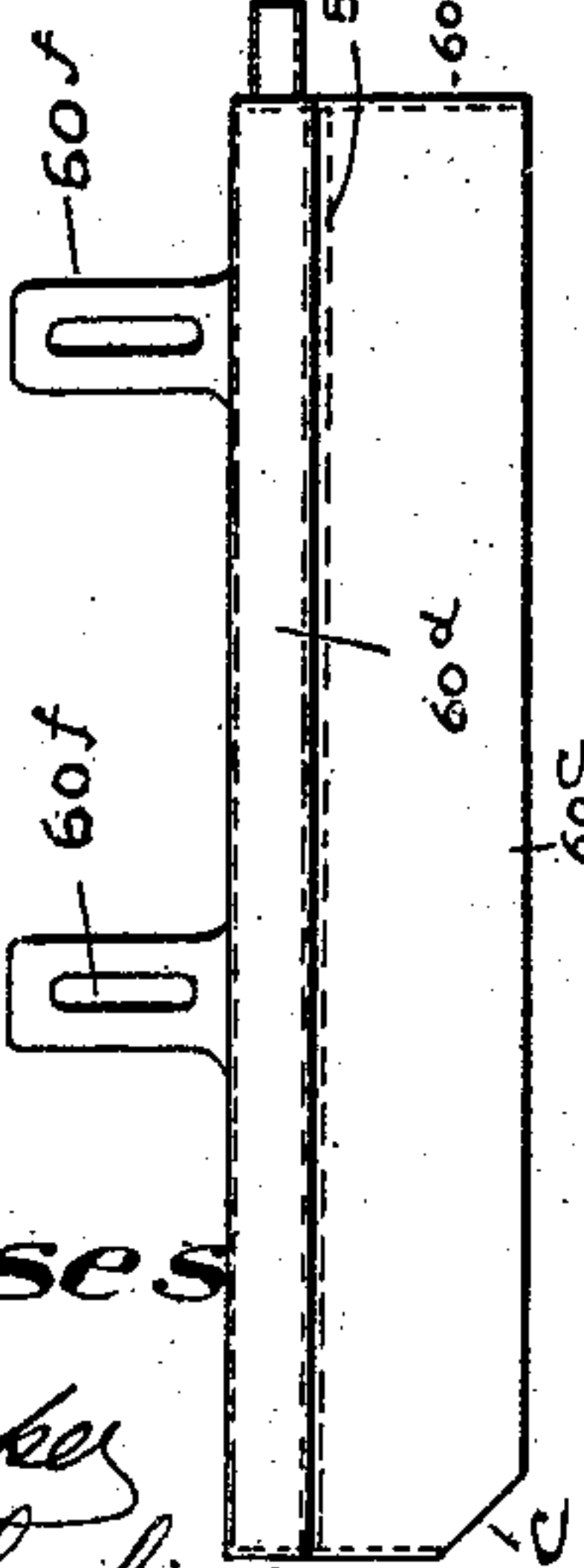


Fig. 10

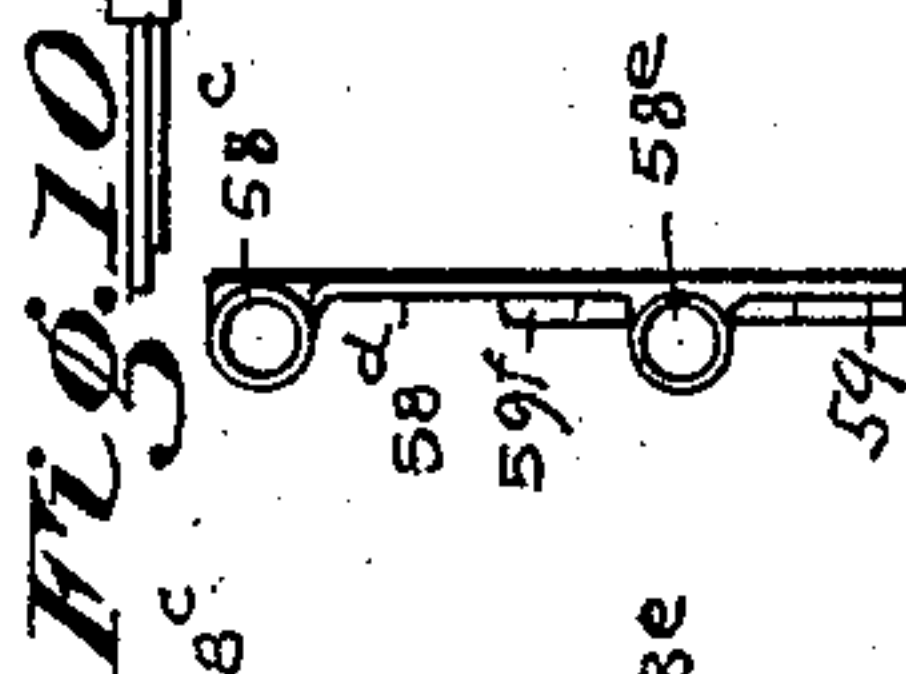


Fig. 9

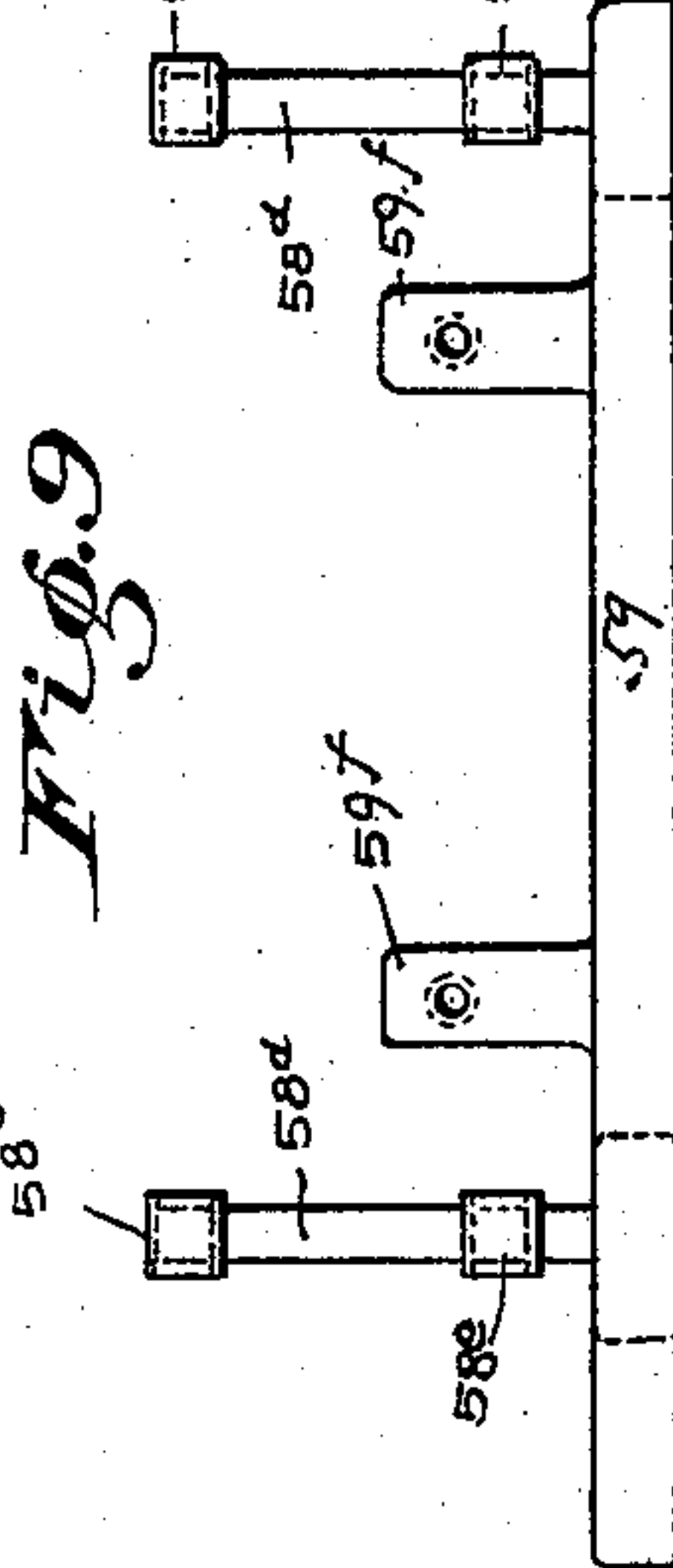


Fig. 12

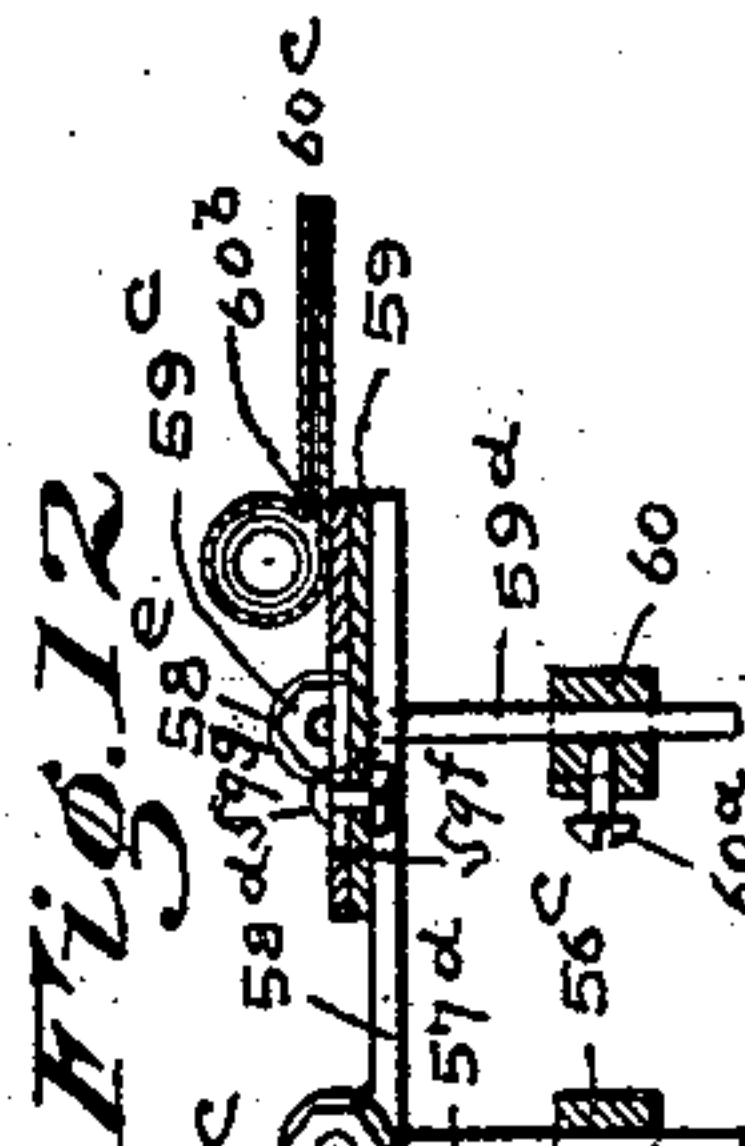
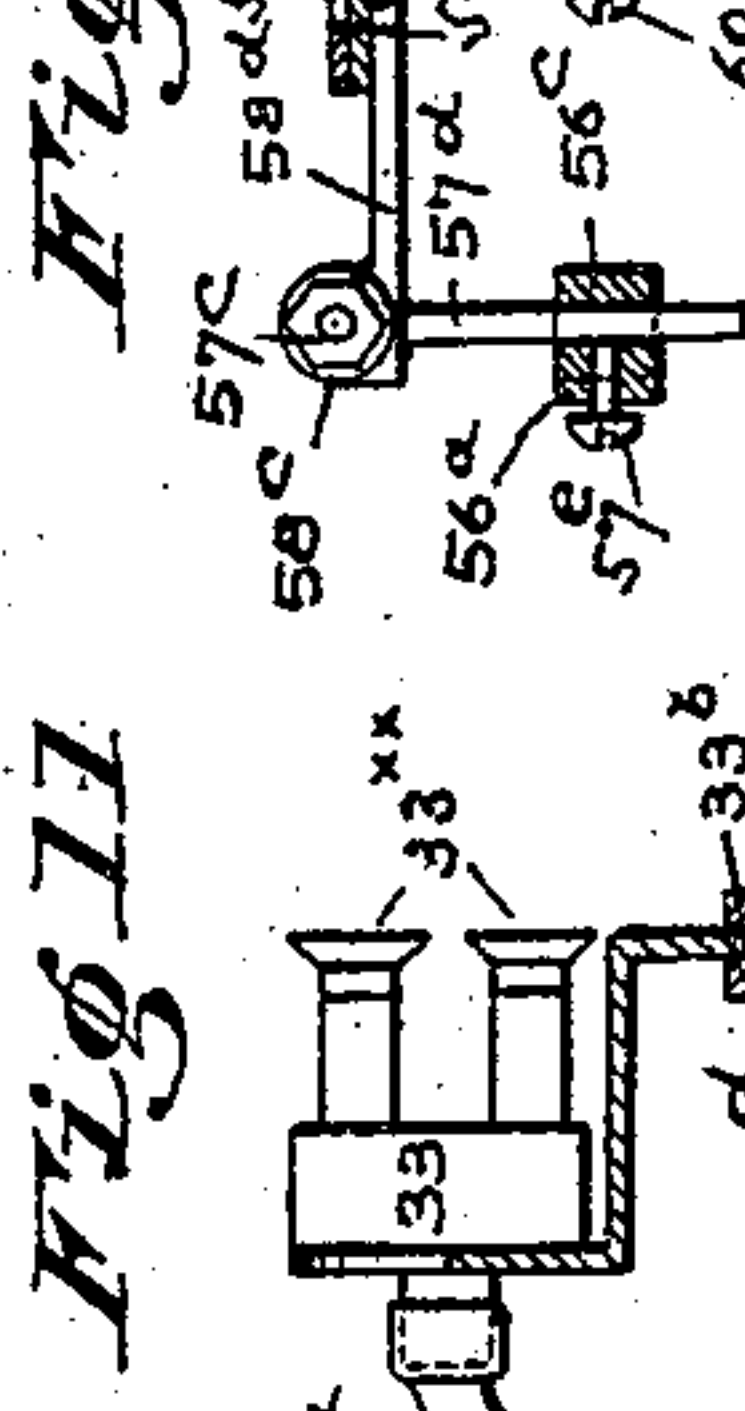


Fig. 11



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(No Model.)

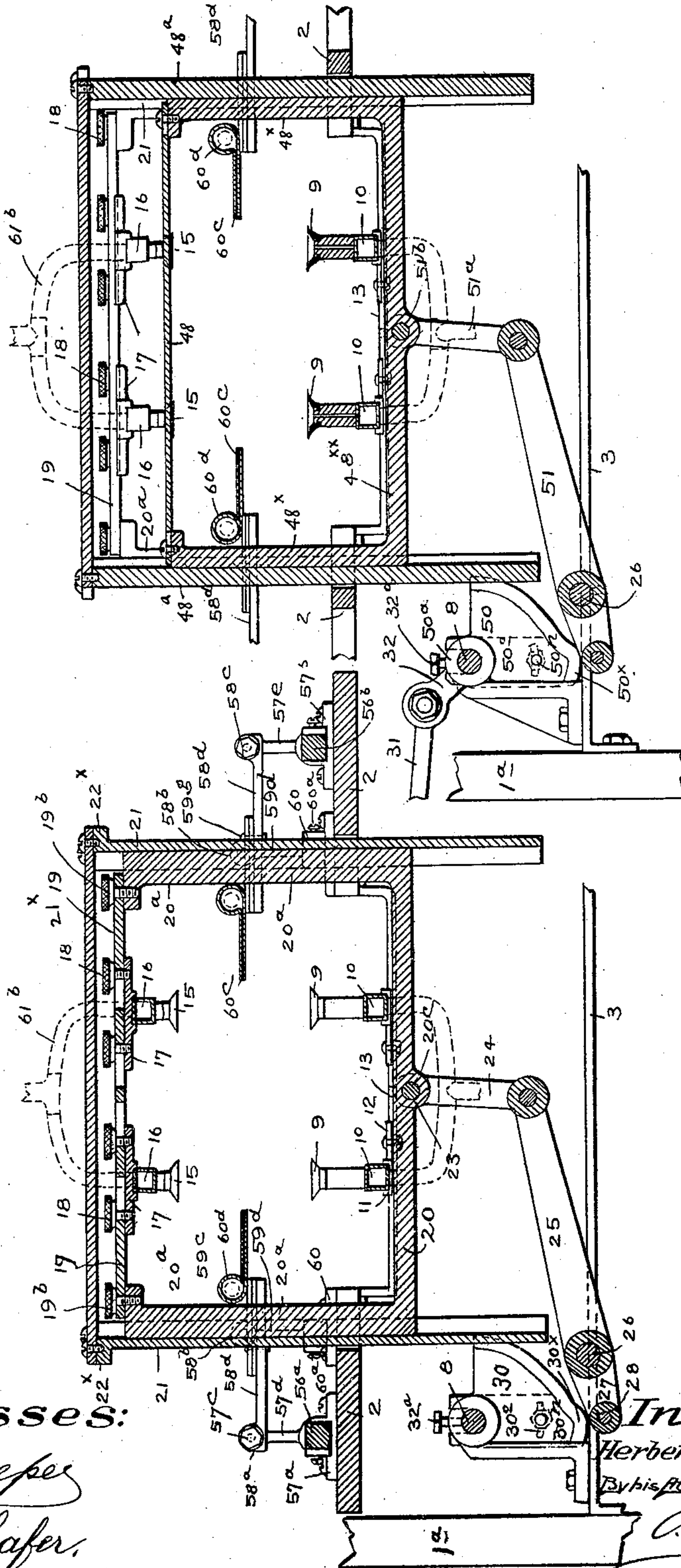
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Fig. 5



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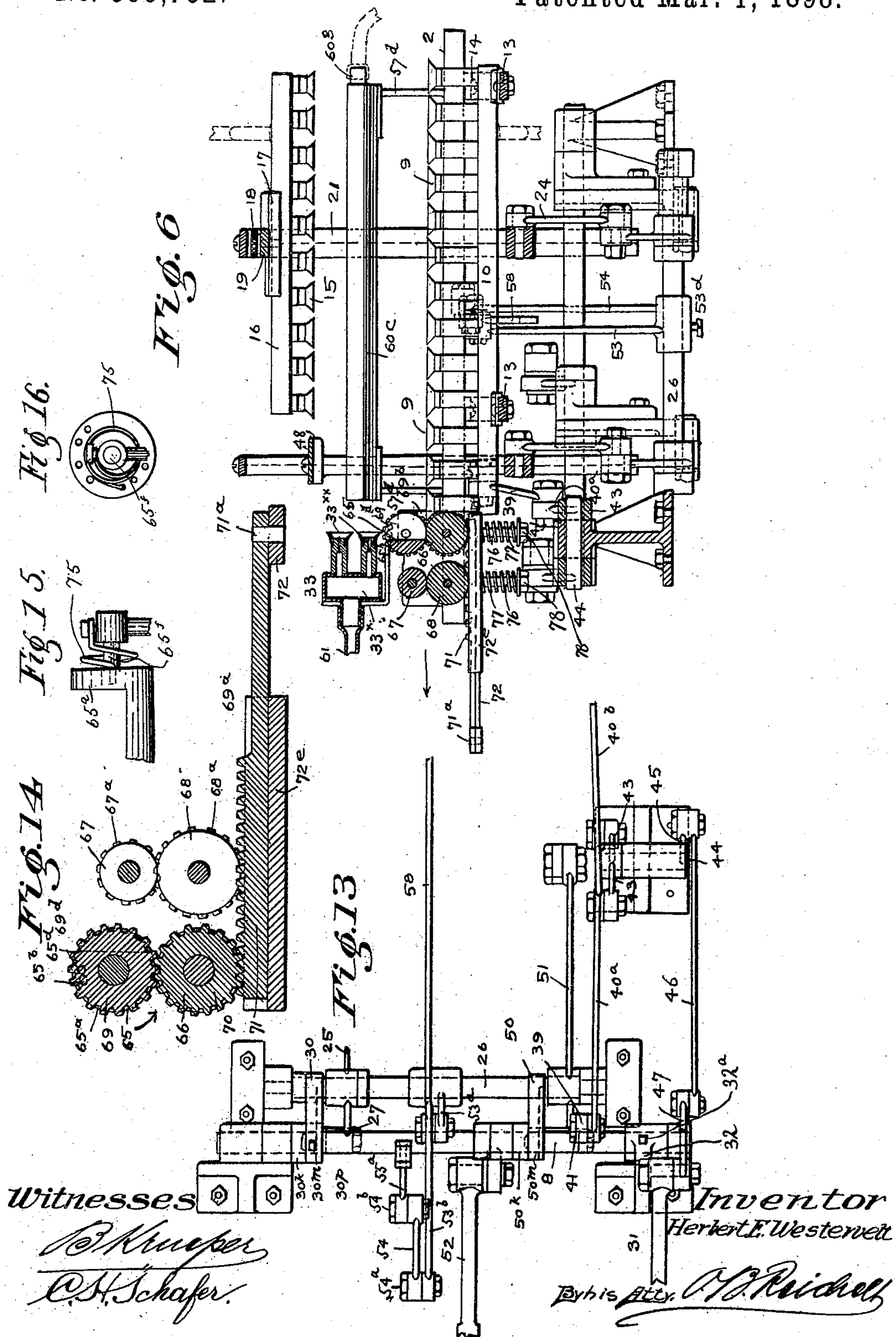
(No Model.)

5 Sheets—Sheet 5.

H. E. WESTERVELT.
MACHINE FOR FOLDING PAPER BAGS.

No. 599,752.

Patented Mar. 1, 1898.



UNITED STATES PATENT OFFICE.

HERBERT E. WESTERVELT, OF SOUTH BEND, INDIANA.

MACHINE FOR FOLDING PAPER BAGS.

SPECIFICATION forming part of Letters Patent No. 599,752, dated March 1, 1898.

Application filed August 16, 1897. Serial No. 648,398. (No model.)

To all whom it may concern:

Be it known that I, HERBERT E. WESTERVELT, a citizen of the United States, residing at South Bend, in the county of St. Joseph, State of Indiana, have invented certain new and useful Improvements in Machines for Folding Paper Bags, of which the following is a specification.

My invention relates to machines for converting satchel-bottom paper bags into what are known as the "self-opening" satchel bags, which form is more compact and neat and is found much more advantageous in practical use.

The object of my invention is to provide a machine which will receive the previously-completed satchel-bottom bag having a cross bottom fold only, two side marginal edges, a diamond-shaped satchel bottom turned flat in its middle line upon the cross bottom fold, the said machine having fixed sucker-bars upon which the bag rests to seize the surface of the under side of the bag, vertically-reciprocating sucker-bars to seize the surface of the uppermost side of said bag to pull the bag open, an oscillating bottom sucker-box to lift the bottom of the bag to a vertical position, and two parallel-moving blast-followers which are caused to follow the movement of the two parallel marginal side edges and direct a thin sheet of air against them to make bellows folds therein. The sides of the bag are thus turned inwardly in two overlaying sections, which are subsequently pressed down to form the usual folds of an ordinary self-opening satchel bag, the material of which is firmly held with precision while being refolded without shifting the bag and without the latter being pressed upon in the folds by the edges of folding and pressing plates, the sharp edges of which are liable to tear the material.

To these and other ends contributory to the perfect refolding of the bag, as stated, my invention consists in certain constructions, combinations, and arrangements of parts and of novel mechanism for operating the same, as will hereinafter appear.

The mechanism by which I carry out my invention is shown in the drawings, in which—

Figure 1 is a plan view of my refolding-paper-bag machine; Fig. 2, an end elevation

looking from the discharge end-of the machine; Fig. 3, a side elevation thereof; Fig. 4, a transverse section in line xx of Fig. 1 and in the line of the reciprocating slide of the movable sucker-bars, showing the means for operating the same; Fig. 5, a similar section in line yy of Fig. 1, showing the bottom cross-fold plate and its operating mechanism; Fig. 6, a central longitudinal section of the machine in line zz of Fig. 1. Figs. 7, 8, 9, and 10 are details of the plates for adjusting the blower-wings; Fig. 11, a sectional side elevation, in enlarged detail, of the bottom suction-box; Fig. 12, a similar view of one of the blast-followers; Fig. 13, an enlarged plan view of the secondary cam-shaft and rock-shafts with the connecting-gear; Fig. 14, an enlarged longitudinal sectional detail of the mechanism for withdrawing the bag from the machine; Fig. 15, a plan of, and Fig. 16 an end view of, the end of the mutilated roller of said mechanism, showing the spiral spring upon the spindle of said roller; Figs. 17 and 18, diagrams of the cams on the main driving-shaft.

The figures of the drawings show the parts in their initial or normal position, the sucker-bars being raised, the oscillating bottom sucker-box turned back to its vertical position, the side-fold blast-followers turned, raised, and drawn back, and the cross-fold plate also raised to receive the paper bags as they come from the machine in the usual manner and before they are folded.

The side frames $1^a 1^b$ of the machine support longitudinal side plates 2, upon which the upper sets of shafts are supported, the lower set of shafting being supported upon bearings secured to the lower cross-plates 3 3, extending from one side frame to the other. The side frames rest upon and are secured to a base cross-plate 4, which projects from one side of the frame at each end thereof, to which are secured pillow-blocks 5, having bearings 6 for the ends of a cam-shaft 7, from which the several mechanisms comprising the machine are operated.

The lower cross-plates 3 3 support the ends of a rock-shaft 8, arranged parallel and adjacent to the side frame 1^a nearest the cam-shaft and supporting the several crank-arms and secondary plates which operate the bag

opening and refolding mechanism, as herein-after described.

The bag is placed longitudinally in the machine to rest upon a bed of stationary sucker-nipples 9, supported upon longitudinal hollow bars 10, held by clips 11, having plates 12 adjustably secured upon slotted cross-bars 13, bolted at their ends by means of bolts 14 in a suitable manner for adapting the said bars and nipples to be placed near the sides of bags of varying widths, the said bars extending the entire length of the bag, thus permitting the sucker-nipples to hold the bag firmly upon the under side in proper position for folding it without in any way damaging the material of which the bag is made.

The upper side of the bag is seized when the bag is to be opened by sucker-nipples 15, supported upon hollow bars 16, placed directly over the bars 10 and adjustably secured transversely by cross-plates 17 and clamping-screws 18 to the slotted top cross-plate 19 of a slide 20, the guide-plates 20^a of which have a V-shaped edge to slide in corresponding grooves in vertical guide-bars 21, the latter being secured by lugs 22, projecting therefrom to rest upon the plates 2 of the frame, the said guide-bars passing through slotted or recessed openings in the longitudinal side plates of the frame, and the upper ends of said guide-bars have lugs 22^x bolted to the ends of a top plate 21^x, which serves to connect said guide-bars and hold them parallel and rigid.

The top cross-plate 19 has slotted lugs 19^a projecting forwardly at the ends thereof, and the guide-plates 20^a have oppositely-disposed lugs 20^b, upon which rests the said top cross-plate, and receive clamping-screws 19^b to pass through the slots in the lugs 19^a and thus admit of the longitudinal adjustment of the sucker-bars 16 to adapt them to bags of different lengths. The cross-bar of the slide 20 has an eye 20^c to receive the pin 23 of a link 24, which latter connects said slide with one end of the long arm of a vibratory lever 25, supported upon a rock-shaft 26, a pin 27 upon the short arm of the lever 25 having a roller 28 journaled thereon and adapted to be pressed upon by a secondary or rocking cam 30, secured to the rock-shaft 8 and driven from the main cam-shaft 7 in a manner described as follows:

The first cam, as shown in detail in Fig. 16, has a double throw a' a^2 and is secured to a disk A, keyed to the shaft 7, and comprises an initial concentric section a^z , including an approximate half-circle, an initial outwardly-extending section b , a short concentric section c , a return-section d , a rounded inner section e , a secondary outwardly-extending section f , an outer point-section g , and a second return-section h , the latter terminating at the beginning of the initial concentric section. The double-throw cam a is connected with and rocks the shaft 8, two movements to each revolution of the cam-shaft 7, thus

reciprocating the top sucker-slide and oscillating the bottom sucker-box, hereinafter described, twice to each single movement of the bottom cross-bar and blast-followers in forming the bag in the following manner:

A connecting-rod 31 is slotted at one end to receive the cam-shaft 7 and admit of being guided and reciprocated against the cam a of the disk A by means of a roller 31^x on said rod and is secured at its other end to a crank-arm 32, fixed to the shaft 8 by set-screws 32^a and rocks said shaft, one movement for each throw a' a^2 of the cam a , secured to the main cam-shaft. The cam 30, secured to the rock-shaft 8, is thus rocked twice to every revolution of the main cam-shaft, and the lever 25 is thus vibrated twice to raise and lower the top sucker-slide first to take hold of the bag and open it and then to close the bag and after releasing it move up out of the way to receive a new bag.

While the top suckers take hold of the top of the bag, the bottom suckers closely follow both movements of the top suckers and successively open and close the bottom of the bag coincidently with the movement of said top and bottom suckers.

The bottom suckers are constructed and operated as follows: The bottom sucker-box 33 is suitably formed of a body-shell 33^x, provided with sucker-nipples 33^{xx}, secured at its ends to two short shafts 33^a 33^b, respectively, journaled in bearings 34, bolted to the longitudinal side plates 2 of the frame, the inner ends of said shafts being outside the path of the bags. The outer ends of the shafts 33^a 33^b are secured to miter-pinions 35^a 35^b, which latter engage with miter-pinions 36^a 36^b, secured to shafts 37^a 37^b, supported in bearings 38^a 38^b, also supported upon the side plates 2 of the frame, the said plates being cut away to receive the miter-wheels and also to receive crank-arms 39, secured to the shafts 37^a 37^b, by which means the shafts 33^a 33^b may be connected and oscillated coincidently below the path of the bag by means of connecting-rods 40^a 40^b, secured to said crank-arms by pins 41 at one end and secured by pins 42 at the other end to crank-arms 43, fixed upon a short rock-shaft 44, bolted to the lower cross-plate 3, the said shaft 44 being coupled by a crank 45 and connecting-rod 46 with a crank 47, fixed securely to the rock-shaft 8. The sucker-box 33 is connected to angle-plates at its ends, which are slotted and pass through slots 33^c in the shafts 33^a 33^b to admit of being adjustably secured thereto by set-screws 33^d and also to allow the box to be removed and another box of different size substituted therefor to suit bag-bottoms of different sizes.

When the top and bottom suckers have properly opened the bag and the latter is ready to be folded with bellows side folds, the bottom cross-plate 48 is brought down in front of the folding bottom to define the cross fold at the bottom of the bag and a pair of blast-followers 49^a 49^b are caused to move toward

and follow the middle fold or longitudinal edge-line of the bag and all descend together with the top and bottom suckers in a suitable manner to fold the bag without pressing upon any of its folded, creased, or contact surfaces with plates or other hard and unyielding substances.

The bottom cross-plate 48 is secured to the upper end of slide-bars 48^x, the lower ends of said slide-bars being connected by a bottom cross-bar 48^x, forming a rectangular frame, the slide-bars being held to reciprocate between suitable guide-rods 48^a, secured in a suitable manner to the side plates 2 of the frame.

The bottom cross-plate is operated by mechanism similar to that for operating the top sucker-slide—that is, a secondary cam 50, similar to the secondary cam 30, is held by a collar 50^a to oscillate upon the rock-shaft 8 and presses upon a roller upon the short end of a vibratory lever 51, secured upon the shaft 26, the end of the long arm of said lever being connected by a link 51^a and pin 51^b to the middle of the cross-bar of the slide of said bottom cross-plate.

Both of the cams 50 and 30 have an end shoulder 50^x 30^x, which gives a quick movement at the initial part of the downward movement of the slides operated thereby, and the cam-surfaces approach the shaft in such manner as to gradually reduce the speed of the said bottom cross-plate and top sucker-slide as they are drawn down to the level of the bed upon which the bag is placed by means of the links 51^a 24, levers 51 25, and cams 50 30, which latter are operated independently of each other from the cam-shaft 7, as hereinafter described. The cams 50 and 30 each comprise two sections 50^k 50^m and 30^k 30^m, the sections 50^k 30^k having a hub to fit the shaft 8 and a set-screw 50ⁿ 30ⁿ, passing through said section and also through a segment-slot 50^o 30^o in the adjustment-plates 50^m and 30^m, which latter have a yoke to fit the shaft 8. The adjustment-plate 50^m has a crank-arm integral therewith and is journaled loosely upon the shaft 8, and the adjustment-plate 30^m has a set-screw 30^p to secure it upon said shaft, the latter being rocked by the said shaft and the cam-plate 50^m being rocked independently thereof by means of a connecting-rod 52, having a slotted end 52^a, similar to the corresponding end of rod 31, (shown by dotted lines in Fig. 2,) to receive the shaft 7, and a roller 52^b, journaled to a pin thereon, which is acted upon by the double-walled cam *b*, secured to the disk B of the cam-shaft.

The cam *b* upon the disk B (shown by dotted lines, Fig. 2) works both the bottom cross-plate 48 and the blast-followers for folding the bag, as hereinbefore described, and is shaped as shown by dotted lines in Fig. 2, the concentric part *z a^x e* serving to hold the said bottom cross-plate and blast-followers inoperative in their raised positions until the bag has been opened by the top and bottom

suckers and until the said parts are ready to start down to fold the bag, at which point, the cam *b* being coincident with *e f g* of the cam *a*, the bottom cross-plate, blast-followers, top suckers, and bottom suckers will all go down together when the bag is folded. The cam *b* has a quick return *h*, directly following the point *g* for a short distance, sufficient to allow the bag full clearance, both from the bottom cross-plate and the blast-followers, when it is withdrawn and delivered from the machine.

From *h* the cam *b* has a concentric section to *k* and then a return-section from *k* to *i*, (the initial point coincident in both of the cams *a* and *b*,) by which means the bottom cross-plate, bottom sucker-box, top sucker-bar, and blast-followers are restored to their normal position and state of rest to thus receive the next bag to be folded.

The shaft 26 is rocked once by the cam *b* by means of the rod 31, and arm 32, and supports a forked or double-armed lever 53, secured thereto by a set-screw 53^d, the arm 53^a thereof being connected by link 54 and pins 54^a 54^b with a crank-arm 55^a upon a square rock-shaft 56^a, supported in bearings 57^a and upon the side plates 2, longitudinally of the machine, and the arm 53^b of said double-armed lever being connected by a link 58, having up-turned ends and pins 58^a 58^b, one to connect said link to the arm 53^b and the other to connect the link 58 with a crank-arm 55^b upon a square rock-shaft 56^b, supported in bearings 57^b and upon the said side plates 2, longitudinally upon the side of the machine opposite the shaft 56^a, the said shafts 56^a and 56^b being thus coupled together to be rocked alternately toward and away from each other during the movement of the cam *b* while the roller 52^b of the connecting-rod 52 is in contact with the sections *e g k z i* thereof and hold said shafts 56^a 56^b from turning while the roller 52^b is in contact with the concentric portion *i e* of the said cam. The shafts 56^a and 56^b are mortised at 56^c to receive at each end square arms 57^d, secured by set-screws 57^e at either end thereof and provided at their upper ends with pins 57^c, which pass through eyes 58^c upon the outer ends of coupling-bars 58^d, the inner ends of said bars having eyes 58^e to receive pins 59^c upon the upper ends of square arms 59^d, which are adjustably secured in square mortises of rocking studs 60 by set-screws 60^a thereon in a manner similar to that of the adjustment of the corresponding arms 57^d upon the shafts 56^a 56^b, the rocking studs 60 being supported in bearing-blocks 61, supported upon the side plates 2 of the frame, thus providing a double system of parallel-moving coupling-bars 58^d upon each side of the machine. The coupling-bars 58^d are thus adapted to support longitudinal plates 59, having lugs 59^f adjustably secured upon lugs 60^f of the coupling-bars 60 of the follower-plates by means of clamping-bolts 59^g, and the said coupling-

bars 60 are affixed to correspondingly-arranged air-tubes 60^a, slotted longitudinally at 60^b and provided with parallel follower-plates 60^c, secured one above the other and leading to the said slots, the rear ends of the plates 60^c being beveled at an angle of forty-five degrees, and the remaining part of the ends of said plates are closed, thus providing a duct for a thin sheet of air to issue from the air-tubes to be directed against the sides of the bag when it is opened, the said plates, arms, and shafts providing parallel-movement followers 60^d, which will direct the air in a horizontal line against the opposite sides of the bag and follow said line until it is completely folded down to form the bellows-fold sides, the bevelled corners *c* of the follower-plates 60^c serving to direct the blast against the reëntrant and connecting angle of the bag while the latter is being folded.

The air is withdrawn from the bottom sucker-box 33 and from the hollow top sucker-bars 16 by means of rubber air-pipes 61^a 61^b, leading, respectively, therefrom to an exhaust-pump through a valve 63, which is operated by a stem 63^a, carrying a crank-arm 63^b, the latter being connected by a link 63^c, crank-arm 63^d, and rocking pin 63^e to a rocking arm 63^f, having a ball-roller 63^g upon its vibratory end, which is operated upon by a face-cam *d* upon a disk D, secured to the cam-shaft 7, the face-cam being so located upon the said disk that the air-valve will be held open to receive the suction of the air-pump while the nipples of the top sucker-bars and the bottom sucker-box are in contact with top and bottom of the bag, and the said valve will be closed when the suction is to be removed from the nipples and the bag is to be set free.

The blast-follower air-tubes 60^a are connected by rubber air-pipes 60^b with a valve 64, connected to the discharge end of an air-pump, the stem 64^a of said valve carrying a crank-arm 64^b, the latter being connected by a link 64^c, crank-arm 64^d, and rocking pin 64^e to a rocking arm 64^f, having a ball-roller 64^g upon its vibratory end, the said ball and crank-arm being operated by a face-cam *e* upon a disk E, secured to the cam-shaft 7, the face-cam serving through the means described to open the valve 64 and direct the air to the blast-followers while the latter are being moved toward the sides of the bag to fold it and to close the valve after the bag has been folded and until a new bag is opened, as hereinbefore described, and ready to be folded.

After the bag has been folded it is withdrawn from the rear end of the machine by means of two sets of rollers 65 66 and 67 68, supported in housings 69^a 69^b, secured to the under side of the side plates 2 of the machine, the said rollers being constructed and operated in the manner as follows: The rollers 65 and 66 are geared together and connected with and operated intermittently from the cam-shaft 7, and the rollers 67 and 68 are

geared together by pinions 67^a 68^a and operated continuously by suitable means.

The upper roller 65 is mutilated longitudinally the full width of the widest bag to be folded, thus providing the roller with a flat face or abutment, against which the end of the bag may be placed when it is put into the machine, and also with end disks 65^a, one of which carries a pin 65^b, projecting outwardly therefrom and also having a journal 65^c adjacent thereto to receive a gear-pinion 69, adapted to turn freely thereon and provided with a pin 69^d upon its inner face to engage with the pin 65^b of the disk and rotate the same.

The lower roller 66 is a plane-surfaced roller and has a gear-pinion 70 secured thereto to engage with the pinion 69, and a rack-bar 71 is supported in a suitable slide-box 72^c, cast upon the housing 69^a, and engages with the pinion 70 at its end.

A lever 72 has a slot 72^a in the end thereof to receive a pin 71^a on the end of rack-bar 71 and is supported in bearings 72^b, secured to the side rails of the frame.

The short arm 72^c of the lever 72 is provided with a ball-roller 72^d, which is operated upon by a face-cam *a*^x *a*^{xx}, secured to the outer face of the disk A upon the cam-shaft, the initial point *a*^x of said cam being arranged upon the face of the disk A in such relation to the cam *a* that they will be operated to take hold of and commence to withdraw the bag from the machine as soon as it has been folded and the top suckers and bottom cross-plate slightly raised to free the bag therefrom and complete the withdrawal of the bag before the several folding devices shall have reached their raised normal position.

When the bag is to be withdrawn from the machine, top edge 65^d of the upper mutilated roller 65 will have turned in the direction of the arrow, Fig. 14, and pinched the rear edge of the bag-bottom against the bottom roller 66, and as the pinions of both rollers are geared together and as the upper gear-pinion engages by its pin with a pin on the disk of the mutilated roller the two rollers will turn together to seize the bag and draw it rearwardly until it is caught between two rollers 67 and 68, geared together by pinions 67^a and 68^a, and placed one above the other to rotate at the same surface speed in bearings in the housing-plates, the rollers 67 and 68 being driven continuously from any suitable moving part of the machine at an accelerated speed to quickly withdraw the bag from the machine after it has been caught between them. The pinions 67^a and 68^a of the rollers 67 and 68 are placed upon the side of the machine opposite the side upon which the pinions 69 and 70 are located and are entirely disconnected from each other. The surface speed of the rollers 65 and 66 being less than that of the rollers 67 and 68, the bag when withdrawn by the rollers 67 and 68 will pull

upon the mutilated roller 65 and turn it more rapidly. This is provided for by the mutilated roller being loose upon its spindle and connected therewith by the pin on the gear pressing against the pin on the disk at one end of the roller 65, as hereinbefore described, and also by a spiral spring 75, which encircles the spindle 65^f at the other end of said mutilated roller and is connected, respectively, to the end of said roller and to a suitable fixed part of the machine—as, for instance, to the bearing or housing at the adjacent end thereof—as shown in Fig. 15. By this means when the more rapidly moving roller 67 68 pulls upon the bag the spring 75 will allow the mutilated roller to yield and the bag to be drawn forward from beneath it quickly, the spring-pressed edge of the mutilated roller simply resting with a slight pressure regulated by the strength of the spring, which latter may be made adjustable in a suitable manner by placing the end of the spring in any one of a series of holes in the disk of the mutilated roller, as shown in Fig. 16, to allow the bag to be withdrawn without being torn or injured by the resistance of the mutilated roller.

The journals of the upper rollers 65 and 67 of the bag-withdrawing mechanism are supported in sleeves upon the upper ends of rods 76, which pass through the plate 2 and are encircled by springs 77, which bear between the said plate 2 and nuts 78, screwed upon the ends of the rods 76 to adjust the springs and adapt the said rollers 65 and 67 to press with greater or less force upon the bag to suit the strength of the material and the size of the bag.

I claim as my invention and desire to secure by Letters Patent—

1. In a machine for folding satchel-bottom bags, the combination with a bag-opening mechanism, the side-folding and bottom-folding mechanisms and a bed comprising sucker-nipples fitted upon longitudinal hollow bars connected with an exhaust, substantially as described.

2. In a machine for folding satchel-bottom bags, the combination with a bag-opening mechanism of side-folding and bottom-folding mechanisms and a bed comprising sucker-nipples fitted upon longitudinal hollow bars connected with an exhaust and means for adjusting said bars laterally upon the frame, substantially as described.

3. In a machine for folding satchel-bottom bags, the combination with the suction-bed of the bottom-folding mechanism, the side-folding mechanism and sucker-nipples fitted upon hollow bars connected with an exhaust and a vertically-reciprocating slide to which said bars are secured to be raised and lowered for opening the bag, substantially as described.

4. In a machine for folding satchel-bottom bags, the combination with the suction-bed of a bottom-folding mechanism, a side-folding

mechanism, a vertically-reciprocating slide and hollow bars having sucker-nipples fitted thereon connected with an exhaust and adjustably secured upon said slide, substantially as described.

5. In a machine for folding satchel-bottom bags, the combination with the bed of means for opening the body of the bag, a top-holding mechanism, a side-folding mechanism and an oscillating bottom holding and folding suction-box, substantially as described.

6. In a machine for folding satchel-bottom bags, the combination with the bed of means for opening the body of the bag, a top-holding mechanism, a side-folding mechanism, a box provided with sucker-nipples supported upon journals and adapted to oscillate at the discharge end of the machine to open and hold the bottom of the bag, substantially as described.

7. In a machine for folding satchel-bottom bags, the combination with a bed, of a bag-opening mechanism, a top-holding mechanism, a side-folding mechanism and a bottom suction-box having side plates, two oscillatory shafts slotted to receive the ends of said side plates and clamping devices for adjusting and holding said plates on the shaft, substantially as described.

8. In a machine for folding satchel-bottom bags, the combination with a bed of a bag-opening mechanism, a top opening and holding mechanism, a side-folding mechanism, a bottom suction-box having side plates to bridge the bed for the passage of the bag, twin shafts each having miter-wheels arranged upon opposite sides of the frame, a driving-shaft and a gear connecting said miter-wheels and driving-shaft, substantially as described.

9. In a machine for folding satchel-bottom bags, the combination with a bed of a bag-opening mechanism, a side-folding mechanism, a bottom opening and holding suction mechanism, a vertically-reciprocating slide and a bottom cross-fold plate secured thereto and reciprocated coincidently with the movement of the side-folding mechanism, substantially as described.

10. In a machine for folding satchel-bottom bags, the combination with a bed, a bag-opening mechanism, side-folding mechanism, an oscillatory bottom suction-box adapted to open the bottom at its first oscillation to hold the bottom while the latter is being folded by a second oscillation and a bottom cross-fold plate adapted to press upon the top of the bag in close proximity to the bottom cross fold during said second oscillation of the bottom suction-box, substantially as described.

11. In a machine for folding satchel-bottom bags, the combination with a bed of a bag-opening mechanism, a top-holding mechanism and blast-followers supported to move toward the edge fold of the bag and direct an air-current against each side of the bag for folding the same, substantially as described.

12. In a machine for folding satchel-bottom

bags, the combination with a bed of a bag-opening mechanism, a top-holding mechanism, a bottom suction-box adapted to open and hold the bottom of the bag and blast-fol-
 5 lowers adapted to follow and direct a blast of air against the sides of the bag for folding the same, substantially as described.

13. In a machine for folding satchel-bottom bags, the combination with a bed of a bag-
 10 opening and top-holding mechanism, a bottom suction-box adapted to open and hold the bottom of the bag, a reciprocating bottom cross-fold plate, and blast-followers adapted to follow and direct a blast of air against the
 15 sides of the bag for folding the same, substantially as described.

14. In a machine for folding satchel-bottom bags, the combination with a bed, a bottom-opening mechanism, means for folding in the
 20 sides of the bag, a reciprocating slide carrying a top-opening suction mechanism, a link, a rock-shaft, a rocking lever, a secondary cam-shaft, a cam and a driving cam-shaft connected therewith, substantially as described.

25 15. In a machine for folding satchel-bottom bags, the combination with a bed, a bag opening and holding mechanism, means for folding the sides of the bag, a reciprocating slide carrying a bottom cross-fold plate, a link and
 30 rock-shaft, a rocking lever, a secondary cam-shaft and cam and a driving cam-shaft connected therewith, substantially as described.

16. In a machine for folding satchel-bottom bags, the combination with mechanism for
 35 opening the bag, mechanism for folding the

bellows side folds therein, of a mutilated roller, and a bottom roller geared thereto and means for rotating said rollers to grip and withdraw the bag, substantially as described.

17. In a machine for folding satchel-bottom
 40 bags, the combination with mechanism for opening the bag, mechanism for folding the bellows side folds therein, a mutilated roller, a bottom roller geared thereto and a reciprocating rack-bar adapted to engage with said
 45 roller-gearing, substantially as described.

18. In a machine for folding satchel-bottom bags, the combination with mechanism for opening the bag, mechanism for folding the bellows side folds therein, a mutilated roller
 50 having a stop-pin at one end thereof, a spring connecting said roller with a fixed part of the machine, a gear thereon also provided with a stop-pin, a bottom roller and means for rotating said rollers, substantially as described. 55

19. In a machine for folding satchel-bottom bags, the combination with mechanism for opening and folding the bag, of a mutilated roller and bottom roller at the rear end of the machine driven intermittently and two roll-
 60 ers at the rear thereof driven at an accelerated speed, substantially as described.

In testimony that I claim the foregoing as my invention I have signed my name in the presence of two subscribing witnesses.

HERBERT E. WESTERVELT.

Witnesses:

B. KRUEPER,
 GEORGE GOETZ.