

No. 621,881.

Patented Mar. 28, 1899.

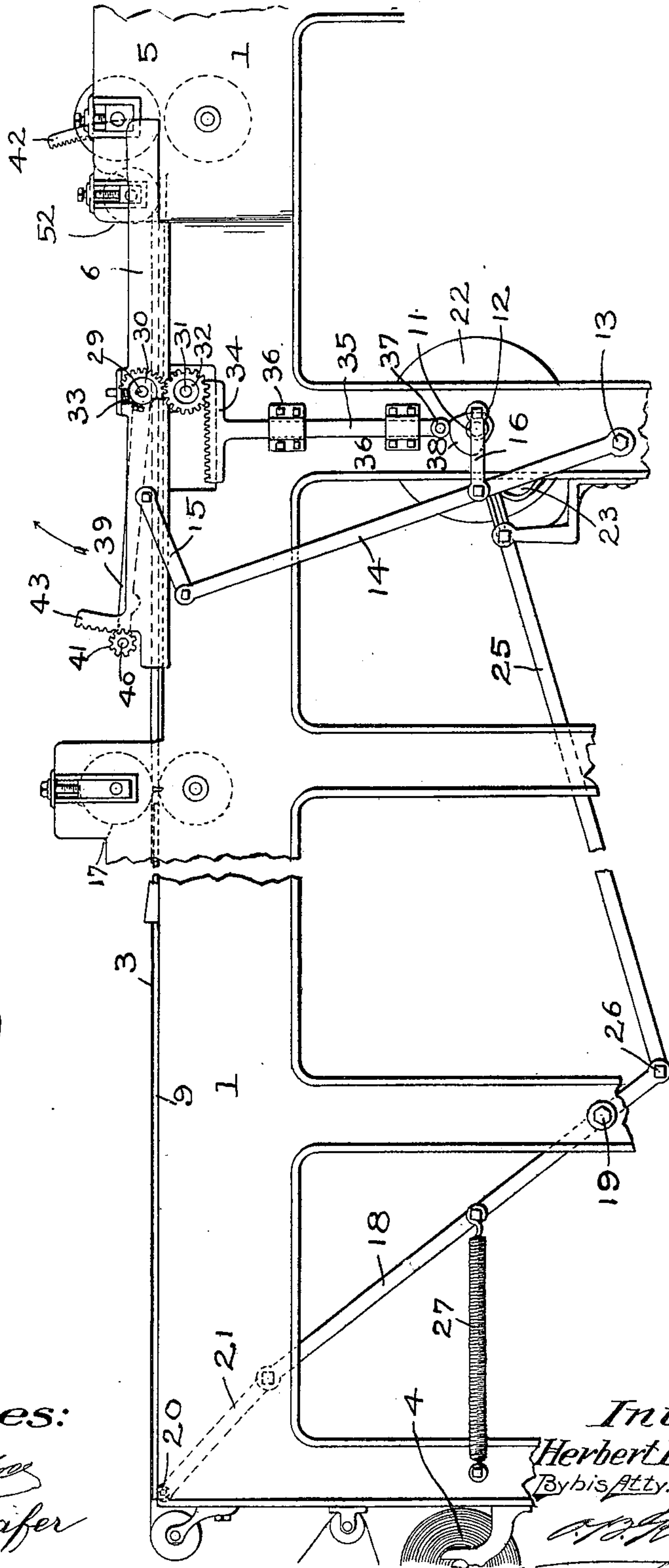
H. E. WESTERVELT.
PAPER BAG MACHINE.

(Application filed Dec. 27, 1897.)

(No Model.)

5 Sheets—Sheet 1.

Fig. 1



Witnesses:

Wm. H. Schaefer
C. H. Schaefer

Inventor

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By his Atty.

W. H. Schaefer

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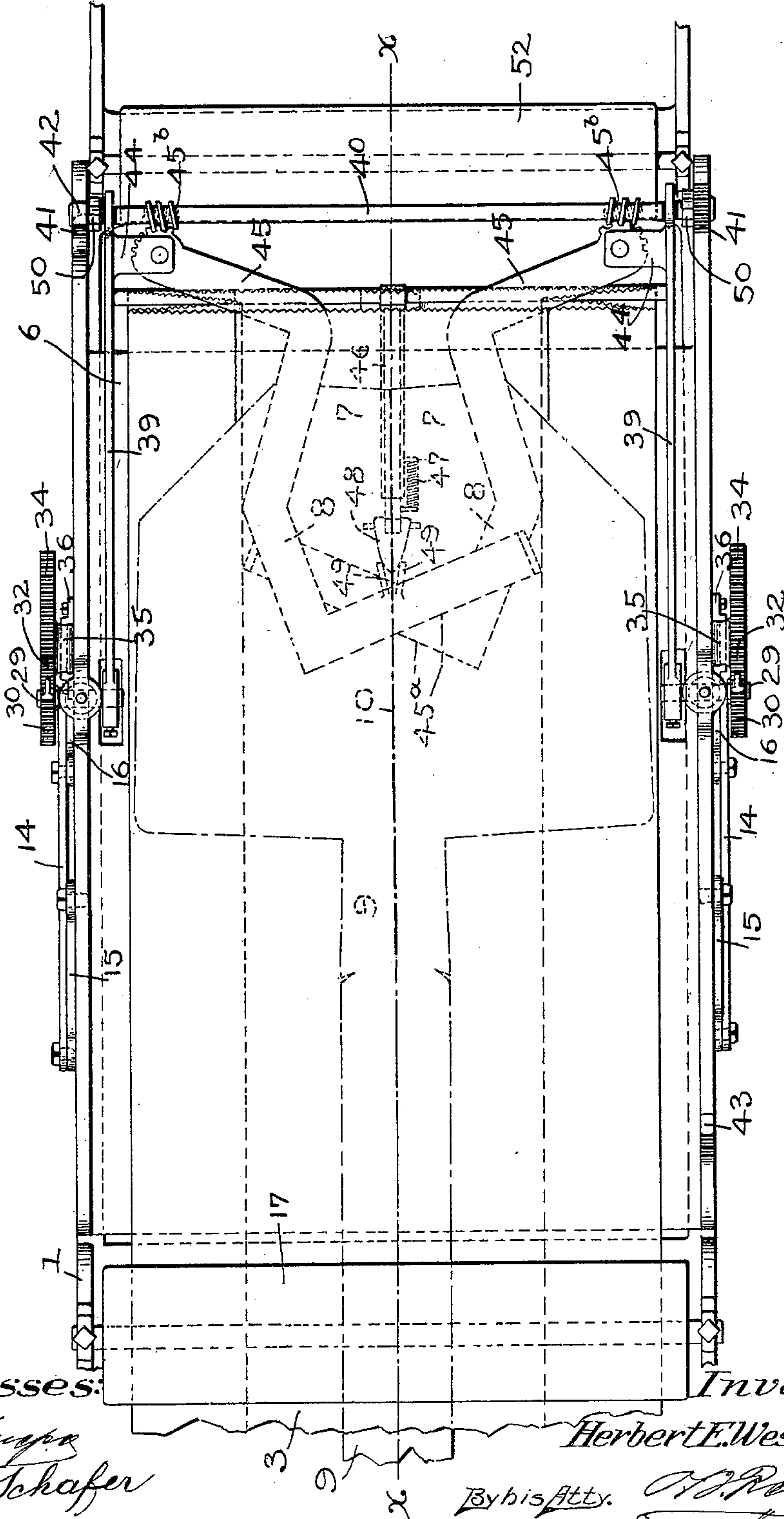
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Fig. 2



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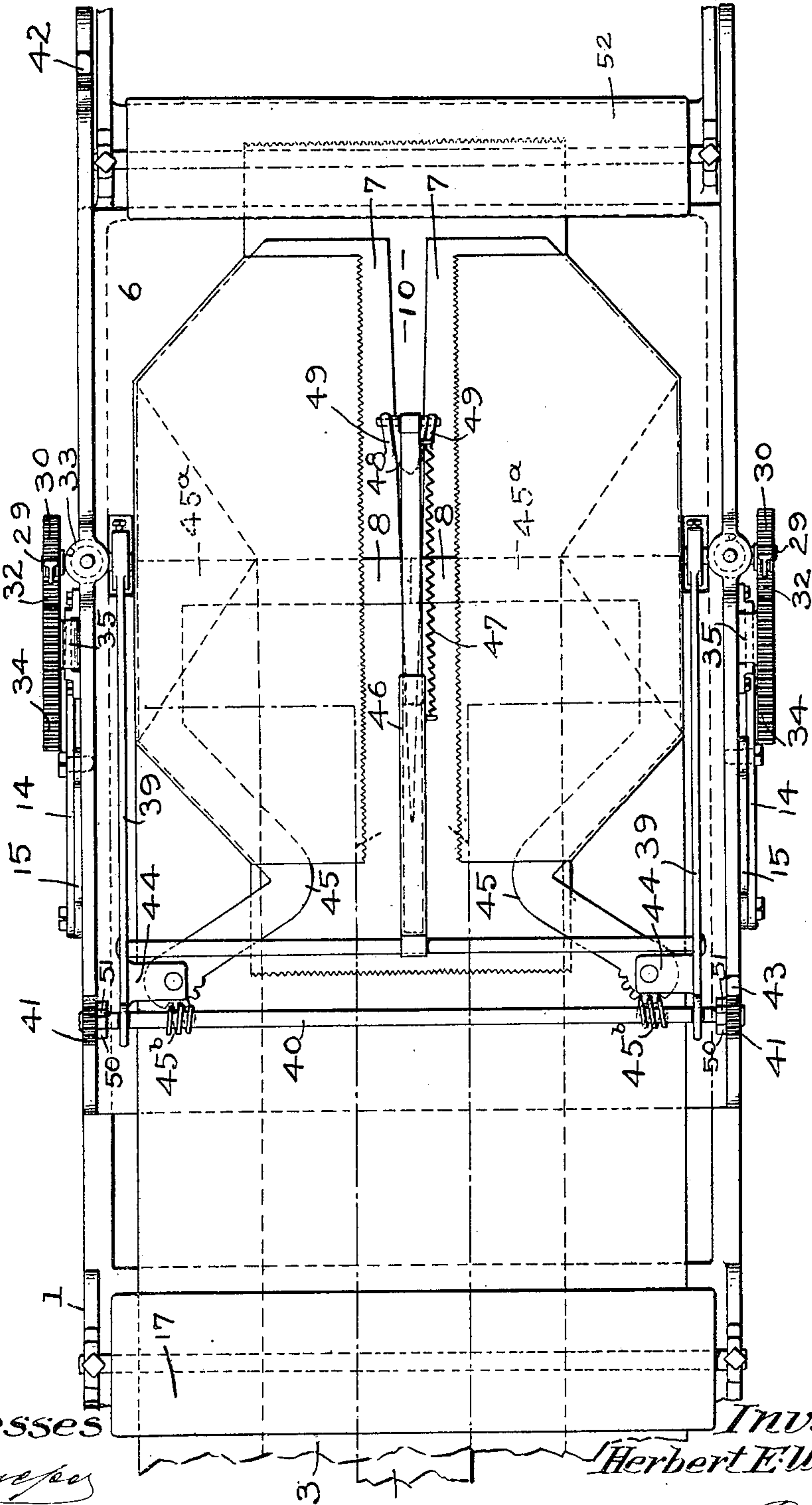
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Fig. 3



Witnesses

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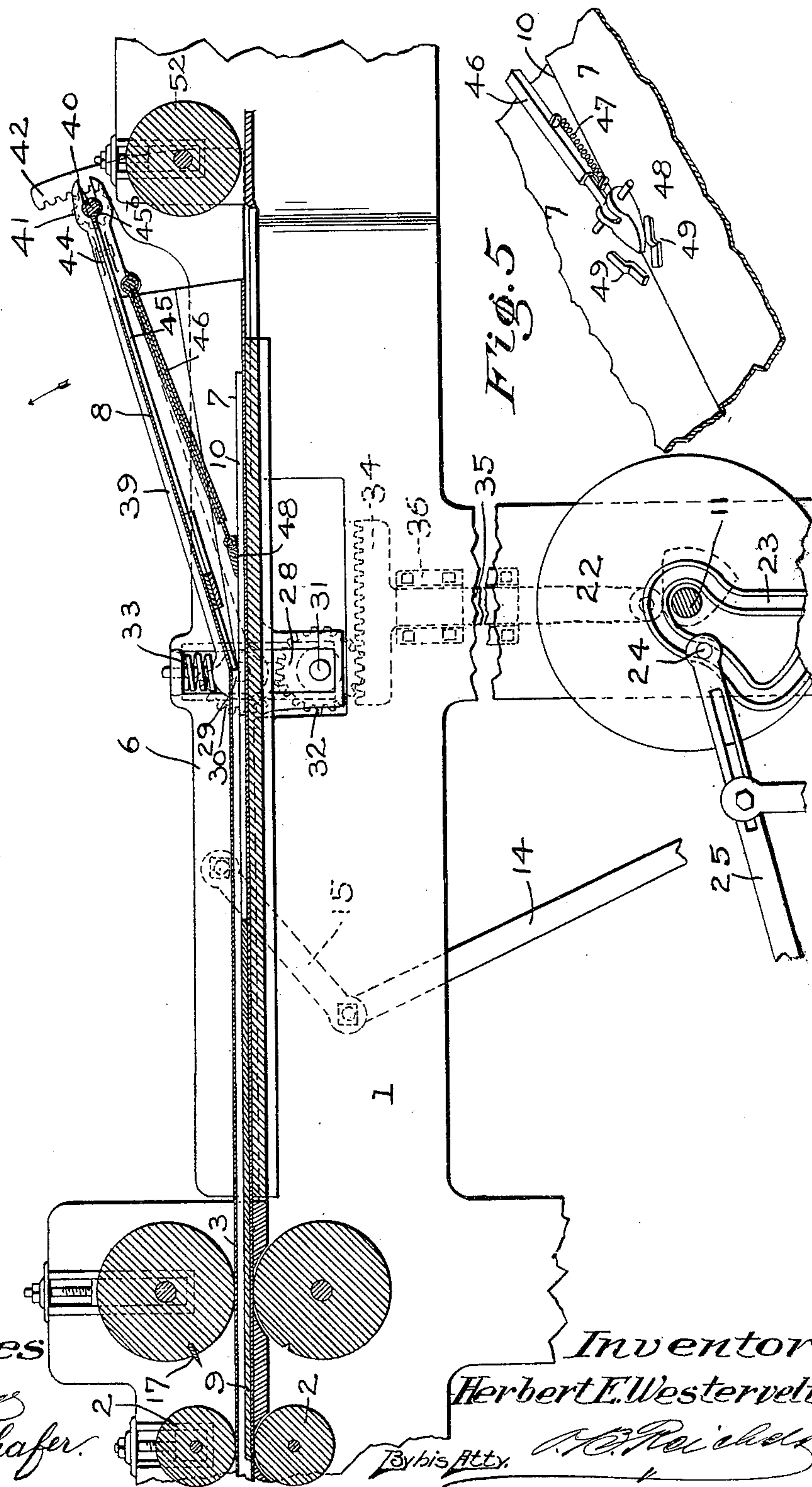
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(No Model.)

5 Sheets—Sheet 4.



Witnesses

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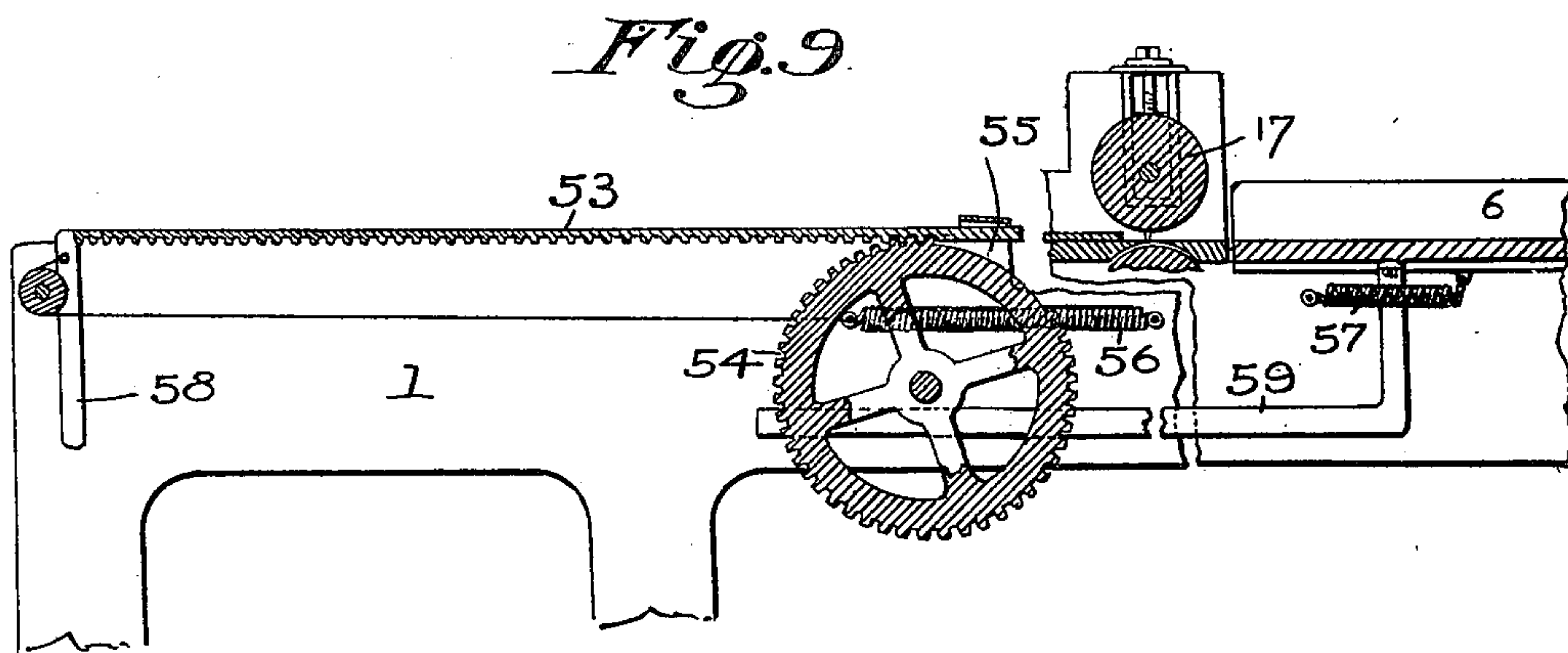
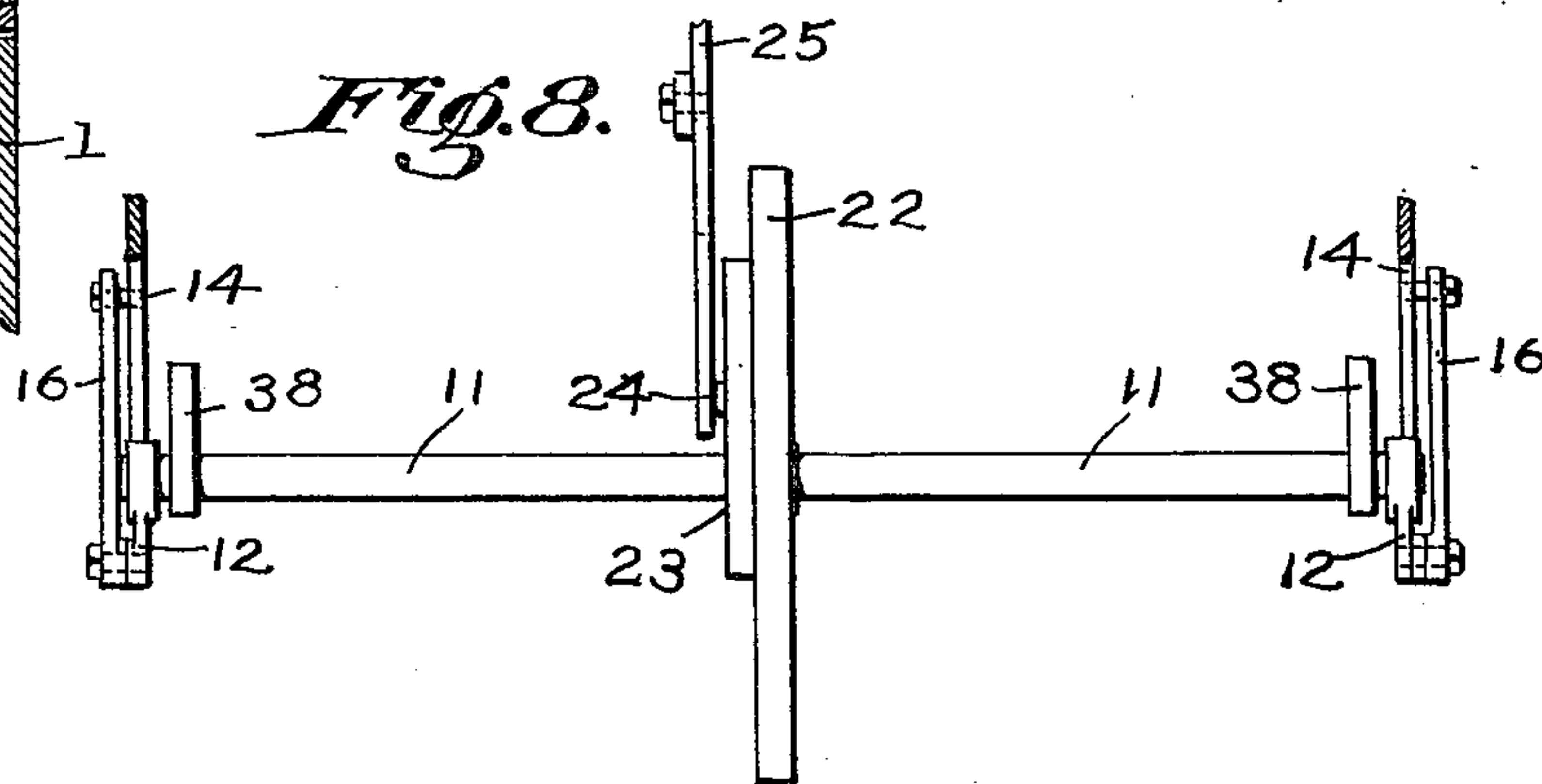
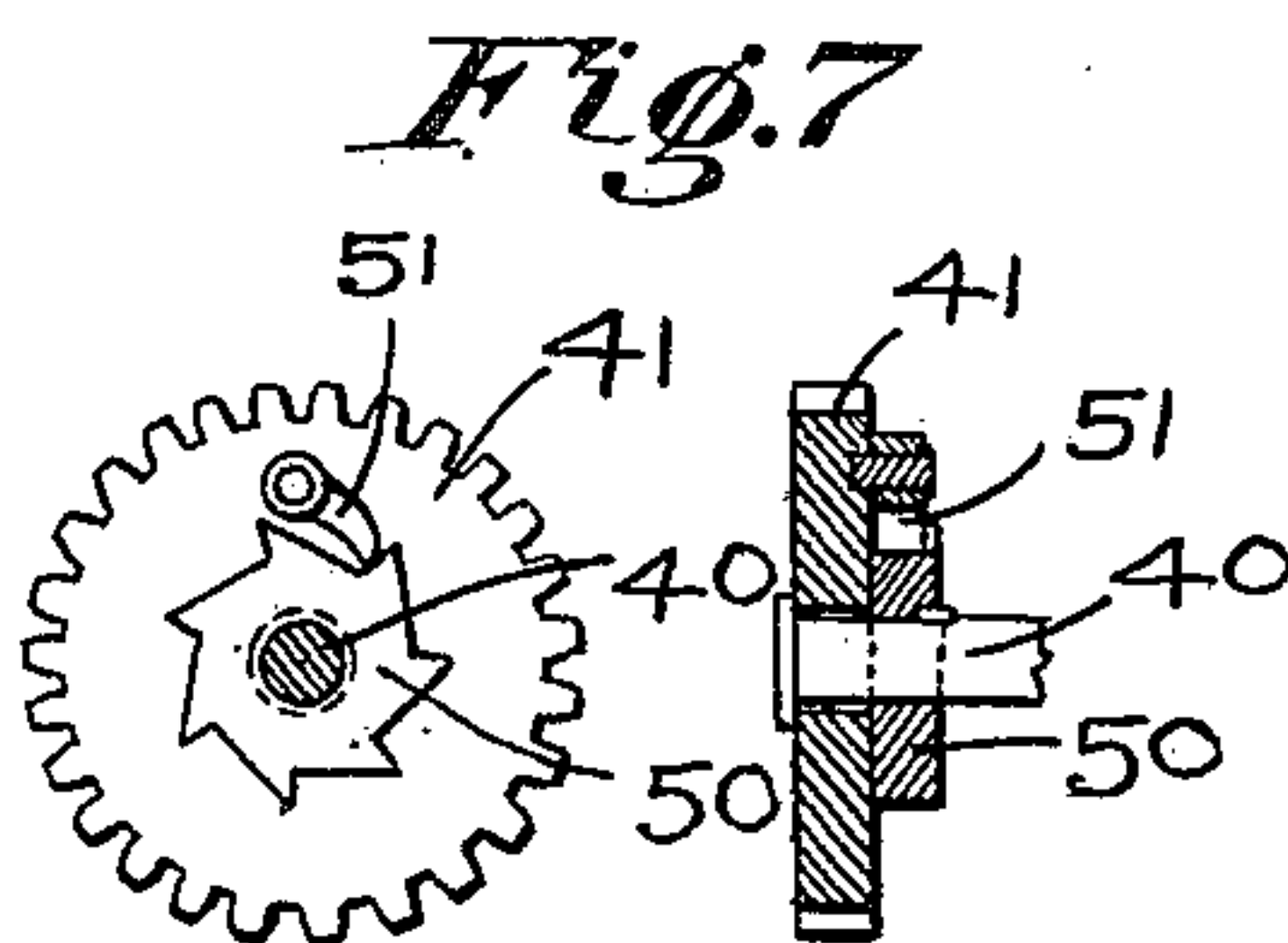
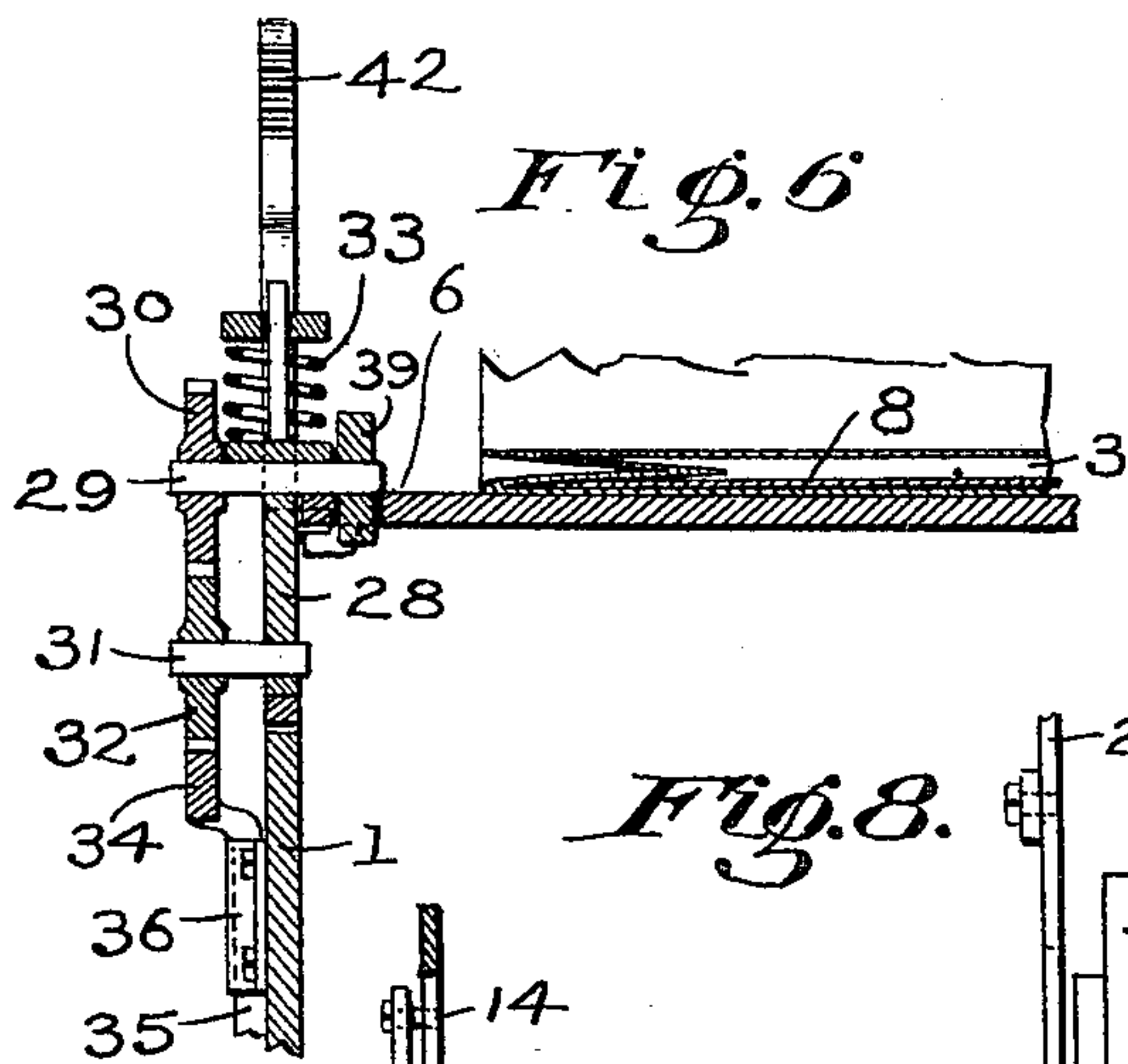
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(No Model.)

5 Sheets—Sheet 5.



Witnesses:-

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UNITED STATES PATENT OFFICE.

HERBERT E. WESTERVELT, OF SOUTH BEND, INDIANA.

PAPER-BAG MACHINE.

SPECIFICATION forming part of Letters Patent No. 621,881, dated March 28, 1899.

Application filed December 27, 1897. Serial No. 663,481. (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 and State of Indiana, have invented certain new and useful Improvements in Paper-Bag Machines, of which the following is a specification.

This invention relates to improvements in paper-bag machines, and pertains more especially to the mechanism for defining the diamond fold in converting a bellows-folded tube-blank into the satchel-bottom bag-blank.

The object of the invention is to provide a mechanism which will perform the above operation in a more simple and efficient manner than heretofore, in which the parts shall be adjustable with relation to the bag-blank, whereby they coact therewith when inserted or removed from the blank without binding, and the mechanism and blank are consequently not retarded in their movement, and the machine has a maximum capacity.

A further object is to provide formers to define the creases of the diamond fold of the blank-bottom which shall compress and hold the plies of the blank firmly during the operation of forming the diamond fold.

The invention consists in plates for defining the line of creases of the plies of the diamond fold of the satchel-bottom form—to wit, a plate to rest upon and hold the under ply of the bag-blank and a plate to fold the upper ply backward upon the blank, the plates being expandible, so as to when contracted enter and leave the bag-blank freely and when expanded to hold the blank tightly during the operation of folding the upper ply to form the diamond fold.

My invention relates to paper-bag machines of that class in which a strip of paper is first by suitable mechanism formed into a bellows-folded bag-blank and cut into the required length, is fed to the mechanism which folds the plies to form the diamond fold of a satchel-bottom bag-blank, and, finally, to the mechanism for pasting the said folds and compressing the same to form a finished satchel-bottom bag; and this invention consists more specifically in the mechanism for folding the plies of a bellows-folded bag-blank to form the diamond fold of the satchel-bottom blank.

The invention consists in the parts and combination of parts shown in the drawings, described in the specification, and more particularly pointed out in the claims.

In the drawings, Figure 1 is a side elevation of a portion of a paper-bag machine, illustrating my improved mechanism for defining the diamond fold of the satchel-bottom blank and the mechanism for actuating the same. Fig. 2 is a plan view of the mechanism for defining the diamond fold of the bag-blank bottom, the parts being illustrated in position in the bag-blank prior to folding the same. Fig. 3 is a like view, the parts of the mechanism being in a folded position. Fig. 4 is a longitudinal vertical sectional view of the mechanism shown in Fig. 2, this view being taken at a point indicated by the line *xx*, Fig. 2. Fig. 5 is a detail perspective view of the means for expanding the lower defining-plate; Fig. 6, a transverse section through the gearing for operating the defining-plate; Fig. 7, a section and face view of the gear and ratchet wheel thereof; Fig. 8, a plan view in detail thereof, and Fig. 9 a longitudinal section elevation of a modification of the means for reciprocating the table of the defining-plate.

Upon the frame 1 of the machine are supported and operate the feeding-rolls 2, which receive the strip 3 from the paper-roll 4 and feed the same to the mechanism for defining the folds of the bag-bottom and to the pasting mechanism 5. The feeding-rolls and pasting mechanism, however, not forming the essential parts of my invention are not described in detail and can be of any well-known or preferred construction.

In carrying out my invention a table 6 is movably secured upon the frame to reciprocate in a direction longitudinally thereon, said table carrying the mechanism for defining the creases of the diamond fold of the bag-bottom, which are operated by the movement of the table.

The diamond-folding devices comprise two defining-plates 7 and 8, a lower and an upper plate, respectively, the lower plate at all times being contained within the bag-blank and timed by suitable mechanism to be projected and retracted into the blank, the upper plate being normally held in a position to be auto-

matically entered between the plies of the bag-blank when the bag-blank is fed by the feed-rollers onto the table, as shown in Fig. 2. The lower plate therefore comprises the defining-plate proper and a rearwardly-projecting tongue 9, the plate being slitted longitudinally, as at 10, said slit extending rearwardly into the tongue, whereby the plate can be adjusted laterally and be of a variable width. The contour of the plate corresponds to the line of creases formed in the lower ply incident to a diamond-folded satchel-bottom bag. Said plate is adapted to be projected into the bag-blank and to remain in a stationary position in relation thereto during the operation of folding the upper ply to form the diamond fold, and is retracted or narrowed as to its width during the operation of inserting or retracting the same within the bag-blank, and is expanded laterally during the operation of folding the upper ply, so as to not only hold the bag firmly during this operation, but to embrace the lower ply between the plate and the table.

As shown in Fig. 1, the paper-roll is located below the table. Consequently the seam of the bag-blank is formed in the lower ply, which, being held between the plate and the table during the operation of folding the upper ply, protects the raw seam and prevents the seam from being pulled apart.

The upper defining-plate 8 enters between the plies as the bag is moved forward and has a rearward circular movement to carry the upper ply into its folded position substantially parallel with the body of the bag-blank. The plate 8 is of a contour to define the creases in the upper ply incident to a diamond-folded bag-bottom, whereby when the plate is moved rearwardly the creases of the diamond fold are defined. The plate 8 comprises two defining-strips, which are pivotally secured to the means for moving the same rearwardly in a semicircular line, said plates having a movement to and from each other to enable them when enveloped by the bag-blank or with the diamond fold when the bottom is formed to be contracted so as to enter and freely leave the bag-blank and to be expanded or moved outwardly to engage with the side of the blank immediately beneath the upper ply during the operation of folding the upper ply backwardly to form the diamond fold.

This invention consists, primarily, in the defining-plates, as has been described, for not only defining the creases of the diamond fold of the plies of the bag-blank, but for holding the under ply, which contains the seam of the bag-blank, firmly against the table during the operation of folding the upper ply and also to the defining-plates themselves in the construction wherein they are allowed to increase or decrease the width of the same, whereby the plates are free to move within the bag-blank when inserted or removed therefrom and engage with the sides thereof to hold the

bag-blank securely during the operation of folding the upper ply.

The mechanism for moving the table and operating the defining-plates is as follows: The table has a limited longitudinal movement upon the frame and is actuated indirectly by means of a crank-shaft 11, having crank-arms 12 secured upon each end of the same. Pivotally secured upon the frame at 13 is an arm 14, which is connected at its upper end with the table by means of a link 15, and interposed between and pivotally secured to the arm 14 upon the crank-arm 12 is a link 16, whereby as the shaft 11 revolves the table is moved longitudinally forward and backward upon each revolution of the shaft. The defining-plate 7 and tongue 9 have a movement coincident with that of the table and of a degree equal to the length of the bag-blank and is designed to be projected forwardly to a point coincident with the bottom of the blank when folded and to be projected rearwardly to a point slightly in rear of the rear end of a bag-blank in order that the blank may be severed from the tube, which is accomplished by means of the rotary knife 17 (shown in Fig. 4) or by any other well-known or preferred means. The means for projecting the defining-plate 7 consists in a lever 18, pivotally secured to the frame at 19 and connected at its upper end with a lug 20, depending from the tongue of the plate, 7 by means of a link 21. Secured upon the shaft 11, substantially midway its length, is a cam 22, having a cam-groove 23, in which travels a pin 24, secured upon a reciprocating arm 25, the opposite end of the arm being pivotally secured to the arm 18 at 26. The movement of the plate 7 with reference to the table is as follows: When the table is in the position shown in Fig. 1, the plate and tongue are retracted, which is accomplished by means of a spring 27, interposed between the table and the arm 18, the tongue remaining in this position until the table is moved rearwardly to the position shown in Fig. 4, when it is fed forward with the paper and then with the table.

The defining-plate 8 is operated as follows: Arranged in each side flange of the table is a rectangular way, in which is secured a vertically-movable box 28, and journaled in the box, at the upper end thereof, is a stub-shaft 29, having secured thereon, upon its outer end, a gear-wheel 30. Journaled in the lower end of the box is a stub-shaft 31, having secured upon the outer end thereof a gear-wheel 32, which meshes with the gear-wheel 30. Arranged between the top of the box and the upper wall of the way in the side flanges of the table is a spring 33, which has a tension to normally project the bearing 28 downwardly to at all times cause the teeth of the gear-wheel 32 to mesh with the teeth of a rack-bar 34, located upon the sides of the frame of the machine, said rack-bar having a depending arm 35, moving vertically in

ways formed in boxes 36, secured to the frame of the machine. The lower end of the rack-bar carries a roller 37, which at all times, due to the tension of the springs 33, rests upon the periphery of a cam 38, secured upon the end of the shaft 11, whereby the rack-bar, the box 28, and the mechanism carried thereby are alternately raised and lowered upon every revolution of the shaft 11, for a purpose to be hereinafter set forth. Secured upon the inner ends of the stub-shafts 29 are arms 39, the arms being secured together at their outer ends by a transverse shaft 40, journaled in suitable bearings carried by the arms, the shaft 40 carrying upon each end gear-wheels 41, which alternately mesh with segmental rack-bars 42 and 43, carried by the opposite ends, respectively, of the side flanges of the table 6. Projecting inwardly from the arms 39, at a point inward and adjacent to the shaft 40, is a lug 44, to which are pivotally secured the arms 45, which comprise the defining-plate 8. The outer ends of the arms are circular in form and are toothed concentrically to the pivotal connections with the lug 44, the teeth engaging with a worm-screw 45^b, arranged upon the shaft 40, whereby when the shaft 40 is revolved, due to the engagement of the gear-wheels 41 with the segmental rack-bar 42 or 43, the arms 45 are moved outwardly to the position shown in Fig. 3 or inwardly to the position shown in Fig. 2, according to the direction of rotation of the shaft 40. It will readily be seen that as the table is moved backward and forward the gear-wheel 32 by its engagement with the rack-bar will be revolved, which, meshing with the gear-wheel 30 upon the shaft 29, will cause the arm 39 to be moved in the arc of a circle to either the position shown in Fig. 2 or Fig. 1 or Fig. 4, which carries the defining-plate 8 therewith.

Referring to Fig. 1, it will be seen that when the arm 39 is in its rearward position the cam 38 raises the rack-bar 34, the box 28, and consequently the arm 39 and the defining-plate 8. The parts are held in this position until they assume the position shown in Fig. 4, when they are lowered. Consequently when the defining-plate 8 is in the act of folding the upper ply of the bag-blank rearwardly it is in a lowered position, but is raised when it has assumed the position shown in Fig. 1 and until it assumes the position shown in Fig. 4 or until the bag-blank operated upon is moved forward and the succeeding blank is fed upon the table and in a proper position to be grasped and folded by the defining-plate. The segments 42 and 43 being located at the terminus of movement of the arm 39 expand the plates 45, while the arm 39 is moving in the direction shown by the arrow, Fig. 4, and contract the same when moved in the direction of the arrow shown in Fig. 1, whereby the blank is free to envelop or leave the plate, but is grasped by the plate interiorly when the upper ply is folded backward.

The arms 45 of the defining-plate 8 terminate in right-angled arms 45^a, which when the arms are distended to engage with the sides of the bag interiorly thereof, as shown in Fig. 3, and are lowered against the lower defining-plate 7 form an internal creaser-plate to effectually crease the upper ply without the aid of auxiliary exterior plates or creasers, a feature of great importance.

The means for expanding the lower plate comprises a telescopic arm 46, pivotally secured to a cross-rod carried by the arms 39 and normally held in a telescoped position by means of coil-spring 47, interposed between the two sections of the arm, as shown more specifically in Figs. 4 and 5. Secured to the lower end of the telescopic arm 46 is a wedge-shaped foot 48, adapted when the arm 39 is in the position shown in Fig. 4 to rest upon the lower defining-plate and to move longitudinally and rearwardly thereon when the arm 39 is moved backward, as shown by the arrow, Fig. 4. This movement upon the part of the foot causes the same to pass between wedge-shaped projections 49, arranged upon the upper side of the defining-plates upon each side of the slit therein, which expand or force apart the plate-sections and cause them to bind upon the sides of the bag upon the interior thereof, as has been described.

In order to prevent the cog-wheel 41, carried by the arm 39, from revolving the screw-shaft 40 when the arm 39 is moved in the direction of the arrow, Fig. 1, I provide the shaft with a ratchet-wheel 50 and a cog-wheel with a pawl 51, which engages with the ratchet-wheel to revolve the shaft when the arm moves in the direction of the arrow, Fig. 4, but which rides over the ratchet-wheel without actuating the shaft 41 when the arms move in the direction of the arrow, Fig. 1.

In order to compress the creases after they are defined and to set the diamond fold, I provide rollers 52, between which the bag-blank passes and by which it is fed from the table.

As shown in Fig. 9, I have illustrated a modification of the means for reciprocating the table and the defining-plate 7, which comprises a rack-bar 53, arranged upon the under side of the rear end of the tongue of the defining-plate, with which a mutilated cog-gear 54, driven by any suitable or preferred source of motive power, is designed to primarily project the defining-plate forwardly until the mutilated portion 55 of the gear coincides with the rack-bar, when the defining-plate is free to be retracted, due to the action of a spring 56, secured to and interposed between the frame and the defining-plate. In this construction between the table and the frame is secured and interposed a spring 57, which exerts a tension to normally hold the table in a retracted position, as shown, the table being projected forwardly by the defining-plate 7, provided with a depending projection 58 upon its rear end, which moves in alinement

with and abuts against a rod 59, carried by the table, whereby during the latter part of the movement of the defining-plate or while the upper ply of the bag-blank is being folded the table and the defining-plate move in unison.

While I have shown and described specifically a cam as a medium for raising and lowering the pivotal defining-plate 8, I wish it understood that any other means may be employed to accomplish this result without departing from the spirit of my invention.

What I claim is—

1. In a paper-bag machine, the combination with a bag-blank and means for feeding the same, of defining-plates of a normal width to freely enter and leave the bag-blank, means for expanding the same laterally to impinge against the sides of the bag-blank interiorly thereof, and means for moving one of the plates backward and forward in the arc of a circle to fold one of the plies of the blank to form the diamond fold, substantially as described.

2. In a paper-bag machine, the combination with a bag-blank and means for feeding the same, of means for securing one of the plies while the diamond fold is being made, an expansible defining-plate adapted to be entered between the plies when contracted and means for expanding the same while the diamond fold is being made, substantially as described.

3. In a paper-bag machine the combination with a bag-blank and means for feeding the same, of upper and lower defining-plates of a size to enter and impinge upon the sides of the bag-blank interiorly thereof conforming to the fold-lines of the bag and means for separating said plates adapted to move in a direction opposite to and coincident with that of the movement of the bag-blank substantially as described.

4. In a paper-bag machine the combination with a bag-blank and means for feeding the same, of a defining-plate located within the bag-blank over which the latter is drawn to fold the lines of the bag and a defining-plate of the bag-blank which enters the forward end thereof as the bag is fed forward and means for vibrating the last-mentioned defining-plate in a direction opposite to that of the movement of the bag-blank, substantially as described.

5. In a paper-bag machine, the combination of a bag-blank and means for feeding the same,

means for securing the under ply of the bag while the diamond fold is being formed, and a pivotal defining-plate adapted to be entered between the plies of the bag-blank, means for rocking the same alternately backward and forward and expanding and contracting the same laterally respectively, substantially as described.

6. In a paper-bag machine, the combination of a bag-blank and means for feeding the same, a defining-plate normally contained within the blank, a pivotal defining-plate carried by the table and means for rocking the same backward and forward and simultaneously lowering and raising the same respectively, substantially as described.

7. In a paper-bag machine, in combination with a bag-blank and means for feeding the same, two defining-plates adapted to be entered within the blank during the operation of defining the diamond fold for the bottom of the bag, the plates being expansible laterally, and means for expanding the same, substantially as described.

8. In a paper-bag machine, a bag-blank and means for feeding the same, a defining-plate and means for moving the same to fold one of the plies of the bag-blank, said plate being substantially of two parts, the parts being adjustable to and from each other in the same plane, substantially as described.

9. In a paper-bag machine, a bag-blank and means for feeding the same, defining-plates adapted to be contained within the bag-blank to engage with the upper and lower plies thereof during the operation of forming the diamond fold, each of said plates being separable laterally in the same plane respectively, substantially as described.

10. In a paper-bag machine, a bag-blank and means for feeding the same, a lower defining-plate contained within the blank, a pivotal defining-plate adapted to enter the forward open end of the blank and means for rocking the same, means for alternately raising and lowering the pivotal defining-plate from or against the lower plate, 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,
B. FERSTL.