

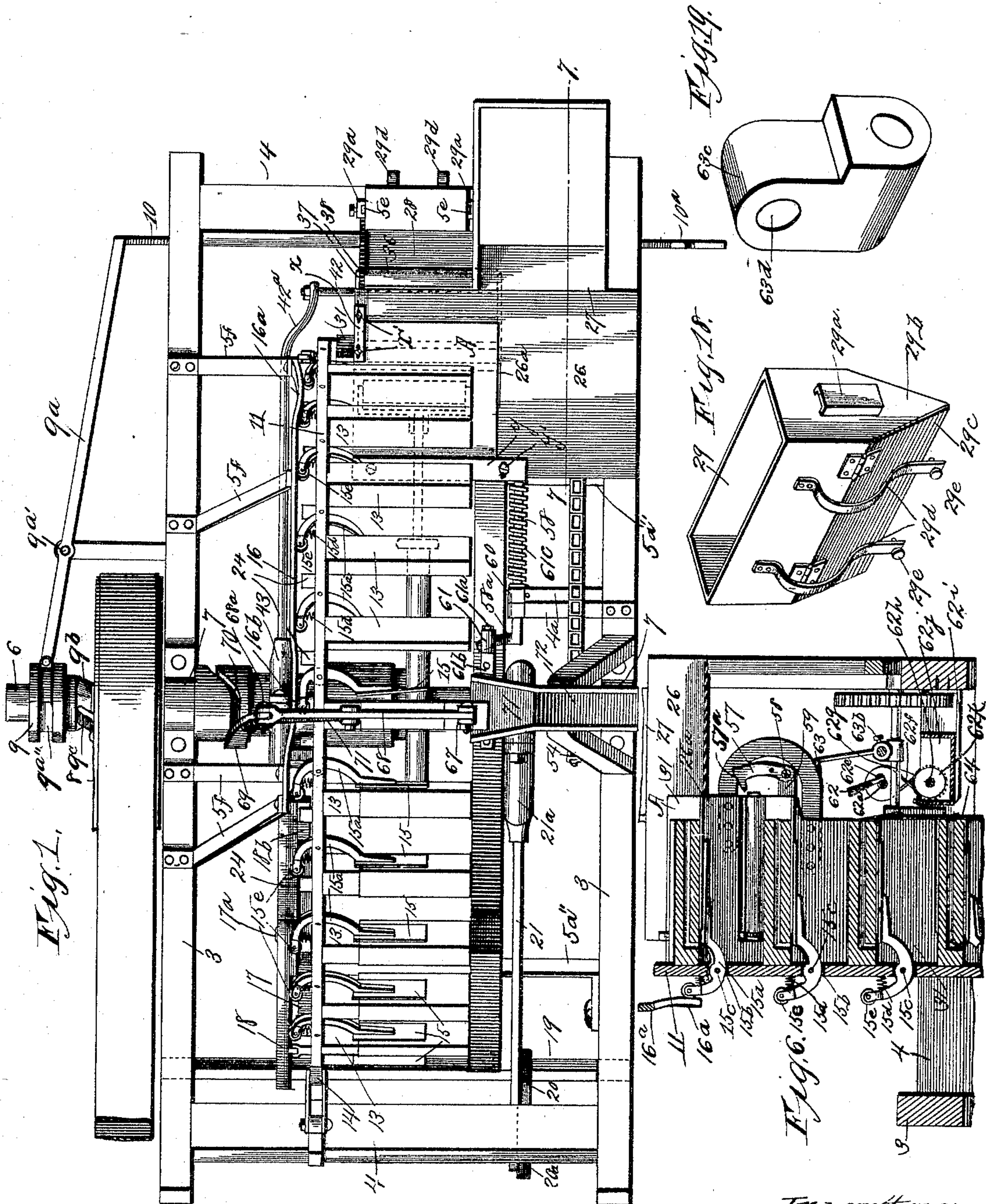
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7 Sheets—Sheet 1.

J. M. & O. M. CARTER.
PAPER BAG MACHINE.

No. 509,874.

Patented Dec. 5, 1893.



Witnesses:

G. P. Hooper.
Margaret R. Remley.

Inventors:
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By H. P. Hooper & Co.
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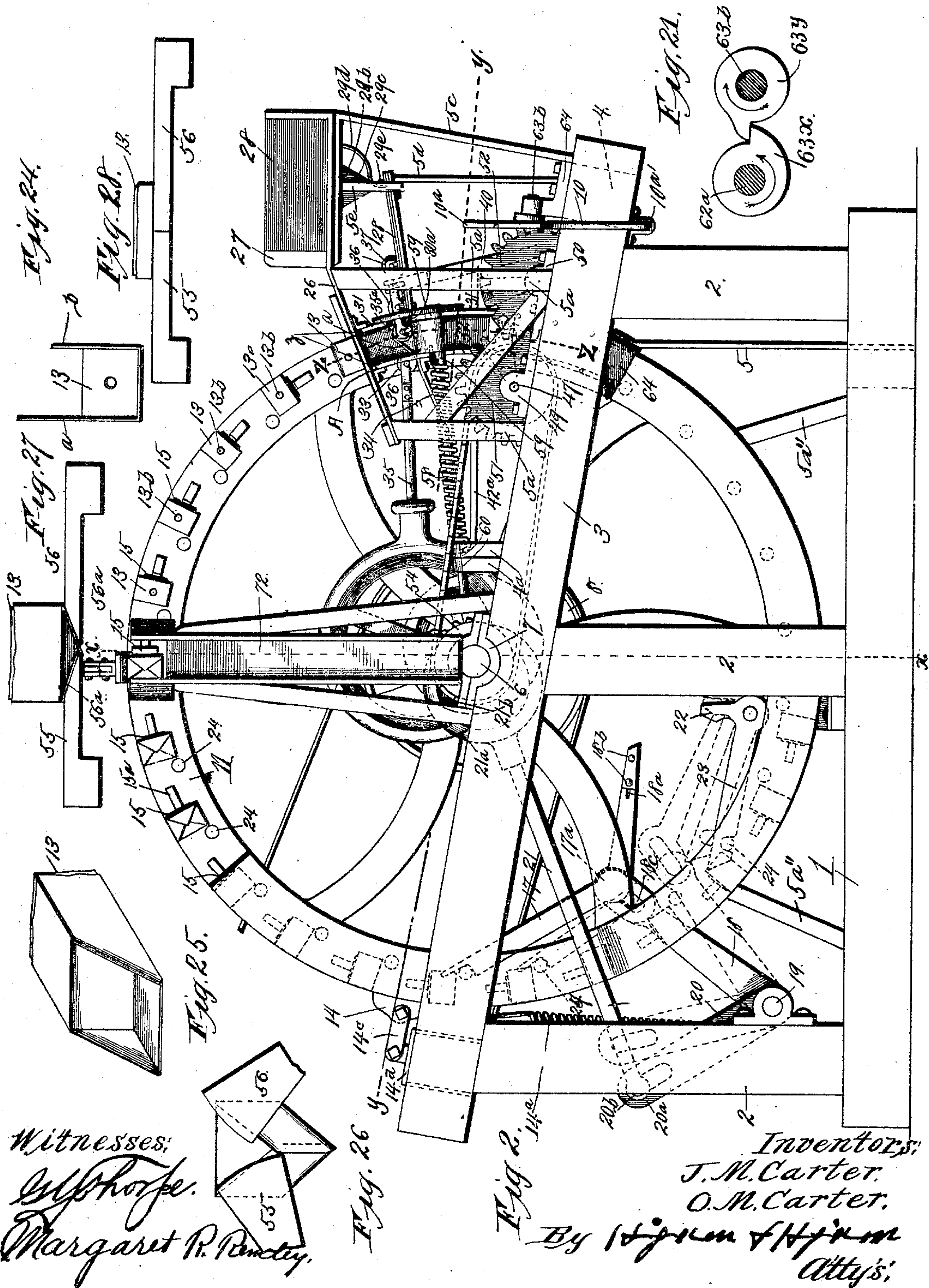
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J. M. & O. M. CARTER.
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THE NATIONAL LITHOGRAPHING COMPANY.
WASHINGTON, D. C.

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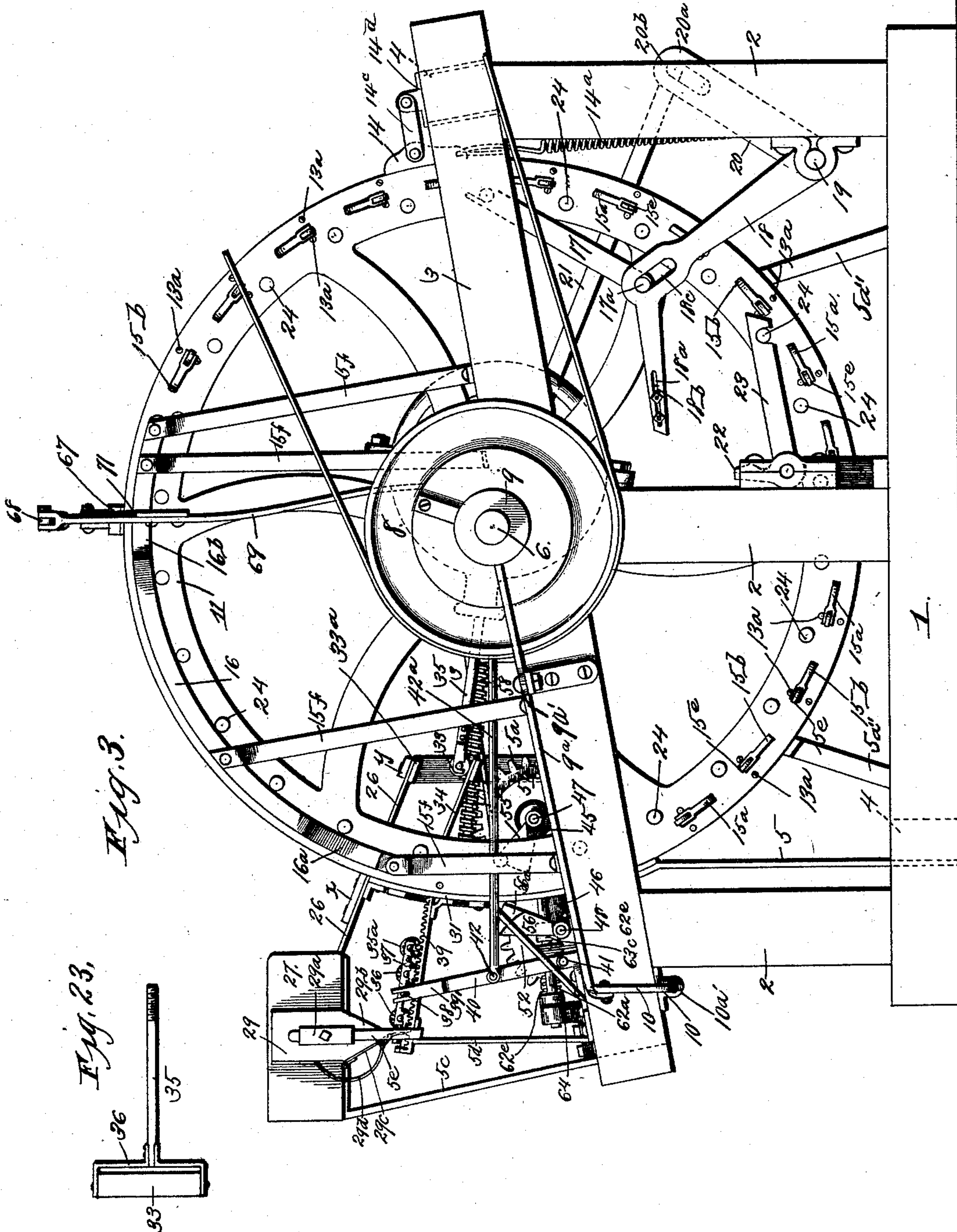


Fig. 1.

Fig. 23.

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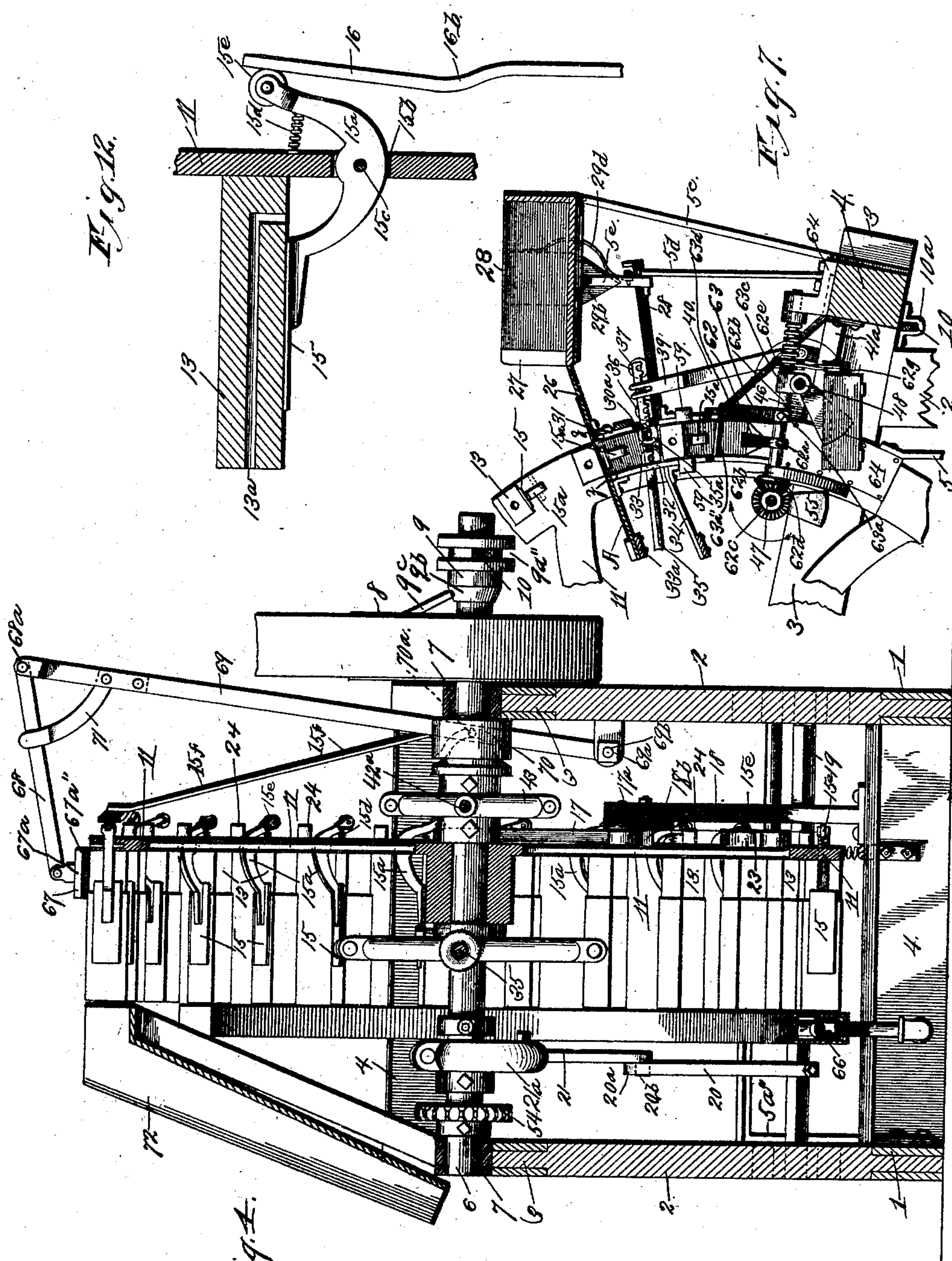
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Patented Dec. 5, 1893.



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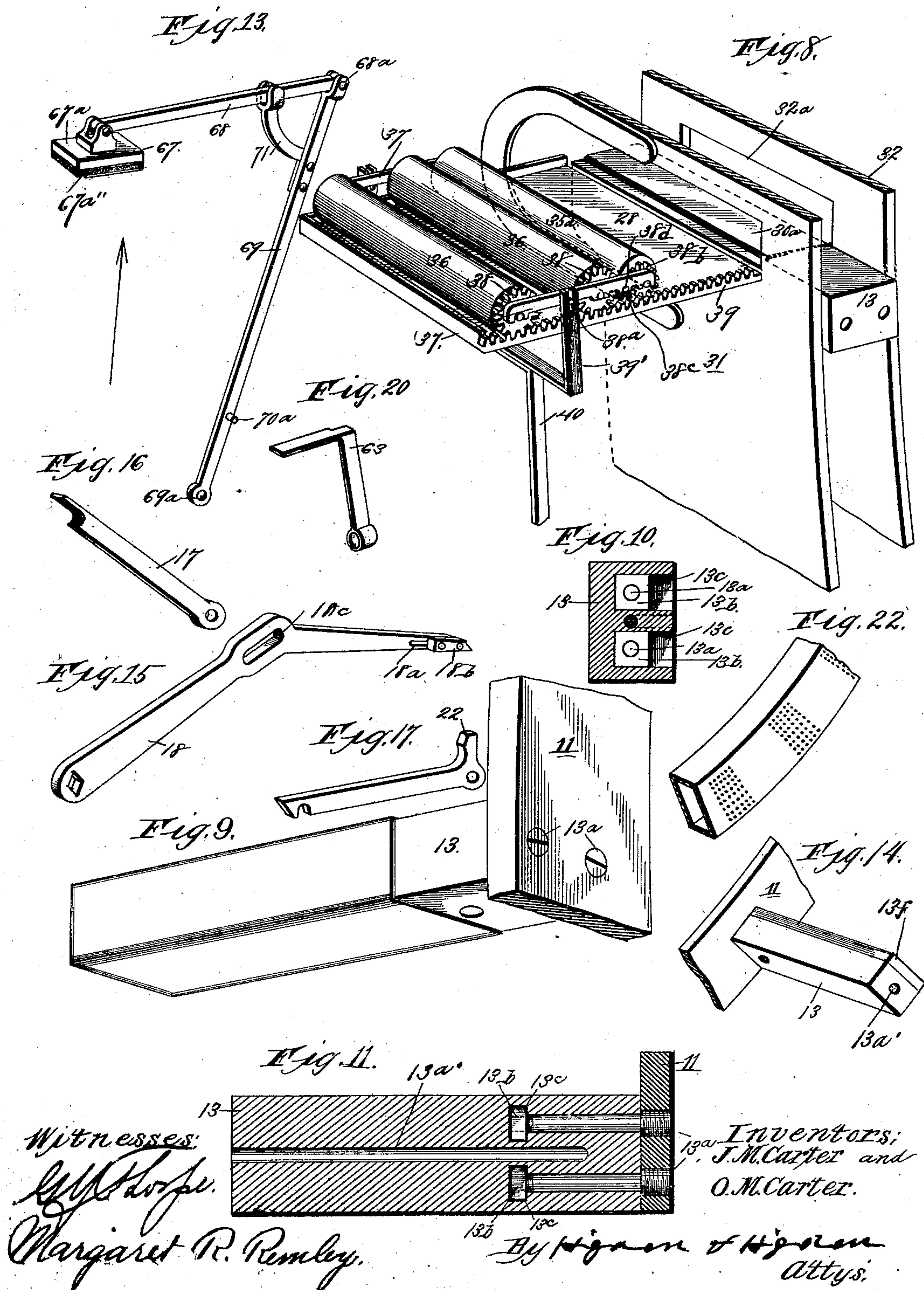
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7 Sheets—Sheet 6.

No. 509,874.

Patented Dec. 5, 1893.



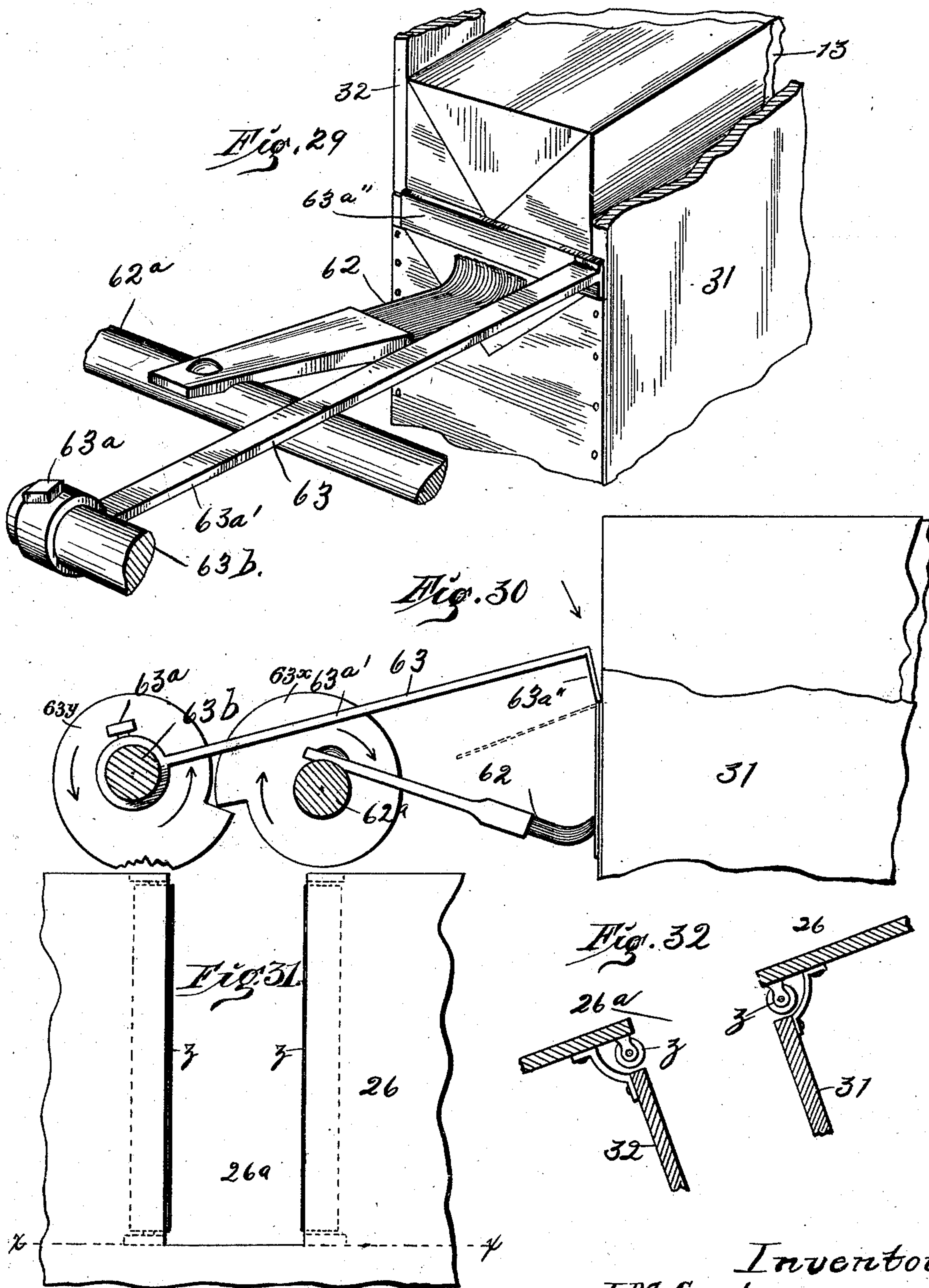
(No Model.)

7 Sheets—Sheet 7.

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UNITED STATES PATENT OFFICE.

JOHN M. CARTER AND OSCAR M. CARTER, OF ST. JOSEPH, MISSOURI.

PAPER-BAG MACHINE.

SPECIFICATION forming part of Letters Patent No. 509,874, dated December 5, 1893.

Application filed October 8, 1892. Serial No. 448,173. (No model.)

To all whom it may concern:

Be it known that we, JOHN M. CARTER and OSCAR M. CARTER, of St. Joseph, Buchanan county, Missouri, have invented certain new and useful Improvements in Paper-Bag Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

Our invention relates to improvements in machines for manufacturing paper bags, and is especially desirable for manufacturing bags from printed and labeled rectangular blanks, to be at once packed with the material to be placed upon the market, such as coffee, cereals, and other dry and light substances.

Our object is to produce a machine comprising a rotatable wheel, a series of form blocks projecting at regular intervals from the face of said wheel, a table with a longitudinal notch therein, a gage for placing the paper blank over the notch, a series of automatically operating devices for pasting and folding the paper blanks around intermittently moved form blocks, a steam chamber for drying the paste used in securing the folds of the bag, an intermittently reciprocating slide for removing the completed bag from the form block, and a chute adapted to convey the bags to a suitable receptacle therefor.

The whole operation of the machine is automatic, with the exception of placing the paper blanks over the notch in the table, whence they are removed by the successive form blocks.

To the above purpose, our invention consists in certain peculiar and novel features of construction and arrangement, as will be hereinafter described and claimed.

In order that our invention may be fully understood, we will now proceed to describe it, reference being had to the accompanying drawings, in which—

Figure 1. is a plan of the machine. Fig. 2. is an elevation of the inner, or front, side of the machine. Fig. 3. is an elevation of the outer, or rear, side thereof. Fig. 4. is a vertical sectional view taken on the line X—X of Fig. 2. Fig. 5. is an irregular horizontal section of the machine taken on the line Y—Y of Fig. 2. Fig. 6. is a detail transverse sec-

tional view taken on the line Z—Z of Fig. 2., looking toward the outer end of the machine. Fig. 7. is a detailed sectional elevation of the part shown in Fig. 6. Fig. 7^a, is a vertical sectional view of a portion of the framework, to show more clearly the construction and arrangement of the spring-actuated brake. Fig. 8. is an enlarged perspective of the paste distributing roller and other attachments, showing the blank encircling the form, in position after the longitudinal seam of the bag is pasted and completed. The remaining figures, 9. to 32. inclusive, are details of certain parts hereinafter referred to. Fig. 9, is a perspective view, showing a portion of the form wheel, and a form-block secured thereto. Fig. 10, is a cross sectional view of the form-block, and showing the nuts and bolts for securing the form-block to the wheel. Fig. 11, is a longitudinal section of the form-block, and showing the manner of securing the form-block to the wheel, which is also partly shown in section. Fig. 12, is a sectional view of a form-block and of a portion of the form-wheel, and also showing the spring actuated paper holding plate. Fig. 13, is a perspective view of the sliding shoe and its connections, to force the completed bag from the form-block. Fig. 14, is a perspective view of a portion of the form-wheel, and showing the form-block reinforced or made larger. Fig. 15, is a detail perspective view of the elbow-lever mounted upon the rock-shaft at the end of the machine, and Fig. 16, is a pawl carried by the elbow-lever to engage the pins upon the form wheel to rotate the same. Fig. 17, is a detent to limit the revoluble movement of the form-wheel by engaging the successively presented pins carried by said wheel. Fig. 18, is a detail perspective view of the paste-box. Fig. 19, is a detail perspective view of the cross bore bearing to support the presser bar shaft. Fig. 20, is a detail perspective view of the presser bar. Fig. 21, is a sectional view of the brush and presser bar, looking toward the end of the machine and showing the cams for operating the presser bar shaft. Fig. 22, is a perspective view of a portion of the steam drying chamber. Fig. 23, is a plan view in detail of the roller adapted to fold the inner longitudinal flap of the bag. Fig. 24, is a

view of the form-block, and the paper blank after the first step in the formation of the bag. Fig. 25, shows the blank after the longitudinal seam has been made, and the first fold toward the end formation of the bag. Figs. 26, and 27, are respectively an end view and a top view of the bag, and the laterally rotatable folders in operative position. Fig. 28, is a top view, showing the laterally rotatable plates, completing the side end folds of the bag. Fig. 29, is a perspective view, showing the segmental guide plates and the final end folding plate, and showing the form block with the blank thereon and in position for the final fold to be made, and showing also the presser bar and the paste brush in operative position. Fig. 30, is a side elevation of the segmental plates and the form block and partially formed bag, and the presser bar and paste brush, and also showing the operative position of the cams for lifting the presser bar from engagement with the partially formed bag. Fig. 31, is a plan view on an enlarged scale of a portion of the notched feed table, and Fig. 32, is a vertical sectional view, taken on the line X—X, of the same, and showing the guide rollers and the upper ends of the segmental guide plates.

The frame of the machine is composed, principally, of a base, 1, vertical posts, 2, inclined cap pieces, 3, transverse end pieces, 4, and brace rods, 5, which support certain guide plates hereinafter described. The axle, 6, has its bearings in boxes, 7, and is revolved by a belt wheel, 8, when in gear with a friction clutch, 9, keyed to slide upon the end of the shaft, and ceases to revolve when the clutch is thrown out of gear therewith. The lever, 9^a, is pivoted at 9^{a'}, and extends longitudinally of and in rear of the machine, the inner end being bifurcated, and engaging the annular groove 9^{a''} of the sliding clutch 9, which is beveled at its front end at 9^b to bear against the lower end of friction bar 9^c, secured at its opposite end to the belt wheel, 8. The outer end of lever 9^a is pivotally secured to the rear end of forwardly extending bar, 10, guided through suitable brackets, 10^{a'}, depending from the frame work. The forward end is bent inwardly and upwardly to form a handle, 10^a. The form wheel, 11, carrying forms, 13, upon which the bags are made, is supported to turn loosely upon the axle when acted upon by a pawl hereinafter described, and is held from turning when not acted upon by an overcoming force, by a detent hereinafter described, and a friction brake-shoe 14, which is held against the periphery of the form-wheel near one end of the frame-work, by a tension spring 14^a, secured at its lower end to the bracket 14^b secured to frame work (Fig. 4) and at its upper end to the lower end of the brake-shoe. The brake-shoe 14 is pivotally carried between the parallel link bars 14^c the rear ends, of which are pivoted to opposite sides of the lug or ear projecting upwardly from the bracket 14^d se-

cured to the end bar of the frame-work. It will be seen that as the frame wheel revolves the spring 14^a is tensioned, and as the movement of the form wheel is stopped, the tendency of the spring is to contract and hold it firmly in position.

The forms, 13, consist preferably of rectangular wooden blocks, and are secured, at one end only, to the front face of the wheel 11 by heavy bolts, 13^a, passing through the rimmed plate of the wheel into nuts, 13^b, resting in mortised holes, 13^c, in one side and at one end of the form, as shown in detail in the enlarged Figs. 9, 10, and 11. The form has a spring actuated paper holding plate, 15, shown by enlarged detail Fig. 12, secured to an approximately bow shaped lever, 15^a, passing through the opening 15^b in the rim of the form wheel, and pivoted therein by bolts, 15^c, screwed into the rims and passing through the levers 15^a. The lever 15^a is held to normally press against one side of the form and hold the paper thereon from the time it is received at the table until the box is ready to be delivered from the machine, by a spring, 15^d, pressing between the outer end of said lever and the outer face of the wheel, and the friction roller 15^e upon the outer end of said lever passes over the inwardly projecting, or cam, faces of the curved plate 16, secured by braces, 15^f, to the frame, the said projecting or cam faces, 16^a, 16^b, as the rollers 15^e come in contact therewith, pivotally moving the levers 15^a to move the plates 15 from contact with the form-blocks respectively when the blank is put upon the form at the table, and when the bag is ready to be removed from the form. At regular intervals apart, and projecting outward from the rear face of the wheel, are pins, 24, corresponding in number to the form blocks, 13, carried by the wheel.

The form wheel is rotatable intermittently a distance equal to the distance from center to center of each form by a pawl, 17, adjustably pivoted at 17^a to an elbow shaped lever, 18, secured to a rock shaft, 19, having an arm, 20, slotted at its outer end, 20^a, to adjustably cut with a pivot pin, 20^b, which pin is pivoted to the end of the connecting rod, 21, the other end of which carries a strap, 21^a, actuated by an eccentric, 21^b, keyed to the driving shaft. The outer end of the lever, 18, is slotted at 18^a to receive the set bolts of a trip plate, 18^b, which, upon its downward movement to allow the pawl 17 to engage with the next successive pin 24, will strike the end of bevel toe, 22, projecting upwardly from the pivotal point of the detent, 23, which, engaging one of the pins 24, holds the wheel until the pawl 17 drops, and is in position to engage with the next successive pin 24, and thus rotate the wheel with an intermittent movement.

Located at the opposite end of the machine, is the feed table, 26, supported by up-rights, or rods, 5^a, and bracket arms hereinafter referred to, and the blank holder, 27,

resting at its inner end against the outer end of the feed table, and supported at its outer end by the horizontal arms of brace bars 5^c, which are secured to one of the transverse beams of the frame-work. The blank holder is located in a plane alongside of the projecting ends of the forms; and the paste distributing board, 28, is supported upon rods, 5^d, at its outer end, and to the outer segment plate at the periphery of the wheel at its inner end by suitable angle brackets.

The paste holding box, 29, is supported alongside the blank holder upon the bar 5^e at the end of the paste distributing board by means of a strap, 29^a, upon its end. The lower end 29^b of the paste box is wedge shaped, and at its outer side has a hinged shutter, 29^c, held normally closed by spring plates, 29^d, bearing against it, the lower ends of said plates carrying set screws, 29^e, which are adjusted as hereinafter described, to control the width of the opening of the shutter. The inner end of the distributing board rests upon angle brackets, and its upper surface is flush with the lower edge of the slotted opening 30^a of the outer segment plate 31, which follows the periphery of the wheel in close proximity to the outer sides of the forms, and a similar inner segment plate, 32, is held in close proximity to the inner sides of the forms, both segment plates being arranged concentrically to the axis of the form wheel, and being supported, mainly, by brace rods, 5. The segment plate 32 has a rectangular aperture, 32^a, through which the folding, or pressing roller, 33, passes to fold down the inner side of the blank as hereinafter described, and the plate 34, extending toward the driving shaft, and supported at its inner end by a horizontal arm, 33^a, secured to the inner upright rod, 5^a, provides a support or track upon which the roller 33 is adapted to travel. A rod and strap, 35, driven by an eccentric on the driving shaft has a bifurcated arm, 36, in the ends of which the roller, 33, is journaled, and is allowed to rest upon and roll freely over the track plate 34.

The pasting roller 35^a, and distributing rollers 36, are journaled in side bars, 37, and the rollers 36 are each provided with a pinion 38, which engages the teeth of the rack bar, 39, upon the rear side of the paste distributing board 28.

The paste roller is provided with a pinion, 38^b, of diameter too small to engage the rack bar, and a small pinion, 38^c is journaled on a pin, or stud, 38^d, and meshes with the pinion 38^b and the pinion 38 of the adjacent distributing roller 36. This arrangement causes the inner, or pasting, roller to revolve more rapidly than the rollers 36, and thus more effectually gather a sufficient quantity of paste to apply to the outer flap of the blank when the proper time arrives. The paste distributing board is further provided with a wall, or guard, the rack bar forming the rear side thereof, to effectually prevent the paste's overflowing

the board should an unusual quantity gather. The side bars 37 have outwardly projecting pins, 38^a, midway of their length, which are held in the slotted ends of arms, 39', of a bifurcated lever, 40, pivotally supported at 41 upon the bar, 41^a, of the frame, and connected by a wrist pin, 42, with the outer end of an eccentric rod, 42^a, of strap 43 of an eccentric upon the driving shaft. The train of paste and distributing rollers are thus operated, and caused to roll over the distributing plate, the pasting roller passing through the slot, 30^a, of the outer segment plate, and over the upper side of the form. When the train of rollers recede from the form, the rear roller, at the end of its outward movement, strikes the set screws 29^e and opens the shutter of the paste box sufficiently to allow the required amount of paste to fall upon the said roller, whence it is evenly applied to the distributing board. The set screws may be adjusted when required to correctly determine the amount of paste delivered at each movement.

At the forward edge of the segment plate, 31, and on opposite sides of the notch, 30^a, therein is secured the ends of a U-shaped strap, which allows the ends of the pasting roller to pass over the entire length of the blank, the outer end of which projects beyond the form a suitable distance to form the end folds at the bottom of the bag, while the aperture 32^a is of equal length with the bag after the bottom has been formed.

The inner end of the feed table 26, is supported upon the horizontal arm 33^a of an angle bracket secured in the inner upright or bar 5^a, and is formed with a notch or recess 26^a, extending from the rear end of said table to within a suitable distance of the front end thereof, and of slightly greater width than the form blocks. The blank A at specified times, as hereinafter referred to, is placed upon said table and over the notch, and bears respectively, at its inner and rear edges, against gage bars *x* and *y*, adjustable upon the feed table by means of set screws *x'* and *y'*. As the form-wheel makes the intermittent revoluble movement preceding that which carries the form-block through the notch of the feed table, the roller 15^e of the corresponding spring actuated paper holding plate 15 comes in contact with the cam surface 16^a of the curved plate 16, and pivotally operates the lever 15^a to move the plate 15 from contact with the form-block. The length of this cam surface 16^a is sufficient to hold the spring actuated plate 15 from contact with the form-block, during the next or succeeding intermittent movement of the form-wheel; allowing the paper blank to be placed upon the notched feed table after the spring actuated paper holding plate 15 has passed through the notch 26^a, but before the form block passes through said notch. As this movement takes place, the paper blank A interposed between the moving paper holding plate and the form

block, is carried through the notch 26^a by the descending form as it follows the paper holding plate, in such manner that the long flap *a* of the blank is formed at the inner side of the form, and the short flap *b* of said blank is formed at the outer side of the form-block. Immediately the form block passes through the notch, the roller 15^e of the lever 15^a, clears the end of the cam surface 16^a of the curved plate 16, and the spring 15^d actuates the plate 15 to bear firmly against that portion of the paper blank interposed between the form block and said plate. A roller, *z*, the same length of the blank, is journaled at the upper edges of the segment plates 31 and 32 on opposite sides of the form block passage, and prevents the side, or flap, of the blank becoming creased, or crumpled. The same intermittent movement of the wheel, causing the form block to move downward through the notch, carries said block until the upper surface is on a level, or flush with, the upper surface of the paste distributing board, and the flaps, *a* and *b*, project upward, as shown in Fig. 24. The pasting roller before described then passes over the outer, or short, flap, *b*, and presses it down firmly upon the upper surface of the form, and at the same time applies paste to the upper surface of the flap *b*; the folding, or presser, roller 33, moving outward, or toward the pasting roller, comes in contact with the inner, or longer, flap, *a*, about the instant the pasting roller reaches its inmost travel, and the folding, or presser, roller, continuing its outward travel, causes the inner surface of the longer flap, *a*, to bear upon the pasting roller just as the said pasting roller begins its retrograde movement, and thus the flap *a* receives a coating of paste upon its inner surface, the folder, or presser, roller continues its outer travel until the opposite, or outer side of the form block has been reached, thus pressing and pasting the flap *a* firmly and smoothly upon the shorter flap *b*, and completing the longitudinal fold, or seam, of the bag, and the folding, or presser, roller begins its retrograde movement through the aperture 32^a of the inner segment plate 32.

At the outer edges of the segment plates 31 and 32 is firmly secured, respectively, the bearing blocks 45, 46, which support the inner ends of the parallel shafts 47 and 48, the outer ends of which are respectively supported in the similar bearings, 49 and 50, upon the cap frame piece 3.

To the outer ends of the shafts 47 and 48 are secured spur gear wheels, 51, 52, which engage with each other, and a sprocket wheel, 53, upon the wheel 51 is driven by a chain from a similar sprocket wheel, 54, upon the shaft 6, and which will operate to turn the said shafts toward each other in the direction of the arrows. Shown in Fig. 7. A rock shaft 58 is journaled at one end in bearings 59, bolted to the segment plates 31 and 32, and at its opposite, or inner, end is journaled in bearings 60 formed through the upper end of brace

bars 4^a, 4^b, which brace bars are secured at their outer lower ends to the front beam 3 of framework. A folding arm 57 is rigidly secured upon the shaft 58 between the bearings 59—59 and directly opposite the passage way between the segment plates 31 and 32. The shaft 58 is caused to oscillate at the proper interval, compelling the arm 57 to move revolvably inward and downward, folding the top end of the blank downward against the end of the form, and returning to its original position about the time the retrograde movement of the roller 33, before referred to, is completed. The oscillation of the shaft, producing the effect described, is caused by means of the elbow, 58^a, at its inner end being engaged by a friction roller 61 upon the pin 61^a projecting from a strap 61^b, secured around the driving shaft. When the end folding arm 57, which is provided with the flat and extended face 57^a to bear firmly and squarely against the end of the form block has completed its fold, the elbow will pass the roller, and the shaft 58, carrying the folding arm, will be returned to its former position by a spring 61^c encircling the shaft, and secured to the bearing 60 at its inner end. As the end folding arm 57 returns to its original position the pawl 17 is acted upon by its eccentric to turn the form wheel a limited distance, to carry the form block to a third position, the second form, at the same time, moving with its respective blank to a second position, where its longitudinal seam or fold is made, and a third form moving to the first position just above the notch in the feed table, and over its respective blank, the spring actuated plate 15, being at the same time held away from the form-block, and at the lower side of the blank. Immediately the form block reaches its third position the segmental arms 55 and 56, carried by the shafts 47 and 48, and continually revolving therewith, come in contact with the sides of the projecting end of the blank, and fold said sides across the end of the form.

In order that the construction and operation of the succeeding devices may be clearly understood, we will describe more accurately the construction and operation of the plates 55 and 56. These plates are fan shaped segments, each having its inner advance edge chamfered, as shown at 56^a, Figs. 3 and 27, which acts upon the projecting fold and turns it inwardly first, as shown in Fig. 27, before it is completely folded down by the flat surface of the segment arm which follows the chamfered portion. The plate 55 will first act upon the inner fold of the bag and turn it down, closely followed by the plate 56, which will fold down the outer fold to partially cover the inner one, and thus leave a depending triangular flap, shown in Fig. 26, only remaining to be folded up in place to complete the bottom of the bag. Before this is done the end folds and depending flap receive a coating of paste on their exposed, or

outer, surfaces by a revolving brush, 62, closely followed by a presser bar, 63, holding the folds securely upon the upper edge of the folding bottom board, 64, connecting the lower and front edges of the segment plates, 31 and 32. The brush 62 is adjustably secured directly opposite the form passage upon the shaft 62^a, journaled at its inner end in a bearing 62^b, secured to the segment plate 32, and at its outer end in a double bearing block 64 upon the upper side of cross beam 4 of the frame. The inner end of shaft 62^a carries a miter gear 62^d, meshing with a similar gear, 62^c, upon the cross shaft 47, and adjacent to the inner folding side arm 55 on the same shaft. A grooved belt pulley, 62^e, is also secured upon the shaft 62^a.

Located a suitable distance beneath the shaft 62^a is a paste box 62^j, which is supported upon the horizontal arms of brackets 62ⁱ secured to the inner side of front beam 3 of framework. This paste box 62^j carries a shaft 62^h, located vertically beneath, and extending parallel with the shaft 62^a, and has a grooved pulley, 62^g, on the end which projects from the outer side of the paste box; the grooved pulley is connected to the similar pulley 62^e of shaft 62^a through the medium of cross belt, or cord, 62^f. The shaft 62^h also carries a paste roller, 62^k, situated vertically beneath the brush 62, and revolving therewith through the medium of cross belt, or cord, 62^f.

The presser bar 63 consists of a handle portion, 63^{a'}, adjustably secured by a set bolt, 63^a, to the inner end of shaft 63^b, and a presser arm 63^{a''} extends perpendicularly from the handle portion 63^{a'} and across the form passage, as will be hereinafter referred to. The shaft 63^b extends parallel with the shaft 62^a, and is supported at its outer end in the block 64, and at its inner end in the bore bearing block 63^c, the cross bore of which fits around the shaft 48, and the bore 63^d supports the inner end of shaft 63^b. This presser bar 63, supported on shaft 63^b, is forced down at the proper time, by means of the spring 63^e, spirally encircling the shaft 63^b, and secured at one end thereto, and at its opposite end to the double bearing block 63^c. When the presser arm 63 has completed its work of holding the folds and depending triangular flap, the spur of the revolubly moving cam 63^x, secured upon shaft 63^a, will engage the spur of cam 63^y, secured upon rock shaft 63^b, and revolubly moving said cam in the direction of arrow Fig. 30, raise said presser arm 63 until the spur of cam 63^x becomes disengaged from the spur of cam 63^y, when the presser arm is immediately acted upon by the spring 63^e, to move downward and engage the succeeding bag, in the order of progression. The pawl 17, by reason of its actuating mechanism, causes again the intermittent rotation of the wheel, and thereby causes the form block to assume a fourth position, which carries the said form block below the upper edge

of plate 64 and in rear thereof, thus causing the depending and final flap to be folded upward, and completing the formation of the bag.

A segmental drying chamber is located opposite the closed or outer ends of the bags, and extends from the lower edge of folding plate 64 to within a suitable distance from the discharge point of the bags, and is supported by brace rods 5^{a''}. This chamber is provided with groups of perforations at intervals through its inner side, arranged opposite the ends of each form and bag bottom as it is presented during the intermittent rotation of the wheel. A steam supply pipe, 66, projects into the chamber near its central point, and has branch pipes extending to the opposite ends of the chamber. The object of the perforations being grouped at intervals, as shown in Fig. 22, is to prevent the bottom of the bag, should a little of the paste escape from between the flaps, being torn as the form blocks move from one point of stoppage to another, as would probably be the case if the escaped paste should dry against a closed portion of the chamber. The warm air jets, escaping through the perforations, will thus completely dry the pasted bottom by the time the bag has reached the portion of the wheel where it is to be discharged from the form by a slide plate, or shoe, 67, normally held slightly above the form to permit the latter to pass beneath it, and pivotally supported upon the outer end of a short lever 68, hinged at 68^a to the upper end of an upright lever 69, which is pivotally supported at 69^a upon the stud 69^b upon the frame below the driving shaft. The slide 67 consists of a wooden block 67^{a'} preferably, and a plate 67^{a''} having two horizontal arms secured to the bottom of the block. A block of rubber, or other suitable material, is secured between the horizontal arms of plate 67^{a''}, and projecting a short distance beyond the front edge of the lower arm, the object of which will be hereinafter stated. The lever 69 is vibrated so that the slide 67 will pass along the top of the form by means of the annular cam groove 70 of a collar secured upon the shaft, and a pin 70^a upon the lever 69, engaging the groove 70. The revolution of the shaft causes the cam groove 70 to act upon the pin 70^a to cause the lever to move toward the wheel, and the front edge of the lower arm of plate 67^{a''} engages the edge of the bag surrounding the form, the projecting block of rubber at the same time resting lightly but firmly upon the upper surface thereof, as the slide advances, and thus prevents the bag from crumpling, or creasing, as it is pushed from the form.

A short arm, 71, is secured at its rear and lower end to the lever 69, a suitable distance from the upper end thereof, and projects forwardly and upwardly, and is bifurcated at its upper end. The short lever 68 rests therein, and when the lever 69 is moved back, the lever, being fulcrumed in the upper bifurcated portion of arm 71, elevates the slide suffi-

ciently to allow the form block, and bag thereon, to pass beneath. When, however, the lever 69 is moved forward vertically over its pivotal point, the lever 68 is elevated above its rest upon supporting arm 71, and the slide is thus allowed to rest firmly upon the upper side of the inner, or open, end of the bag, and by its continued forward movement will push the bag from the form and into the hopper of a chute 72, which will conduct the bag away from the machine.

If the form 13 were solid, the bag, closely covering it, would be difficult to remove from the form, because of the partial vacuum, or exclusion of the air, from the interior of the box. To avoid this the longitudinal orifice 13^a extends from the outer nearly to the inner end of the form, and is then conducted transversely to the side of the form beyond the inner open end of the bag, and in rear of the retaining plate 15, as shown in Figs. 9 and 11, by which means air is admitted into the form, and entering the bag as it is pushed from the form, prevents the bag's collapsing, and thereby possibly being destroyed. The form 13, as shown in Fig. 14, has a thickened plate 13^f detachably secured to the side of the form opposite to that against which the paper retaining plate 15 bears, to enlarge the form when it is desired to make larger sized bags. This is often found necessary in the coffee packing trade, as at certain seasons of the year coffee is more bulky to the weight than at other seasons, and the package must be enlarged.

A recapitulation and connected description of the entire operation of the machine will render the various successive steps of the process of fashioning the bag more clearly understood.

In operation, the clutch is thrown into frictional contact with the revolving belt-wheel by means of hand bar extending to the front of the machine and lever 9^a, and as the form approaches the notched feed table the paper holding plate is moved therefrom to allow the paper blank to be interposed between the said plate and the form block as described. The next succeeding movement of the form wheel, carries the form-block through the notch 26^a, until the top of the form is in the same plane as the paste table, folding the sides of the blank upward as shown in Fig. 24. The paste roller then folds the short side upon the upper surface of the form, and applies paste to the outer surface of the fold. The roller 33 then folds the longer side toward the paste roller, the extending end being pressed against the surface of the paste roller before said roller has time to recede. The folding roller 33, continuing its course, folds and pastes the longer flap over the shorter flap; the outer end of the tubular blank thus formed projects beyond the end of the form, and is made to form the bottom of the bag, first by the descent of the folding arm 57, which presses down the upper side of the

projecting end, and also the diagonal upper corner of the sides, as illustrated in Fig. 25. The folding arm then quickly returns to its original position through the action of a spring, and the tubular blank descends by means of the carrying wheel to present a new blank to the pasting rollers, and also to present the thus partially formed end of the tubular blank to the next step in the formation of the bottom of the box, which is accomplished by the action, first, of laterally rotating segment plates, the inner plate first folding the inner side and then the outer plate folding the outer side to partly overlap the inner fold close against the bottom of the form, as shown in Fig. 26. The projecting sides are smoothed down closely to form the side folds without shearing them, by means of the chamfered, or beveled, edges of the plates having first passed over the folds, and then the flat surfaces thereof, and leaving the depending triangular flap (Fig. 26) extending below the edge of the end folding plate at the bottom edge of the bag. The end folds then receive paste from the revolving brush, which applies paste to the outer surfaces of the top and side end folds, and the inner, or exposed, surface of the depending triangular flap, the brush at the same time holding the folded ends in position, until the presser bar which follows immediately in the wake of the brush, descends, and bears firmly against the end folds, and holds them closely together at the point of contact with their stationary plate 64, as shown in Figs. 29 and 30. As the brush leaves the lower end of the triangular flap, said flap springs to the position shown in dotted lines, Fig. 30, and the presser bar retains its position against the end folds until after the form wheel has started, thereby creasing the fold, which is completed by the continued movement of the form, when the plate 64 forces the lower end flap upward, thus completing the end of the bag. The paste being still damp, the bottoms of the bags, after leaving the folding plate 64, are presented successively at each intercepted movement of the form carrying wheel, opposite the groups of perforations in the rear side of the drying chamber, until within a short distance of the top of the wheel, when the friction roller 15^e, coming in contact with the projecting, or cam, surface 16^b of roll plate 16, causes the retaining plate 15 to automatically move from and release the bag, allowing the automatically operating slide to force the bag from the forms. The air passes through the air duct of the form to let the bag fill with air and be freely pushed off into the mouth of the chute, whence it is conducted downwardly and laterally to a car, or form bearer, ready to be filled with the substance which they are to contain.

As will be observed from Fig. 8. of the drawings, the distributing board, or table, ends a slight distance from the outer surface of the plate 31, thus allowing the front distributing roller, when moving forward, should too much

paste gather on the table in front thereof, to cause the accumulated paste to fall through the opening, or space, left between the end of the board and the outer segment plate, and into a receptacle placed thereunder for the purpose. The adjustable gage bar, secured transversely upon the paste box, allows only a certain quantity of paste to be carried up by the paste roller 62^k.

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

1. A paper-bag machine, comprising an intermittently revoluble wheel, forms secured to the face of said wheel and arranged parallel with the axis of the wheel, a notched feed table through which the forms pass, a paste table and a roller operating thereon and adapted to fold down and apply paste to the outer side flap of the blank and a guide table at the inner side and a folding roller adapted to operate thereon and fold down and paste the inner side flap upon the outer side flap, to form the longitudinal seam of the bag, substantially as set forth.

2. A paper bag machine, comprising an intermittently revoluble form carrying wheel, the paste board, or table, the blank receiving table and adjustable gages thereon, segmental guide plates to hold the form while being pasted, and the pasting roller to close the side of the bag, substantially as described.

3. A paper bag machine, comprising a form block, a notched feed table through which the form passes, a guide table and a pasting board, or table, and rollers reciprocating upon said pasting board or table and over the form and an inner roller adapted to reciprocate upon the guide table, substantially as described.

4. A paper bag machine, comprising a movable form, a notched feed table through which the form passes, a guide table and a paste distributing board, or table, and independently moving companion rolls operating upon the paste distributing board or table for supplying the paste, and for pasting and rolling down the side flap of the bag, substantially as described.

5. A paper bag machine, comprising a movable form, a notched feed table, a paste distributing board, or table, and a series of pasting and distributing rolls, and a rack bar to give positive movement to the rolls, substantially as described.

6. In a paper-bag machine, the combination with a drive-shaft, a paste-distributing board, a train of rollers mounted upon said distributing board, and eccentrically operated from the drive-shaft, of a paste-box having an opening, and a spring-actuated shutter adapted to open outwardly closing said opening and adapted to be automatically opened with each outward reciprocation of the roller-train, substantially as set forth.

7. In a paper-bag machine, the combination with a drive-shaft, a paste distributing board,

a train of rollers mounted upon said distributing board and eccentrically operated from the drive-shaft, of a paste-box having an inclined bottom at its inner side and an inclined shutter hinged at its upper edge forming the bottom of the outer side of the paste-box, and presser-springs secured to the outer side of the paste box and bearing against the shutter, and having downward extensions, and set-screws passed through said extensions and adapted to be contacted by the outermost distributing roller at each outward reciprocation of the train of rollers, to operate the presser-springs and allow the shutter to be opened by the pressure or weight of the paste, substantially as set forth.

8. A paper bag machine, comprising the revoluble form carrying wheel, the blank holder, the notched feed table, the paste receptacle supported at the rear side of the blank holder, and the paste distributing board, or table, and paste rollers traversing the same and passing over the form, substantially as described.

9. A paper bag machine, comprising an intermittently rotatable form carrying wheel, a notched feed table, and segmental guide plates adapted to receive the form, reciprocating pasting and folding rollers to form the longitudinal seam of the bag, an oscillatory end folding arm, laterally rotatable arms to form the end side folds, and a stationary end folding plate, connecting the segmental guide plates near their lower ends, substantially as set forth.

10. A paper bag machine, comprising a wheel, forms secured to the face of said wheel and extending parallel with the axis of the wheel, a notched feed table extending radially with the axis of the wheel, an inner slotted segment plate and an outer notched segment plate, parallel to each other and concentric to the axis of the wheel, and connected to the feed table at each side of the notch, a folding and pasting roller adapted to operate through the notch in the outer plate, and a folding roller adapted to operate through the slot or aperture in the inner plate, a paste distributing table or board communicating with the notch of the outer plate, and a guide table communicating with the slot of the inner plate, upon which paste distributing table or board and the guide table, the combined folding and pasting roller, and the folding roller respectively operate, substantially as set forth.

11. A paper bag machine, comprising an intermittently rotary form wheel, outer and inner guide segment plates, notched feed table at the upper ends of said segment plates, a guide plate and a paste distributing board, or table, movable folding and pasting rolls, and an end top folding arm opposite the end of the form, substantially as described.

12. A paper bag machine, comprising a rotary wheel, form blocks secured to the wheel for holding the blank, a spring actuated rock

shaft, an intermittently oscillating end top folding arm secured to said shaft, and a revoluble strap carrying a trip roller for operating the shaft, substantially as described.

5 13. A paper bag machine; comprising a movable form, a pair of segmental guide plates a notched feed table carrying friction guide rollers at each side of the notch and located above the upper end of the parallel segment
10 plates, a top end folder and rotary companion side folding plates, substantially as described.

14. A paper bag machine, comprising a movable form, parallel segment guide plates, a
15 notched feed table located at the upper ends of said segment guide plates, and a plate rotatable laterally across the end of the said form and chamfered at its forward end to pass over the fold without shearing it, substantially
20 as described.

15. A paper bag machine, comprising an intermittently moving form, the parallel segment guide plates, a notched feed table located at the upper ends of said segment guide
25 plates, the top and side folders, and the oscillating presser arm to hold the inner folds until the outer fold is turned up, substantially as described.

16. A paper bag machine, comprising an intermittently moving form, the segment guide
30 plates, a notched feed table located at the upper ends of said segment guide plates, the top, bottom and side folding plates, and the oscillating presser arm supported upon the spring actuated counter rock shaft carrying a cam
35 plate, and a parallel brush rotating shaft carrying a companion cam plate, to operate substantially as described.

17. A paper bag machine, comprising an intermittently moving form, segment guide
40 plates, a notched feed table located at the upper ends of said segment guide plates, the top and side folders, and rotatable paste brush to paste the outer side of the inner folds and the
45 inner side of the outer fold, the presser bar for holding said folds, and the cross plate for turning up the bottom fold, substantially as described.

18. A paper bag machine, comprising an intermittently moving form, segment guide
50 plates, a notched feed table located at the upper ends of said segment guide plates, the top and side folders, revoluble paste brush, a spring actuated presser arm, and a bottom
55 folding presser plate, substantially as described.

19. A paper bag machine, comprising an intermittently revoluble wheel, a series of form blocks secured to the face of the said wheel,
60 a notched feed table, and reciprocating pasting and folding rollers for forming the longitudinal seam of the bag, segment guide plates for form blocks, an arm for folding the upper end of the blank projecting beyond the form,
65 laterally operating arms, or plates, for folding the side projecting ends, and a plate secured

across the guide plates for folding the final end flap of the bag, substantially as described.

20. A paper bag machine, comprising an intermittently moving form, a pair of segment
70 guide plates, a notched feed-table located in the upper ends of said segment guide plates, the end folding plate, the revolving brush, and the paste box carrying the paste roller revolving in the same direction as and be-
75 neath the brush to supply the brush with paste, substantially as described.

21. In a bag making machine, a revoluble shaft carrying a paste brush, a paste box located beneath said shaft, and a short shaft
80 journaled through said paste box parallel to the paste brush shaft, and a grooved roller located upon the brush shaft and upon the outer end of the paste box shaft, and a cross belt connecting said rollers, and a paste roller
85 located upon the shaft within the paste box, and adapted to feed the paste brush, substantially as described.

22. In a paper bag machine, a drive shaft, a belt wheel mounted thereon having an arm,
90 a form-wheel mounted loosely upon said shaft, and a friction clutch keyed to slide upon said shaft, and frictionally engage the arm of the belt wheel, a lever pivotally supported and pivotally connected to the clutch,
95 and a hand-bar extending to the front of the machine and pivotally connected to the other end of the pivotally supported lever, an eccentric mounted upon the drive shaft, and means actuated by the eccentric to intermit-
100 tently revolve the form wheel upon the drive shaft, when the clutch is actuated to frictionally engage the arm of the belt wheel, by means of the forwardly extending hand bar, substantially as set forth.
105

23. A paper-box machine, comprising a shaft, a form-wheel revolubly mounted upon
said shaft, and having pins or projections at its rear side, a rock-shaft mounted trans-
110 versely of the frame at one end of the form-wheel, a rock-arm mounted upon said rock-shaft, an eccentric mounted upon the form-wheel shaft, and operatively connected to the rock-arm to actuate the rock-shaft, a slotted
115 rock-arm also carried by said rock-shaft and an elbow-lever carried thereby and having a pin or projection engaging the slot of said rock-arm, and an arm adapted to engage the pins or projections of the form-wheel, and an
120 inwardly extending slotted arm, and an adjustable trip-plate carried thereby, and a pivoted detent adapted to engage successively presented pins or projections of the form wheel, and having an upwardly extending toe
125 adapted to be engaged at times by the trip-plate carried by the elbow-lever, substantially as set forth.

24. In a paper-bag machine, the combination with a drive-shaft and means to operate the same, a form-wheel revolubly mounted
130 upon the drive-shaft, and having pins or studs upon its rear face, and an eccentric mounted

upon the shaft, of a rock-shaft supported at one end of the form-wheel, and having a rock-arm, and a rod operatively connecting the eccentric and the rock-arm, and a second

5 rock-arm carried by the rock-shaft, and a lever or pawl supported by said rock-arm and adapted to engage the pins or studs to move the form-wheel, all arranged as described, substantially as and for the purpose set forth.

10 25. A paper bag machine, comprising a drive shaft, a form-wheel revolubly mounted upon said shaft, a transverse rock shaft mounted on the frame and eccentrically actuated from the drive shaft, a lever mounted

15 upon said rock shaft, having an inwardly extending arm arranged at a suitable angle to the body of the lever, a pawl adjustably pivoted at its lower end to the lever, and adapted to engage successive pins of the form-wheel to

20 revolve the same, and a detent pivoted at its inner end upon a short, transversely extending rod, suitably supported, and adapted to engage successively presented pins of the form-wheel, and a toe upwardly extending

25 from the pivotal end of the detent, and adapted to be engaged at intervals by the inwardly extending arm of the lever, to trip, or raise, the detent from its engagement with successively presented pins of the form wheel, substantially as described.

30 26. A paper bag machine, comprising a driving shaft, the form wheel revolubly mounted upon said shaft, form blocks carried by said wheel, parallel guide segment

35 plates, and a notched feed table located at the upper ends of said segment guide plates, the parallel shafts carrying the companion side folding plates geared together, and the chain and sprocket wheels connecting one of

40 the said shafts with the drive shaft, substantially as described.

27. A paper bag machine, comprising a driving shaft, a form carrying wheel revolubly mounted upon said shaft, form blocks

45 carried by said wheel, parallel guide segment plates, and a notched feed table located at the upper ends of said segment guide plates, parallel shafts geared together and driven by a driving shaft and carrying revoluble fold-

50 ing plates, substantially as described.

28. A paper bag machine, comprising the driving shaft, a form carrying wheel revolubly mounted upon said shaft, form blocks carried by said wheel, parallel segment guide

55 plates, and a notched feed table located at the upper ends of said segment plates, parallel shafts geared together carrying revoluble folders, and a brush carrying countershaft gearing with one of the parallel shafts, substantially as described.

29. A paper bag making machine, comprising an intermittently rotating wheel, forms carried by said wheel, a hot air chamber having perforations, or apertures, arranged in groups

65 to come opposite each form and bag bottom as it progresses, substantially as described.

30. A bag making machine, comprising an

intermittently rotatable wheel, forms carried by said wheel and a drying chamber having groups of perforations arranged to be opposite the end of each form and bag bottom as

70 the wheel revolves, comprising a segmental casing, and steam pipes supported within said casing, substantially as set forth.

31. A bag forming machine, comprising an axle, a revoluble wheel carrying horizontally

75 projecting bag forms, a sliding plate supported upon vibratory levers, and a bracket arm secured to upright lever and supporting the free upper lever above the bag, and per-

80 mitting it to descend upon the bag in operation to discharge the same, substantially as described.

32. A paper bag machine, comprising a drive shaft, a wheel revolubly mounted upon said

85 drive shaft, form-blocks carried by said wheel and instrumentalities for forming the bag upon the form-block, and a slide supported upon levers, and consisting of a block having a plate secured thereto, and a block of rubber

90 carried by and projecting beyond the front end of the lower arm of the plate, and a cam upon the drive shaft, adapted to actuate the levers to cause the slide to force the completed bag from the form-block, substantially

95 as set forth.

33. In a paper-bag machine, the combination with a wheel, form-blocks projecting horizontally outward from the face of said wheel, and spring-actuated clamping-plates to hold

100 the completed bag upon the form-blocks, of a presser-plate having a cam-face adapted as the wheel is rotated to move the clamping-plate to release the bag, and a sliding-shoe, or plate adapted to force the bag from the form

105 as it is released by the clamping-plate, and a chute opposite the point of discharge to conduct the bag from the machine, substantially as set forth.

34. A paper-bag machine, comprising a

110 wheel, forms projecting horizontally from the face of the wheel, and spring-actuated clamping-plates pivotally carried by the wheel and adapted to hold the blanks, and bags when

115 formed, securely upon the form-block, and means to move said spring-actuated clamping-plates away from the form-blocks so that the bags may be removed, substantially as set forth.

35. In a paper-bag machine, the combination with a wheel, form-blocks projecting from

120 the face of the wheel, and spring-actuated clamping-plates pivotally carried by the wheel, and adapted to bear against the form-blocks, of a curved presser-plate arranged opposite to the form-wheel and having cam-sur-

125 faces adapted as the form-wheel is rotated to move the spring-actuated clamping-plate away from the form to receive the paper, and to move the spring-actuated clamping-plate

130 away from the form to allow the completed bag to be removed, substantially as set forth.

36. In a paper-bag machine, the combination with a wheel, form-blocks projecting from

the face of the wheel, and lever-arms pivotally carried by the form-wheel and projecting beyond the rear-face thereof, and rollers carried in the rear ends of said lever-arms, and
5 plates carried by the forward ends of said lever-arms, and adapted to bear against the form-block, of a curved presser-plate, arranged concentrically to the axis of the wheel and opposite the rear ends of the spring-actuated lever-arms, and bent to form cam-faces
10 adapted as the wheel is rotated to be contacted by the rollers and overcome the resistance of and move the spring-actuated clamping-plates away from the form-block to
15 receive the blank, and to cause the spring-actuated clamping-plate to release the completed bag, substantially as set forth.

37. A paper bag machine, comprising a revoluble form carrying wheel, the spring actuated clamps having arms hinged to said wheel,
20 friction rollers, and a curved track plate with projecting, or cam faces, against which the rollers contact as the form-wheel revolves and lift the clamps, substantially as described.

38. In a paper bag machine, a revoluble 25 wheel and form-blocks having recesses therein, nuts fitting into said recesses, and bolts screwed through the wheel and engaging the nuts carried by the form-blocks, substantially as set forth. 30

39. In a paper bag machine, a revoluble form carrying wheel, a notched segment plate, a paste-box, and a roller adapted to open said paste-box, and a paste distributing table or board connected at one end to, and a suitable 35 distance from the notched segment plate (Fig. 8) to allow an over quantity of paste to escape between the end of said table and the notched segment plate, and not be forced into the form passage, substantially as set forth. 40

In testimony whereof we affix our signatures in the presence of two witnesses.

JOHN M. CARTER.
OSCAR M. CARTER.

Witnesses:

T. H. STUMP,
F. O. ROSE.