

(No Model.)

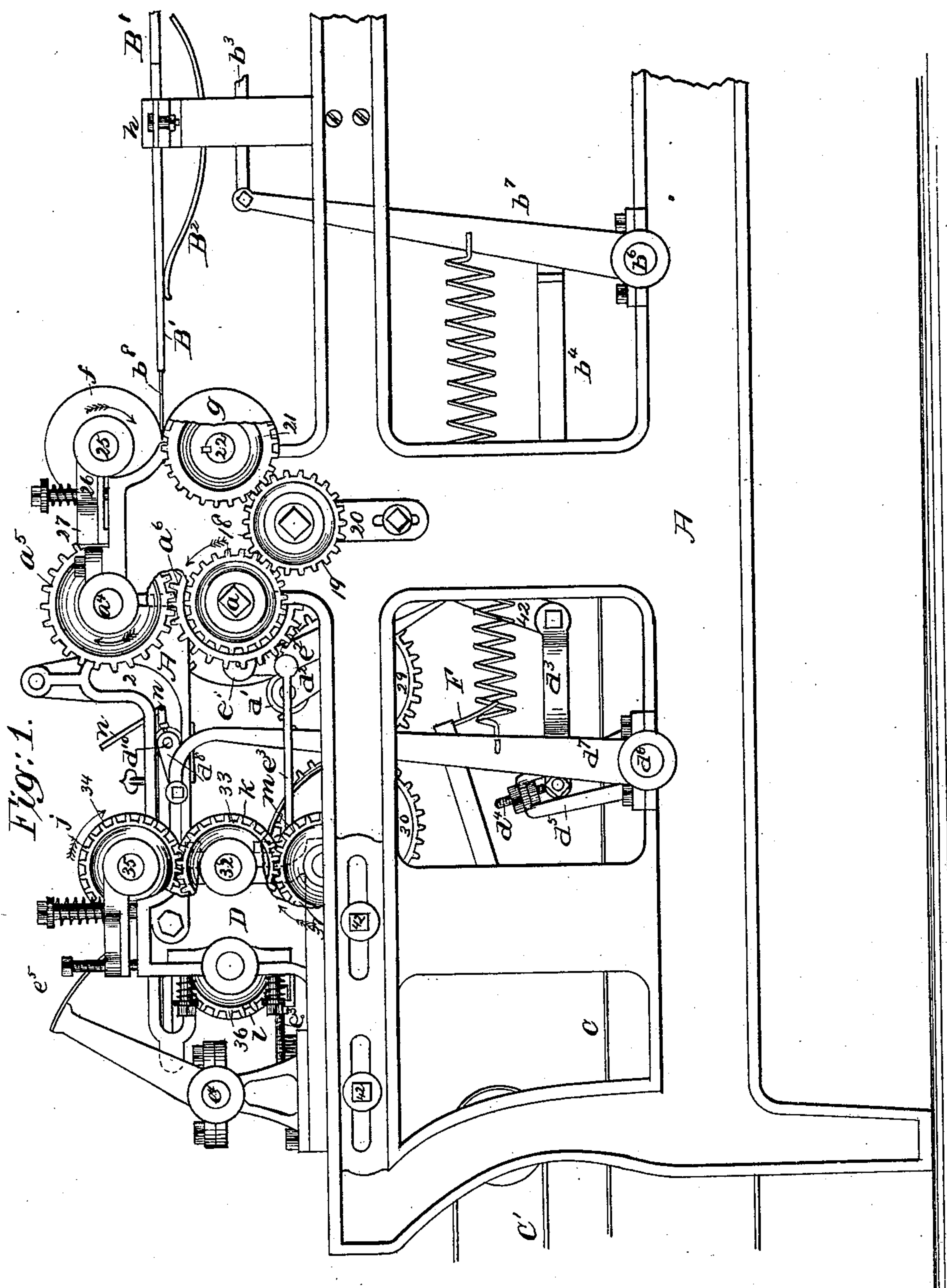
4 Sheets—Sheet 1.

C. A. CHANDLER.

PAPER BAG MACHINE.

No. 256,123.

Patented Apr. 11, 1882.



Witnesses
L. F. Connor.
John F. C. Pruit

Inventor.
Clarence H. Chandler
by Crosby Gregory
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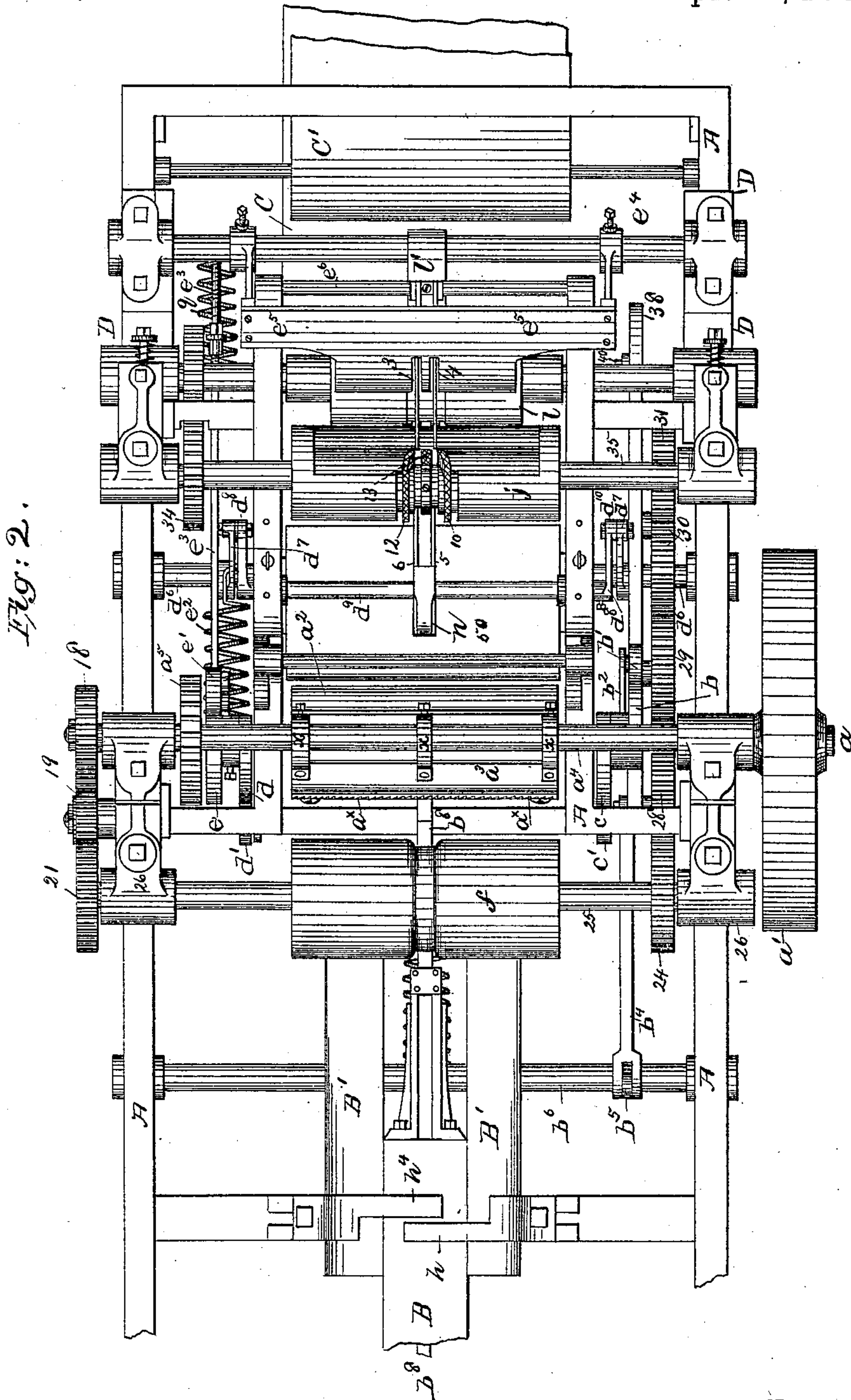
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C. A. CHANDLER.
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(No Model.)

4 Sheets—Sheet 3.

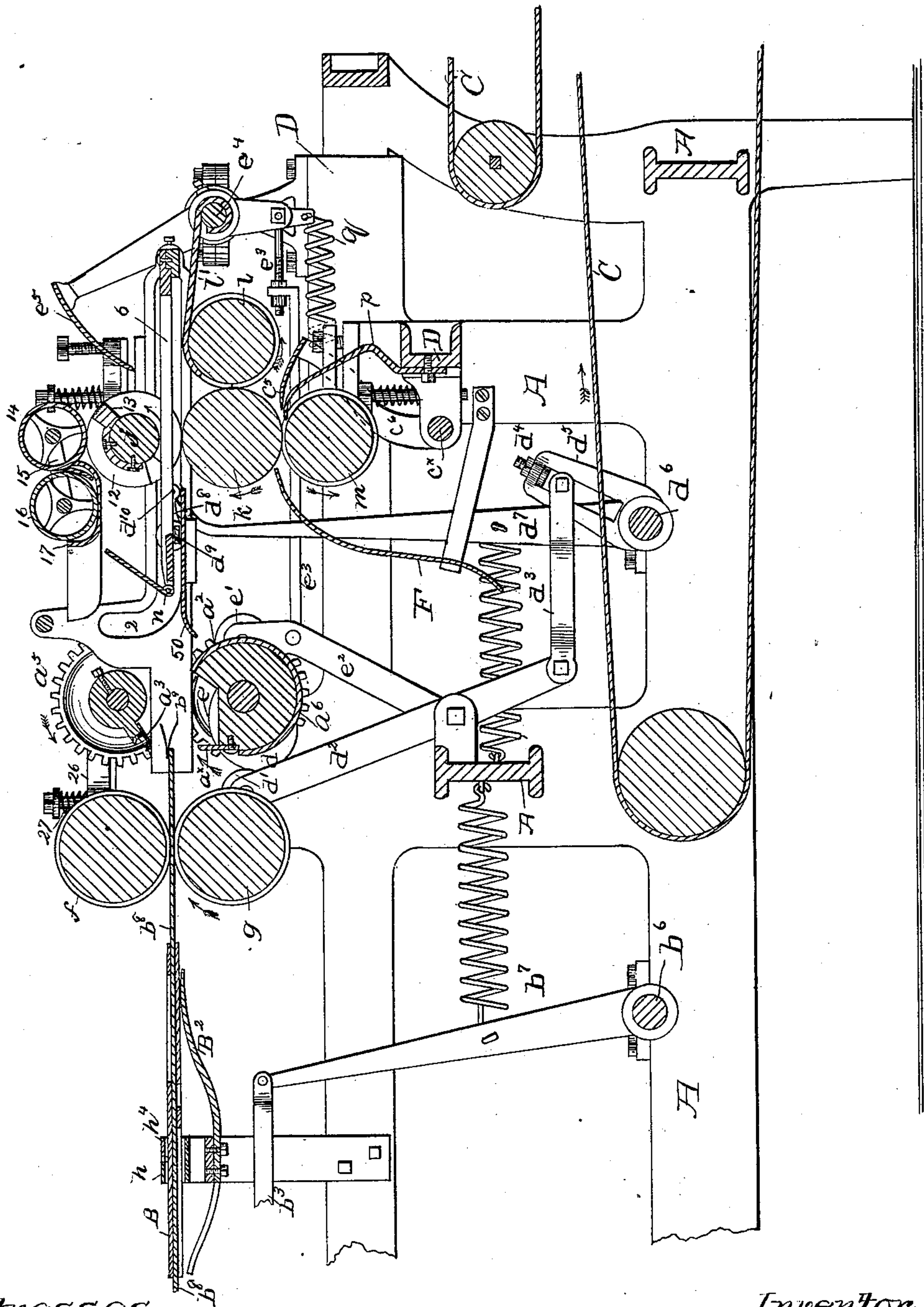
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Fig. 3.



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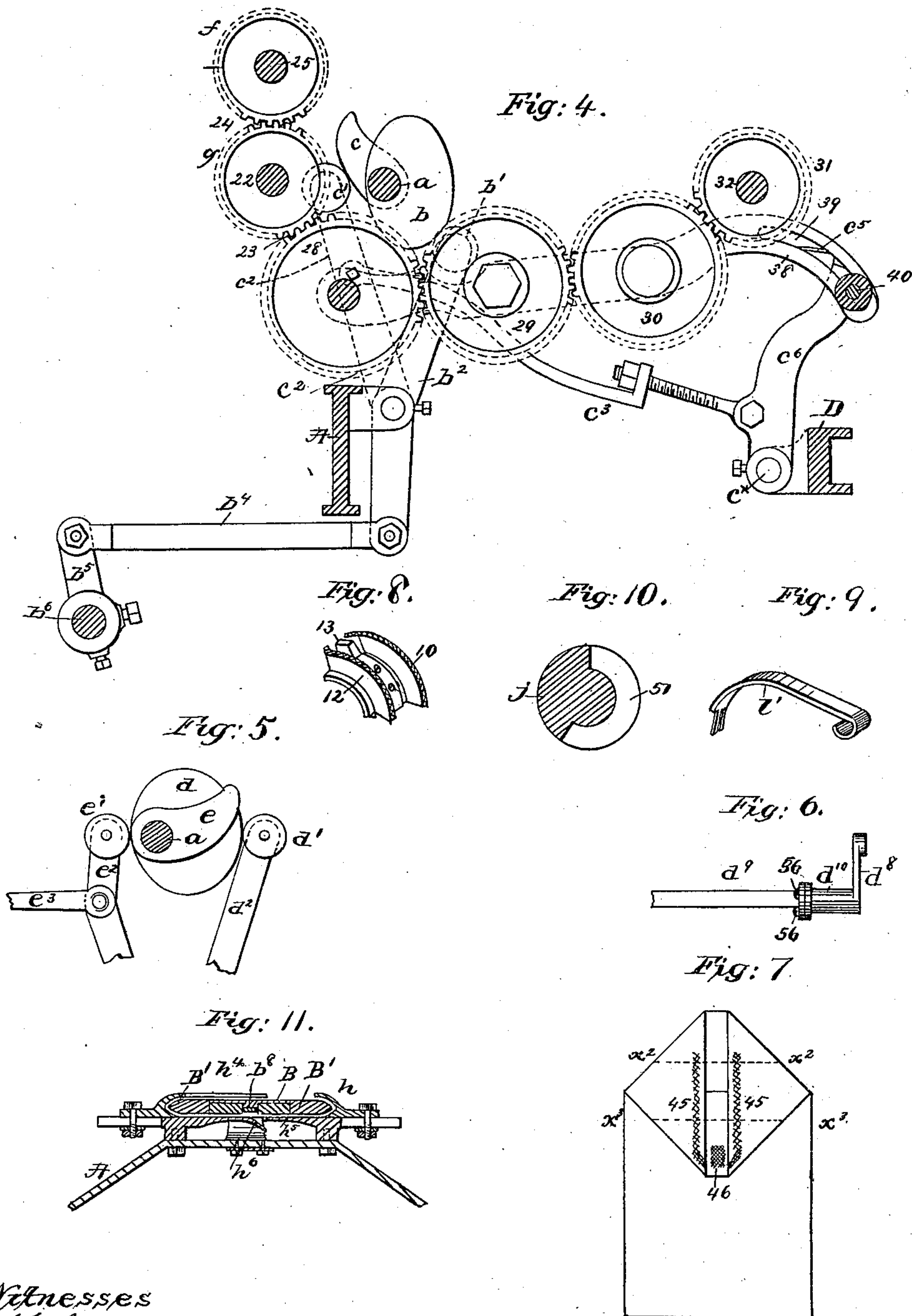
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Witnesses
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UNITED STATES PATENT OFFICE.

CLARENCE A. CHANDLER, OF EAST BRIDGEWATER, MASS., ASSIGNOR TO THE
EASTERN PAPER BAG COMPANY, OF HARTFORD, CONN.

PAPER-BAG MACHINE.

SPECIFICATION forming part of Letters Patent No. 256,123, dated April 11, 1882.

Application filed February 23, 1882. (No model.)

To all whom it may concern:

Be it known that I, CLARENCE A. CHANDLER, of East Bridgewater, county of Plymouth, State of Massachusetts, have invented
5 an Improvement in Paper-Bag Machines, of which the following description, in connection with the accompanying drawings, is a specification.

This invention relates to machines for the
10 manufacture of satchel-bottom paper bags, and is an improvement on United States Patent (Reissue) No. 9,202, dated May 18, 1830, and granted to M. E. Knight.

The object of my invention is to simplify the
15 mechanical construction of the said Knight machine so that it may be run at greater speed and with less power, to improve and simplify the cross-folding apparatus, and to produce a machine which, by changing but few of its
20 parts and adjusting others, is adapted to make perfectly several different sizes of paper bags.

My invention consists in a finger or nose to enter the tubular blank and assist in forming the diamond fold, the said finger being fixed
25 to a cross-bar combined with three folding-rollers and two folding-blades, the said finger being extended between two of the rollers, as hereinafter described; also, in the combination, with a finger to enter the tube and assist in
30 forming the diamond fold, and folding-rollers between which the said finger is extended, of a folding-blade slotted or notched at its edge to pass below the said finger and tuck between the rolls the paper forming the dia-
35 mond fold made in it; also, in other combinations of mechanical devices, as will be specified in the claims at the end of this specification.

The blank feeding and folding rollers and
40 blades are mounted in an independent head made adjustable longitudinally with relation to the tube-feeding, tube-cutting, and diamond-fold-laying mechanisms, to thus provide for the production on the same machine of bags of different lengths.

Some of the driving-gearing to be herein referred to is supported on a lever having a curved slot, so that as the head referred to is moved in one or the other direction the said bar and
50 its gearing will always operate the mechanism carried by the said head.

The rear end of the finger or nose which assists in forming the diamond fold is extended back between the rollers which engage the diamond fold and feed forward the bag-blank, 55 and also back across that roller which, in connection with the lowermost bag-blank-feeding roller and first folding-blade, forms the first cross-fold in the diamond fold. This finger at its rear will preferably be bifurcated to form two 60 narrow bars, below which the notched edge of the said blade may descend. This finger acts to prevent the leading end of the diamond fold from rising or curling up before it is struck by the first folding-blade. 65

Figure 1 represents in side elevation the forward end of a paper-bag-making machine containing my improvements. Fig. 2 is a top view of Fig. 1. Fig. 3 is a vertical horizontal section of Fig. 1. Fig. 4 is a detail representing 70 the train of gearing which operates the bag-blank feeding and folding rollers, the parts of the levers and connections for moving the follower and second cross-folding blade. Fig. 5 is a detail showing the cams for operating the 75 tucking-blade and first cross-folding blade. Fig. 6 is a detail showing a portion of the tucking-blade and its detachable end journal. Fig. 7 represents the diamond fold, dotted transversely to show the lines of the first and 80 second cross-folds to be made by the first and second folding-blades and the rollers between which the said blades tuck the paper at such lines, the said figure also showing in crossed lines the paste applied to the diamond fold to 85 enable it to be pasted together securely; Fig. 8, a detail of the diamond-fold paster removed from the roller *j*; Fig. 9, a detail of the metal band fitted to the grooved central portion of the roller *j*; Fig. 10, a cross-section of the roller 90 *k* midway between one of its ends and the center of the roll in the direction of its length; and Fig. 11 is a cross-section of the former, folder, and follower in the dotted line *x*⁶, Fig. 1.

The frame-work A of the machine will be of 95 suitable shape to properly support the operating parts.

The main shaft *a* of the machine, having thereon a belt-pulley, *a'*, has secured to it the lower member of the tube-cutter, it being com- 100 posed, as herein shown, of a partial cylinder, *a*², having preferably adjustably connected

with it a cutting-blade, a^x , having a series of bevel-pointed sharpened or wedge-pointed teeth, (see Fig. 2,) which at the proper time co-operate with a cutter, a^3 , having a straight edge, preferably adjustably connected with arms x of the shaft a^4 .

The shaft a^4 has fixed upon it a pinion, a^5 , which is engaged and driven by means of a pinion, a^6 , on the shaft a , so that the two rotary cutters are caused to operate one with the other at the proper time to sever the pasted paper tube into lengths for bags of the desired size, the cutting members moving at the same speed.

The shaft a has fixed upon it four cams, b c d e .

The cam b strikes a roller, b' , of a rocking lever, b^2 , connected by link b^4 with an arm, b^5 , on the rocker-shaft b^6 , the said rocker-shaft having upon it an arm, b^7 , connected by link b^3 with the follower b^8 , substantially as in said Reissued Patent No. 9,202, the said follower being thereby reciprocated in suitable guideways in the former B, of usual construction.

The forward end of the follower extended between the feeding-rollers f g , provided at their centers with annular grooves for that purpose, is provided with a finger-cover, b^9 , (see Fig. 3,) shown as a yielding fork, the normal condition of which is expanded, as in that figure, the said cover, when the follower has been moved fully forward, meeting or covering the forward end of the finger or nose n , herein shown as stationary, it being a device substantially such as described in Reissued Patent No. 9,202, dated May 18, 1880, to which reference may be had, the said finger being adapted to enter the leading end of the tube and act upon one ply thereof and lay it back on the body of the tube in the formation of the usual diamond fold, which is the first step in the formation of a satchel-bottom paper bag. The finger-cover b^9 at the end of the follower covers the end of the finger or nose just as the leading end of the tube is being fed upon the said finger or nose by the tube-feeding rollers f g .

The former B may be changed as to size, according to the size of the tube which it is desired to produce, by adding to it the side pieces, B' B' .

A spring, B^2 , located below the former B, presses gently upon and smooths the paper tube where its pasted edges are overlapped.

In connection with the former B, I employ folding-guides h h^4 , (shown in Fig. 11,) to lap the web of paper about the former B. The paper, with one edge pasted, will be supplied to the former B from a suitable roll in any usual manner.

The cam c strikes a roll, c' , on a lever, c^2 , (see Fig. 4,) connected by an adjustable link, c^3 , with an arm, c^6 , of a rock-shaft, c^x , the said arms c^6 having secured to them the second cross-folding blade, c^5 . (See Fig. 3.)

The cam d strikes a roll, d' , on a pivoted

lever, d^2 , having at its lower end the link d^3 , the end of which is made adjustable by the screw d^4 in the slotted arm d^5 , connected with the rock-shaft d^6 , the latter having at each end, just within the frame-work, long arms d^7 , connected by links d^8 with the journals d^{10} (see Figs. 1, 2, and 3) of the tucking-blade d^9 . The tucking-blade d^9 has at each end a detachable journal, d^{10} , which slides in the guide-slots of the frame-work A, the said blade having a movement toward and from the paper tube. The blade is secured to the journals by screws. The tucking-blade d^9 , actuated by the arms d^7 , as above described, is thrown down upon the upper ply of the paper tube substantially as in the Knight patent referred to, and tucks the upper ply under the forward end of the finger or nose just after the same has entered the leading end of the paper tube in the formation of the diamond fold, after which the tucking-blade is moved backward from below the said finger or nose and is lifted from contact with the tube.

By adjusting the screw d^4 the throw of the tucking-blade may be made more or less, according as it is desired to make a long or short bag.

The cam e strikes a roll, e' , of a lever, e^2 , connected by an adjustable link, e^3 , with an arm of a rock-shaft, e^4 , upon other arms of which is secured the first folding-blade, e^5 , said blade being provided near its center with two slots, 3 4, to permit the acting edge of the blade to descend below the side arms, 5 6, of the nose n , the said arms at their rear ends being connected with a cross-bar, e^6 . The arms 5 6 of the nose extend back between the rolls j k , the latter engaging the leading end of the diamond fold laid in the bag-blank, at that time severed from the tube, carrying or feeding said bag-blank forward, while the finger or nose n and tucking-blade operate to lay back or form the diamond fold. (Seen at Fig. 7.) As soon as the diamond-folded portion of the blank has been fed sufficiently far forward between the rolls j k to have made in it the first of the cross-folds the first folding-blade is made to descend and strike the diamond fold on the line x^2 (see Fig. 7) and tuck the blank between the periphery of the roller k and the roller l , the said rollers k l feeding the blank between them and completing the first cross-fold as the first folding-blade retires from between the peripheries of the said rollers. As the rollers k l feed the once-cross-folded bag-blank sufficiently far between them to place the rear end of the diamond fold opposite the bite of the rollers k m the second folding-blade, e^5 , is moved forward quickly to strike the rear corner of the diamond fold on line x^3 , Fig. 7, tucking the same in between the peripheries of the rolls k m , which latter, as the second folding-blade retires, carry the bag-blank between them, completing the second cross-fold of the satchel-bottom, and also making the blind fold in what is to be the body of the bag.

The circumference of the roller *j* is just equal to the length of the bag-blank cut from the tube of paper; but the periphery of the said roller, except near its ends, is very much cut away, as at 51, Fig. 10, or shouldered, to permit the leading end of the diamond fold to get started between the rollers *j k*, where it will be caught by the full parts of the roller *j*, (shown in Figs. 2 and 6,) and, pinching it on the roller *k*, feed the bag-blank forward positively. Cutting away the roller *j*, as shown and described, to form a clear space to permit the leading end of the diamond fold to be entered freely under it keeps the diamond fold in better shape than would be the case if the diamond fold were grasped just at its extreme point or end. The roller *j* is cut away at or near its center to receive the pasters 10 12 13, (shown in detail, Fig. 8,) which apply to the diamond fold the rows 45 and spot 46 of paste represented in crossed lines, Fig. 7, the acting faces of the said pasters being flush with the periphery of the said roll *j*.

The roller *l* is provided with a central annular groove to avoid pressing upon the paper in the line of the paste applied to the diamond fold; otherwise the paste would be spread so far as to fasten together the paper forming the sides and bottom of the bag, which would prevent the bag from opening properly for use. A plate of metal, *l'*, is fitted into this annular groove in roller *l*, and is extended partially about the top of the said roller, so as to maintain an even surface at the top of the roller *l*, for the easy passage of the leading end of the diamond fold over the said roll *l*, prior to the blank receiving its first cross-fold. The plate *l'* is slotted at its ends, (see detail Fig. 9,) to permit the free passage of the lines of paste on the diamond fold then exposed on the upper surfaces of the rear end of the said diamond fold.

Below the rollers *k l*, and connected with the frame-work, is a shield, *p*, to direct the once-cross-folded end of the bag-blank into proper position with relation to the second folding-blade, *e⁵*, and rollers *k m* to be folded on the line *x³*.

The spiral spring *q*, connected with the arms of the rock-shafts which carry the first and second folding-blades, acts, when permitted by the cams which operate the said blades, to throw the blades in their rearmost positions.

The pasters 10 12 13 are provided with paste by means of a roller, 14, (see Fig. 3,) in a yoke, 15, the periphery of the said roller running in contact with a roller, 16, in the paste-trough 17, the roller 14 taking up the proper amount of paste and applying it to the said pasters.

The shaft *a* at one end has connected with it a pinion, 18, which engages an idle-gear, 19, on an adjustable plate, 20, the gear 19 in turn being in engagement with a pinion, 21, on the shaft 22 of the lowermost tube-feeding roller, *g*, which near its other end has connected with it a gear, 23, engaging a gear, 24, on the

shaft 25 of the uppermost bag-feeding rollers, *f*. The shaft of the roller *f* is held in adjustable bearings 26, held down by spring 27.

The gear 23 on the shaft of the lowermost tube-feeding rollers engages an idle-gear, 28, and through a series of idle-gears, 29 30, drives a pinion, 31, on the shaft 32 of and rotates the roller *k*. The idle-gears 28 29 30 run on studs secured upon an adjustable lever, 38, having at one end a curved slot, 39, to receive a stud, 40, connected with the adjustable head D, which carries the folding mechanism. The shaft 32 at its opposite end has a pinion, 33, which engages with a pinion, 34, on the shaft of the roller *j*. The pinion 33 on the shaft of the roller *k* engages a pinion, 36, on the shaft of roller *l*, and also engages a pinion, 37, on the shaft of roller *m*, rotating the rollers *l m* in the same direction, and in the direction of the rotation of the said roller *k*, the three rollers co-operating with the two folding-blades *e⁵* to form the two cross-folds.

This machine, by the change of some of its parts and adjustment of others, may be employed to make bags of different sizes.

To alter the machine to make a bag of a different length, a roller, *j*, will be employed, the circumference of which is just equal to the length of the bag to be produced. The pinion 18 on the shaft *a* will be changed for one of the proper diameter, and the idle-gear 19 will be adjusted between the pinion 18 and the gear 21 to move the tube-feeding rollers more or less and feed more or less length of tube beyond the tube-cutters between one and their next cutting operation, thus varying the length of the bag-blank.

The rollers *j k l m* are mounted in an independent head, D, adjustably connected by bolts 42 (see Fig. 1) with the frame-work of the machine, the said head being adjustable toward and from the tube-cutting and tube-feeding mechanisms and diamond-fold mechanism, according to the length of the bag-blank. The movement of the head D and stud 40 causes the latter, placed in the slot 39, to raise and lower the lever 38 and train of idle-gear thereon, which always remain correctly in operative mesh with the gears with which they are in engagement, notwithstanding the different positions occupied by the head D. The adjustable connecting-rods *e³* and *e³* will be lengthened and shortened as the head D is adjusted on the frame-work, and the throw-points of the cams *c d e* will be changed by adjusting the said cams about the shaft *a*, in order to time the movement of the devices actuated by them according to the size of the bag it is desired to produce.

The directing-plate F receives against it the folded bag and diverts it upon the belt C, which forms one of the system of belts shown in United States Patent to Daniel Appel, No. 231,642, dated August 31, 1880, the belt C co-operating with the belt C' above it. This directing-plate is shown in my application No.

43,092, filed October 3, 1881, and is not therefore herein claimed broadly.

Suitable springs connected with the vibrating levers hold the rolls carried by them against their actuating-cams. The papertube in advance of the tube-cutting mechanism is supported on a plate, 50, against the action of the tucking-blade *d*⁹. Fig. 3 shows the finger or nose *n* in section, with one of its arms, 6, extended back over the rolls *k l* and with the tucking-blade under the said finger almost to its full stroke.

The means herein described for forming the diamond fold are substantially the same as in the Knight patent, and in this application, as in that patent, there is employed a pair of rollers to draw the bag-blank under the finger or nose; and at the rear of the said rollers is a third roller, which, co-operating with the lower bag-blank-feeding roller and a folding-blade, enables the cross-fold to be made at the leading end of the diamond fold. In this application, however, the parts are simplified. The upper roller, which acts on the diamond-folded bag-blank, is also made to apply paste to the diamond fold. I have herein shown a folding-blade and two rolls to form the second cross-fold in the diamond fold, and at the rear of the said rollers a shield to arrest and divert the bag in the opposite direction upon a traveling belt to have the third fold in the bag opened by a second belt; but this I do not herein claim, as it will form the subject of another application for United States patent to be made by me.

I have herein shown the folding-rollers and folding-blades as mounted in a frame, D, made adjustable toward and from the tube feeding and cutting mechanism, to enable the same machine to make bags of different sizes; but I do not herein claim such feature, as it is made the subject-matter of application No. 25,019, filed by me January 31, 1881.

I claim—

1. The finger or nose *n*, extended backward and fixed to the cross-bar *e*⁶, combined with the folding-rolls *j, k*, and *l* and the two folding-blades, the said finger being extended between the rollers *j k* and over past the center of the roller *l*, substantially as described.

2. The finger or nose *n*, extended backward, and a cross-bar to which it is attached, combined with the rolls *k l*, located below the said finger, and with the folding-blade *e*⁵, slotted at its edge to pass below the said finger and tuck the paper bag between the said rolls to

cross-fold the diamond fold, substantially as described.

3. The finger or nose to enter the tube and lay back one ply thereof in the formation of the diamond fold, and the roller *k* below the said finger, combined with the roller *j*, slotted to permit the said finger to be extended back between them, and with the diamond-fold pasters 10 12 connected with the said roller *j*, substantially as described.

4. The roll *k*, combined with the roll *j*, having part of its periphery cut away to permit the leading end of the diamond fold to be projected well under it before the diamond fold is caught between the said rolls to be drawn thereby under the said finger or nose, substantially as described.

5. The rollers *j k*, the finger or nose extended between them, and the movable tucking-blade, combined with the two rolls *l m*, arranged next the roller *k*, and with the two folding-blades *e*⁵ *e*⁵, substantially as and for the purpose described.

6. The rocker-shaft *e*⁴, its arms, folding-blade, and adjustable head, in which the said rocker-shaft has its bearings, combined with the adjustable connecting-rod, the lever *e*², and cam to move it, substantially as described.

7. The roller *k* and its attached gear 31, the adjustable head D and its stud 40, and the gear 23 on the shaft of the tube-feeding roller, combined with the slotted lever 38 and its attached idle-gears, to operate substantially as described.

8. The roller *l*, having an annular central groove to prevent improper spreading of the paste applied to the diamond-folded part of the bag, combined with the metal plate *l'*, extended across the said roller, and between it and the roller *k*, and slotted at its ends, as described, to avoid coming in contact with the lines of paste on the rearmost end of the diamond fold, the said plate filling the said annular groove at the top of the said roller, thus furnishing a smooth surface over which the leading end of the diamond fold is fed before it receives its first cross-fold, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CLARENCE A. CHANDLER.

Witnesses:

ROBERT SHERRARD, Jr.,
Z. L. WHITE.