Dec. 31, 1929. A. C. COTY ET AL 1,742,174

PAPER BAG MACHINE

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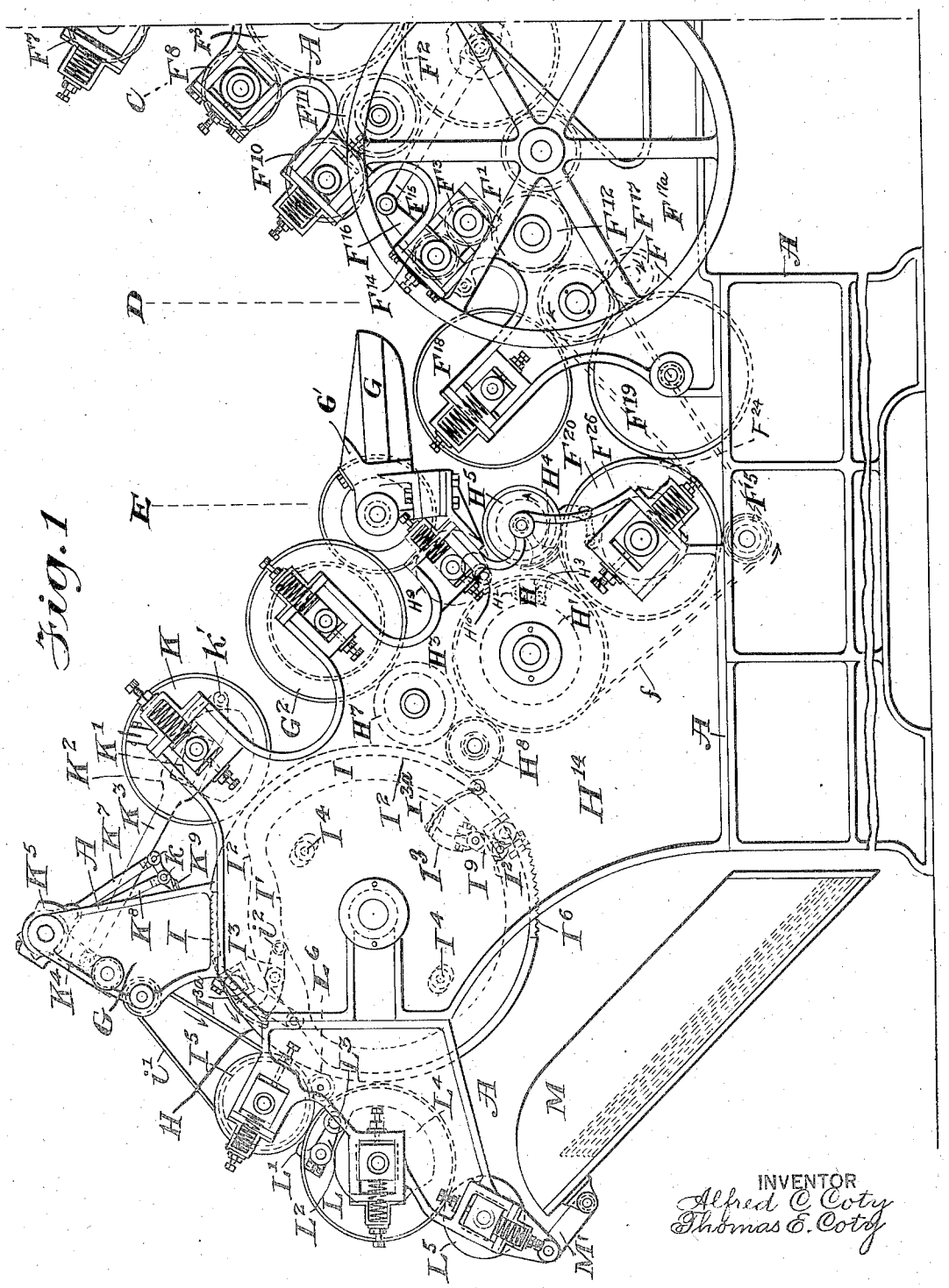


Fig. 1

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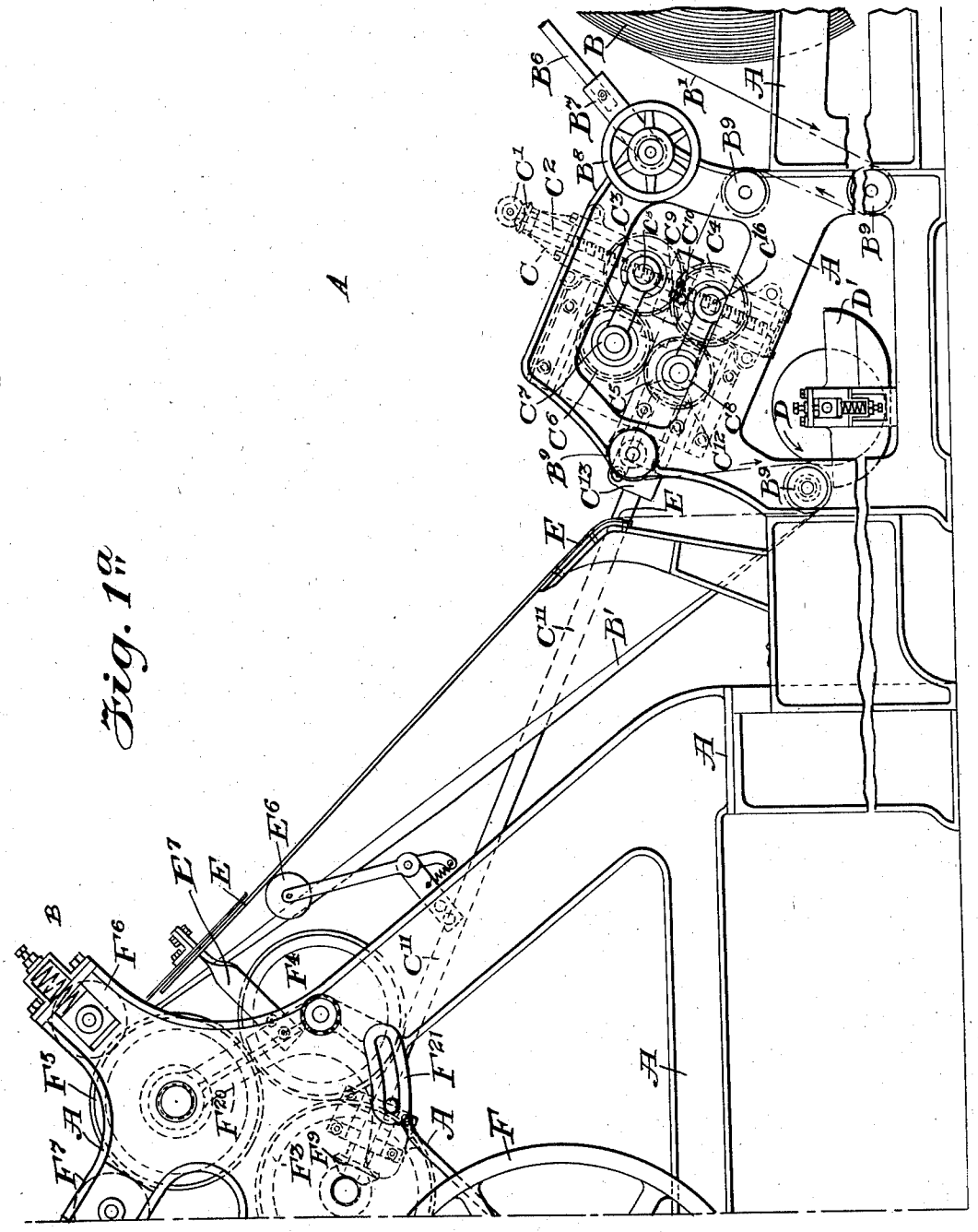


Fig. 1a.

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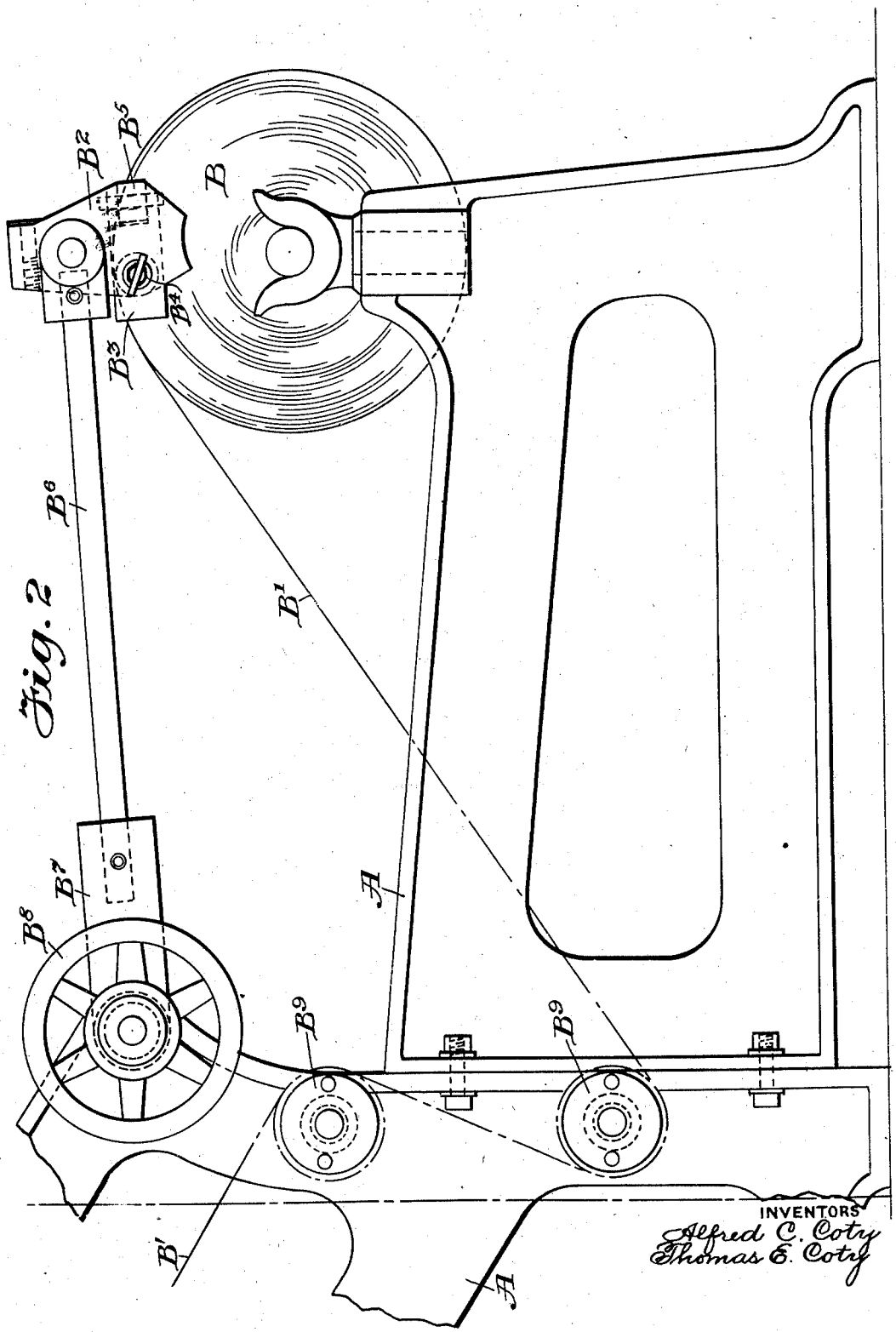


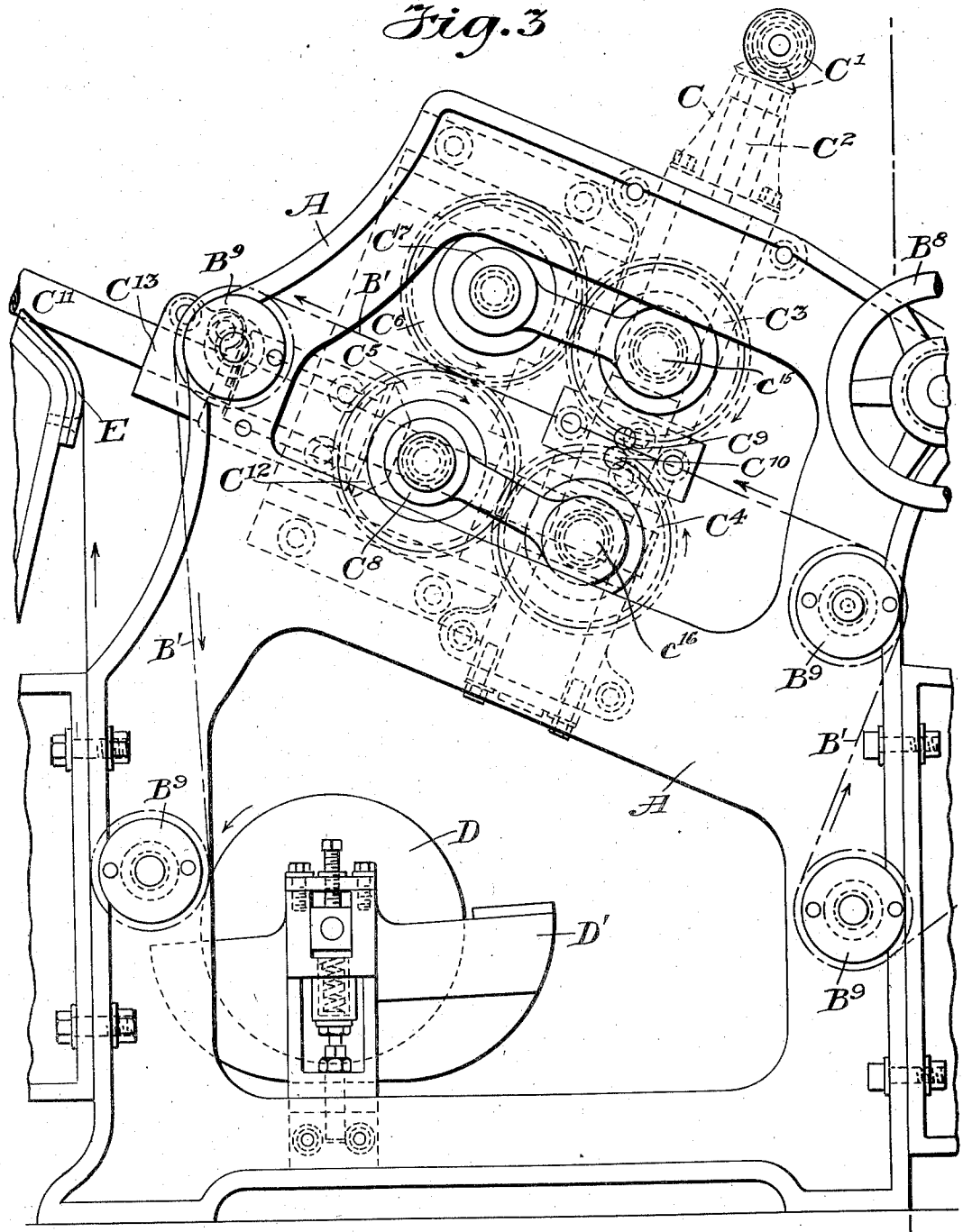

Fig. 2

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Fig. 3



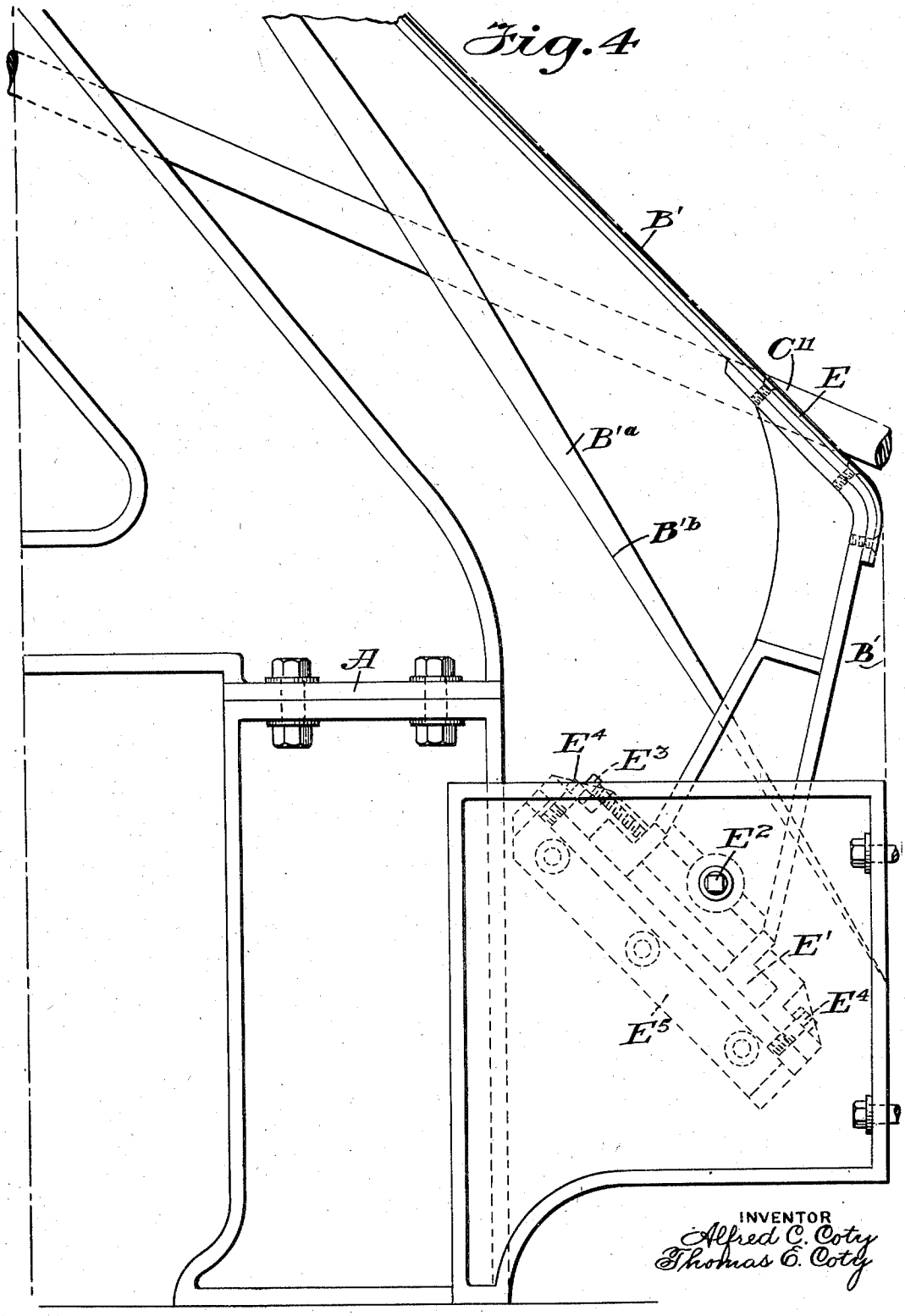

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Fig. 4



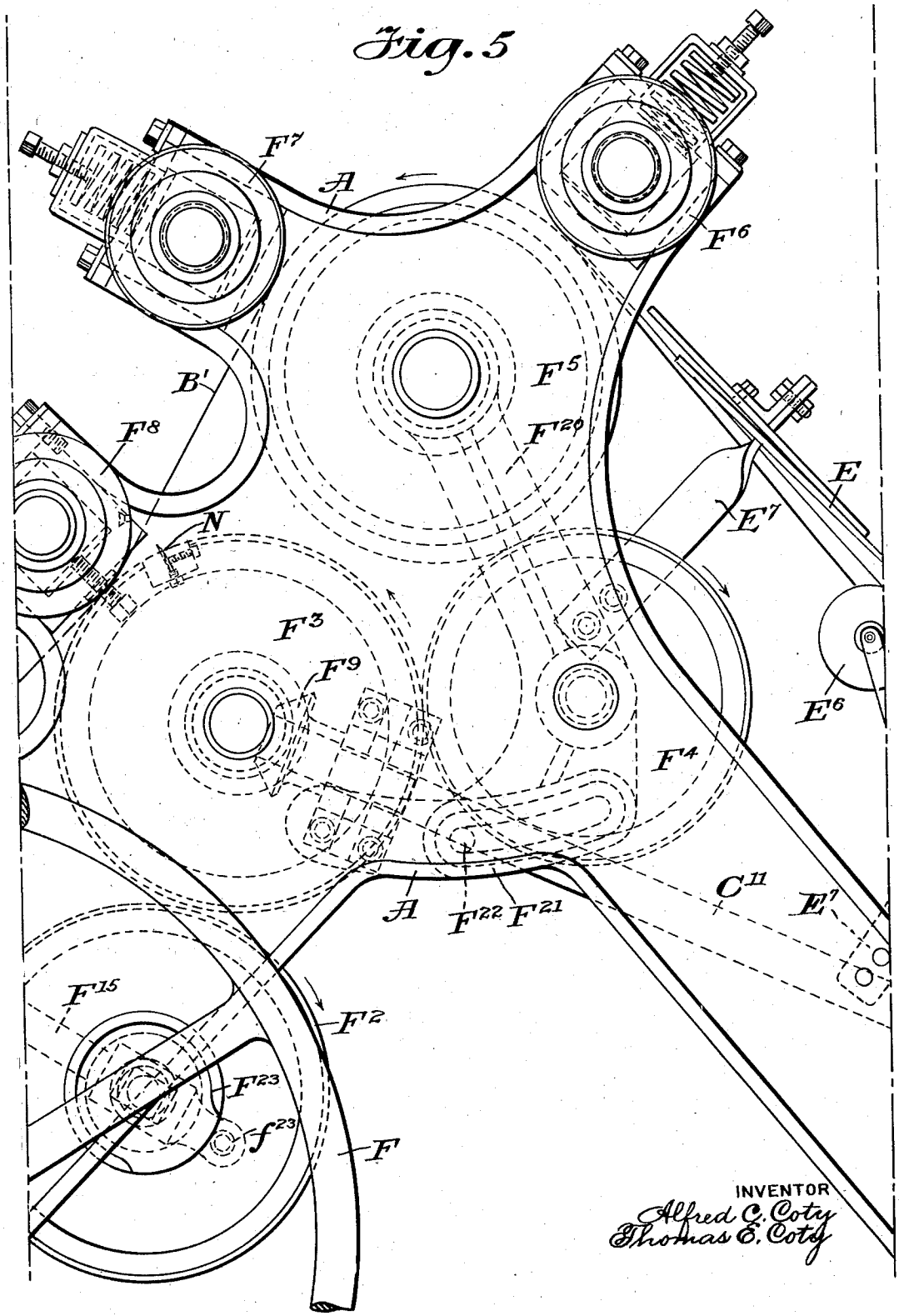

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Fig. 5

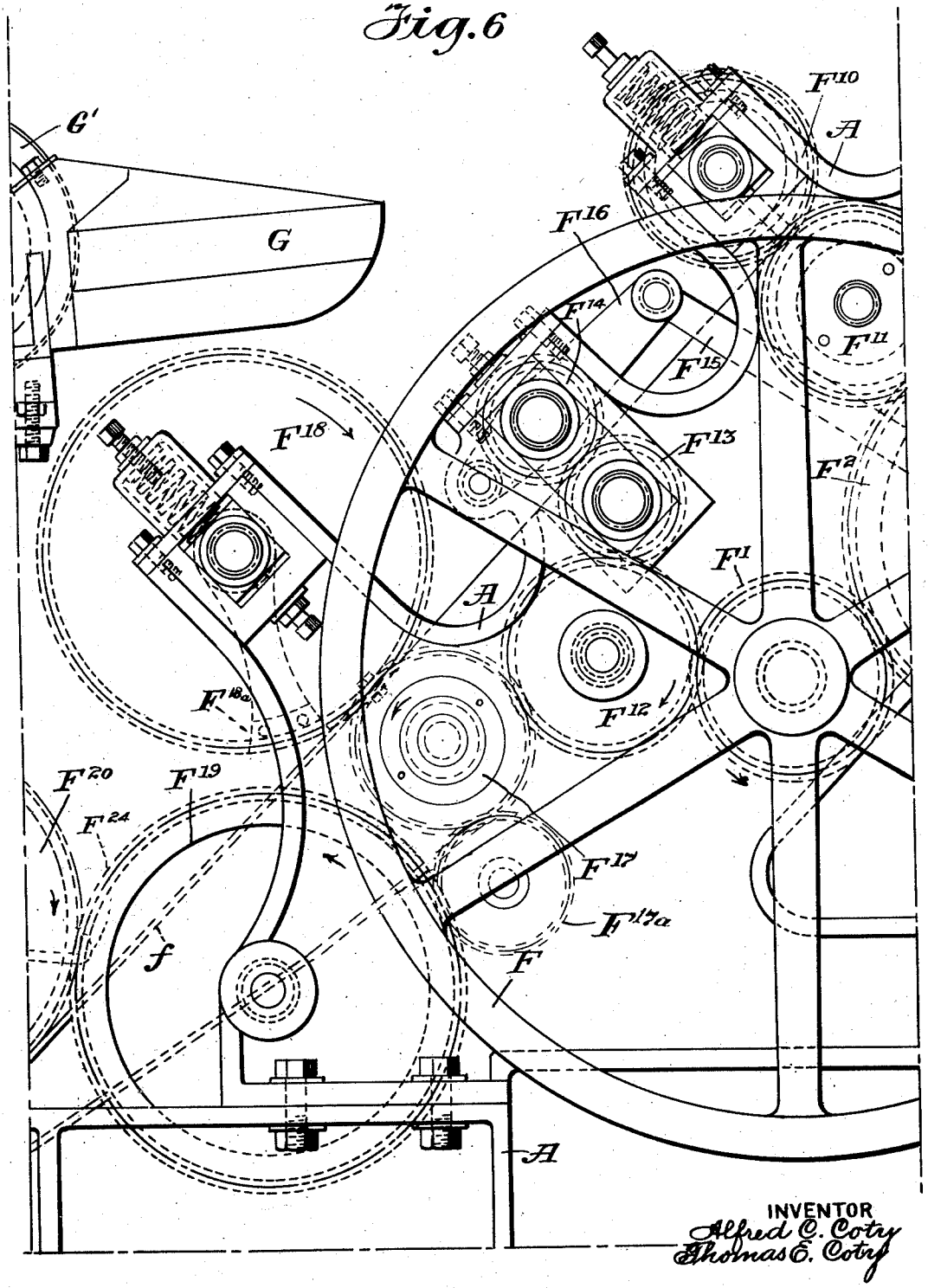


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*Fig. 6*




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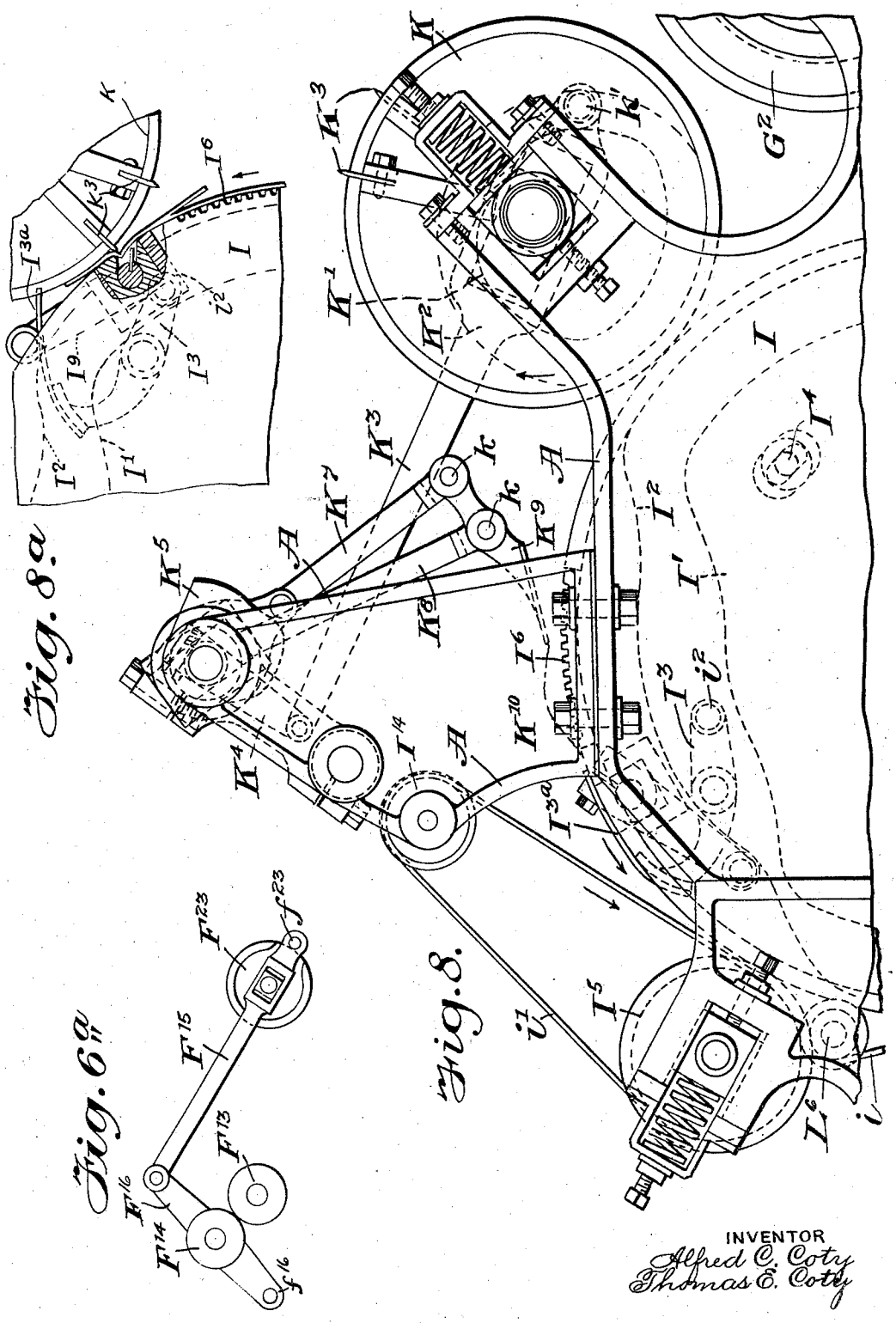


Fig. 8a.

Fig. 8.



Fig. 6a.

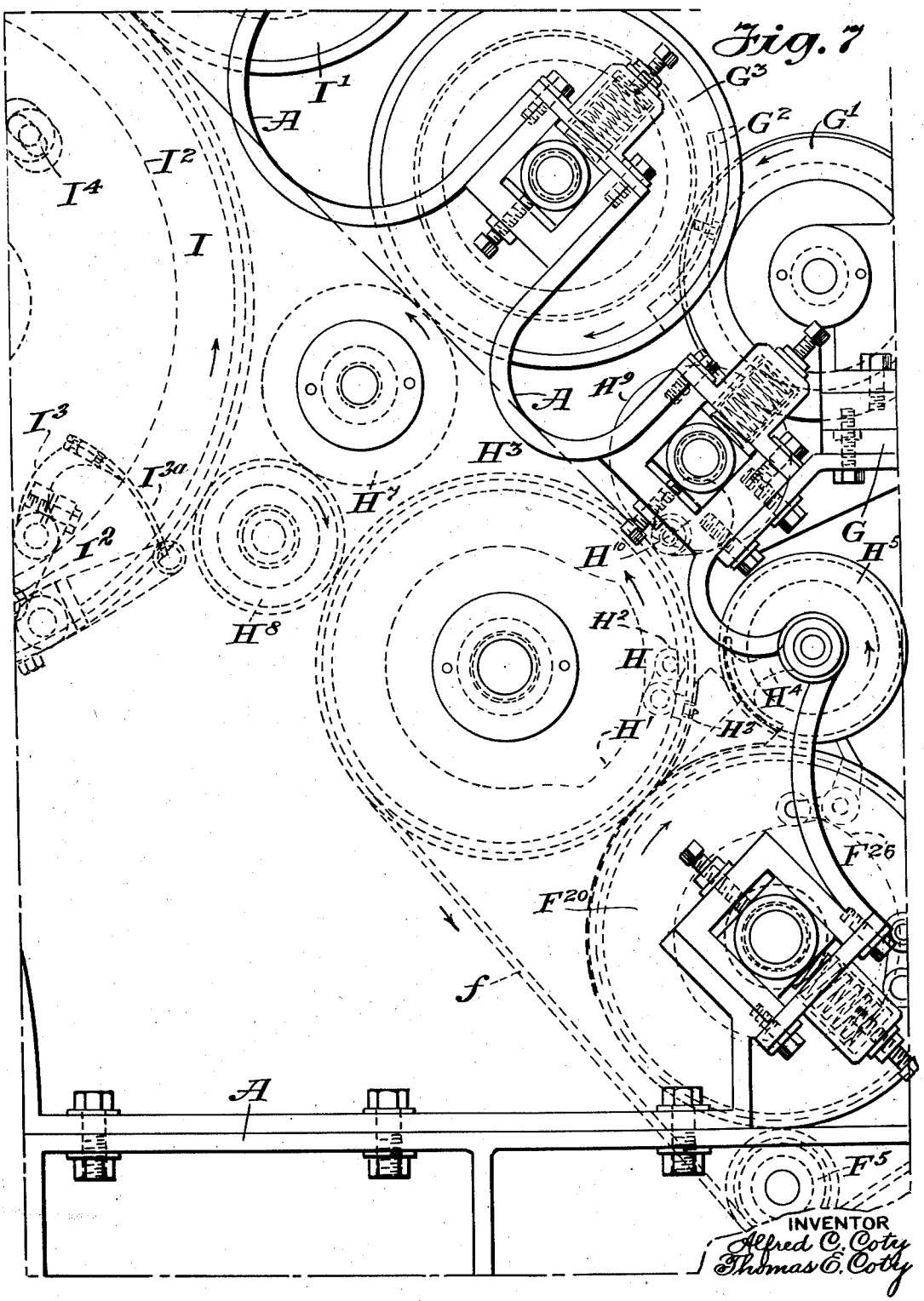
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Fig. 7



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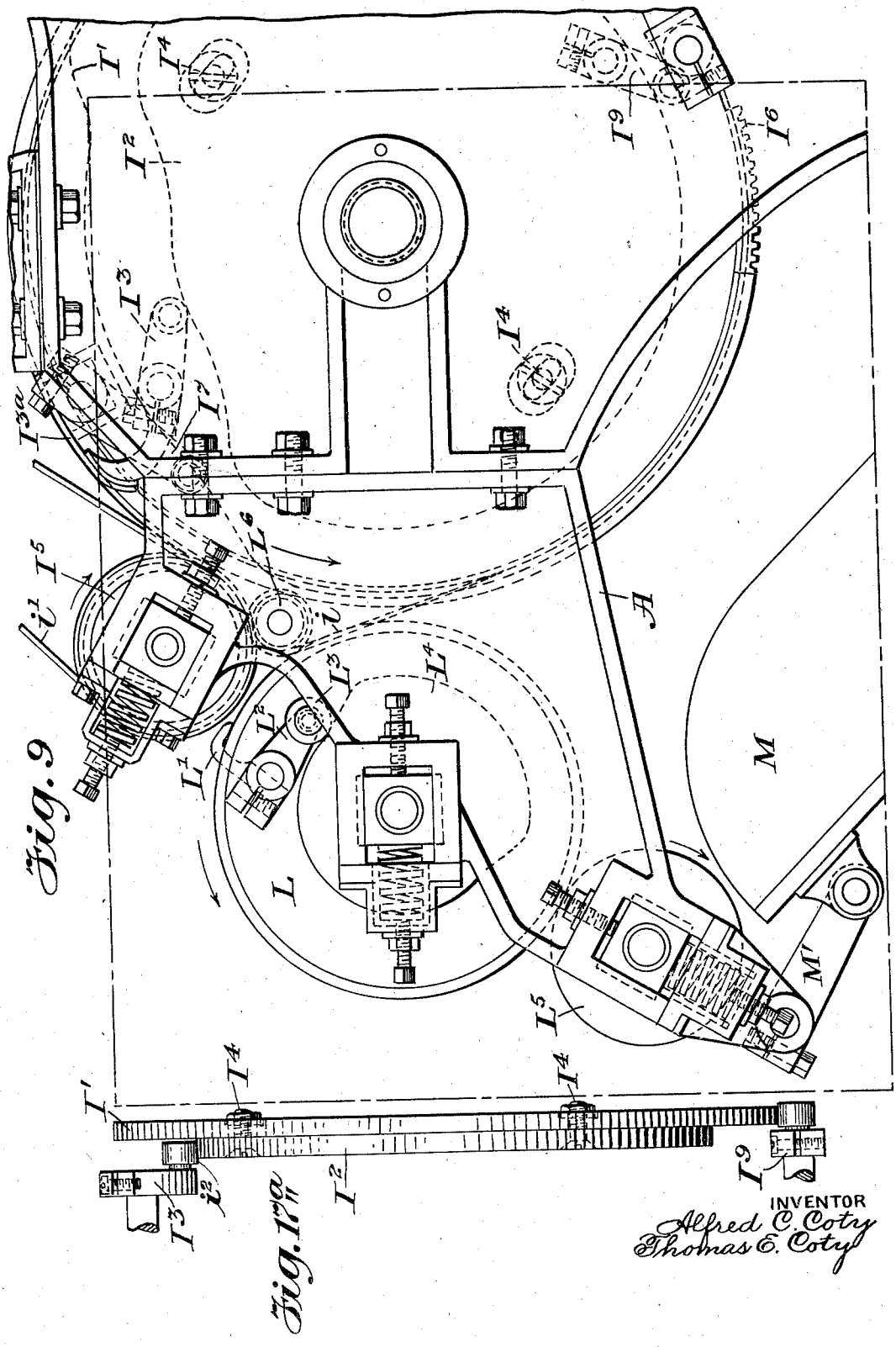



Fig. 9

Fig. 17a

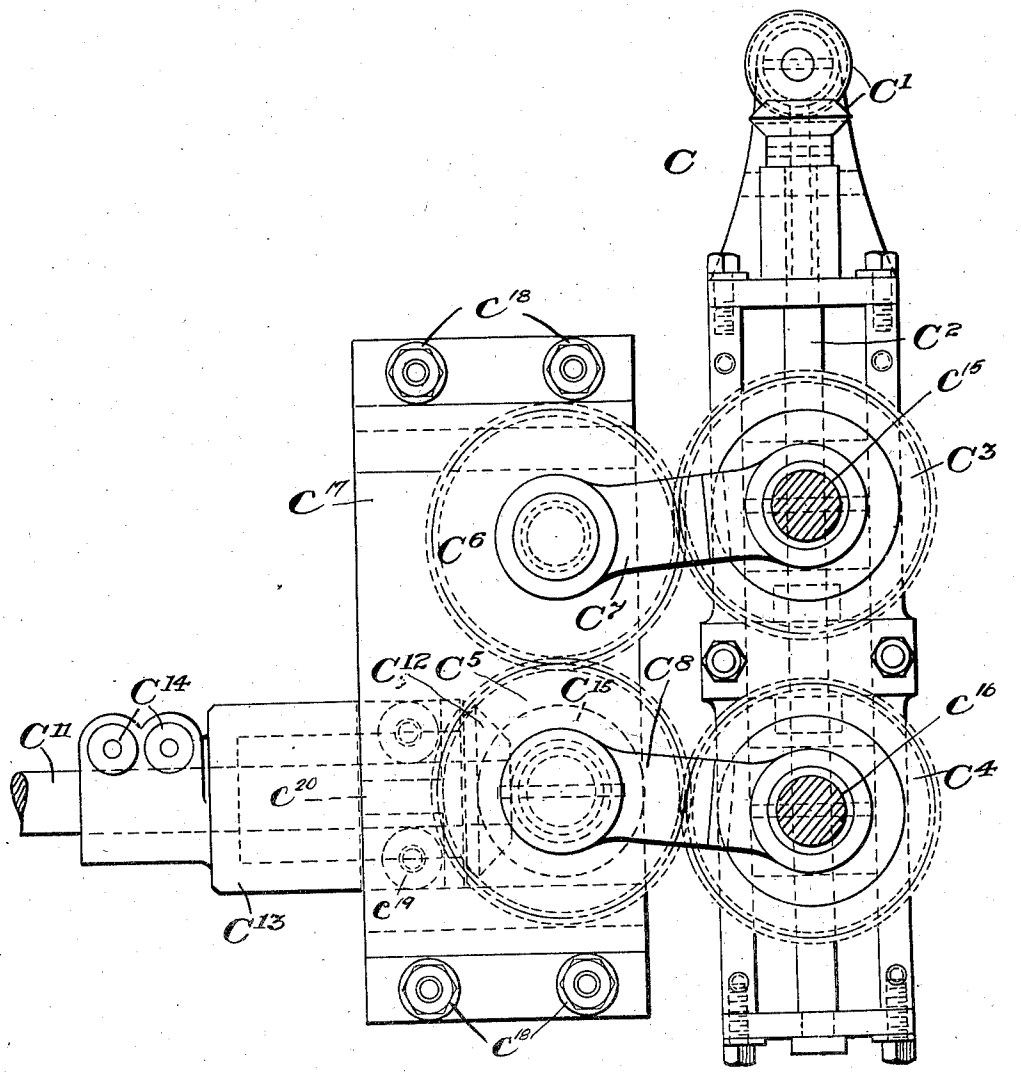
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*Fig. 10*



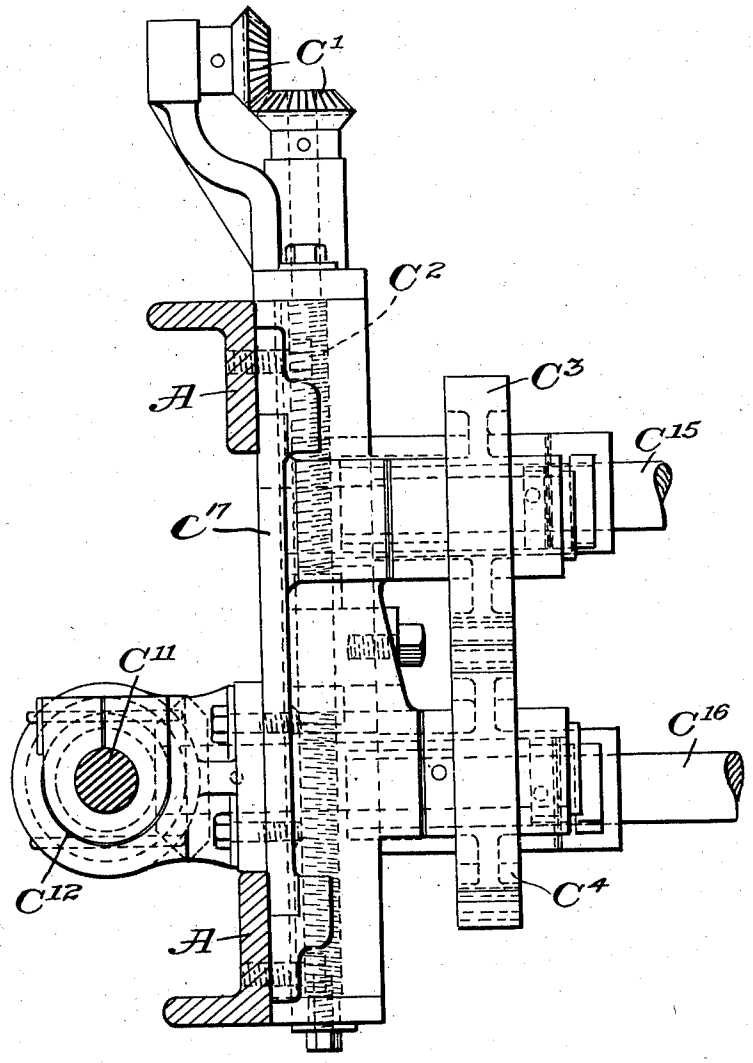

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*Fig. 11*




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Fig. 13

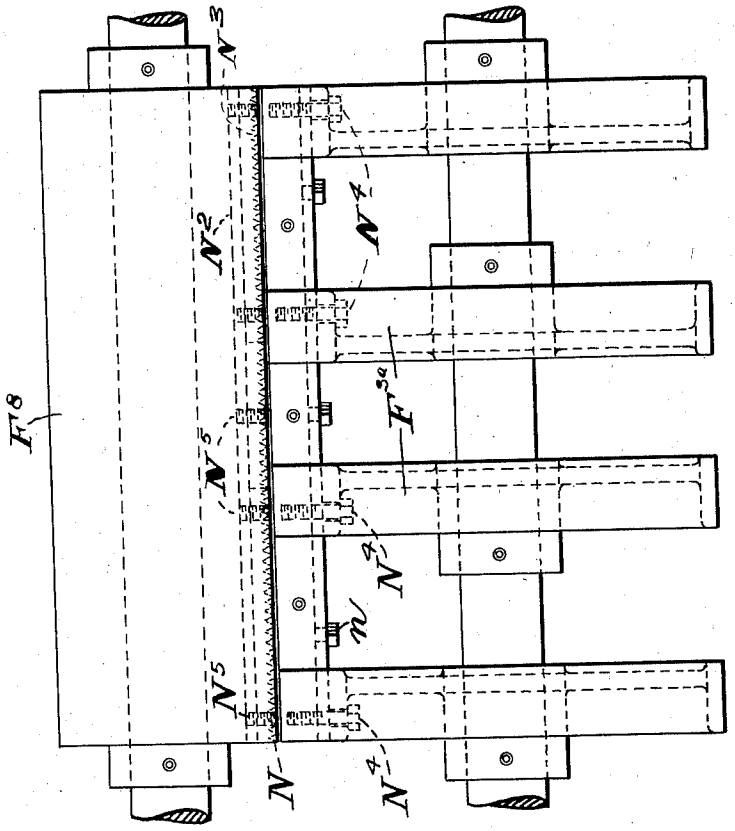
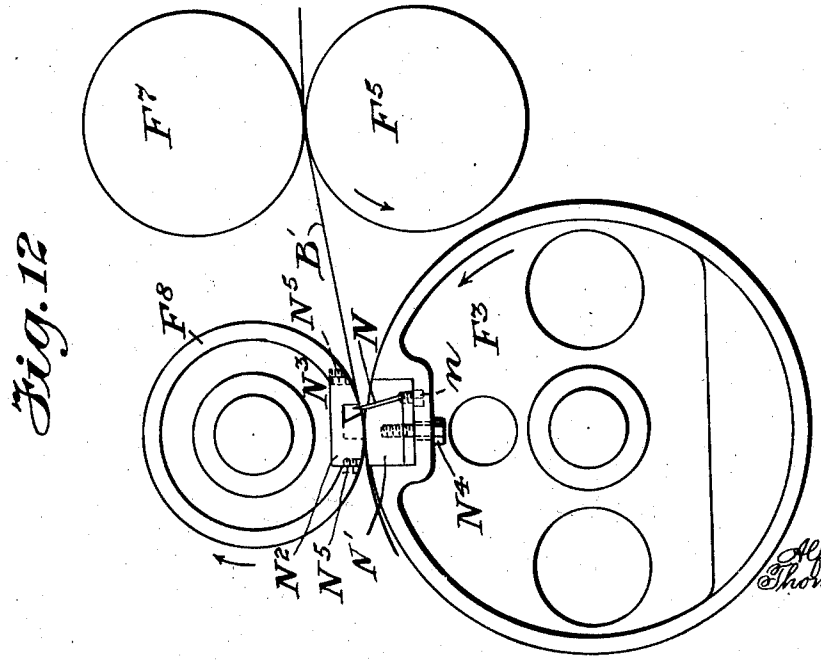



Fig. 12



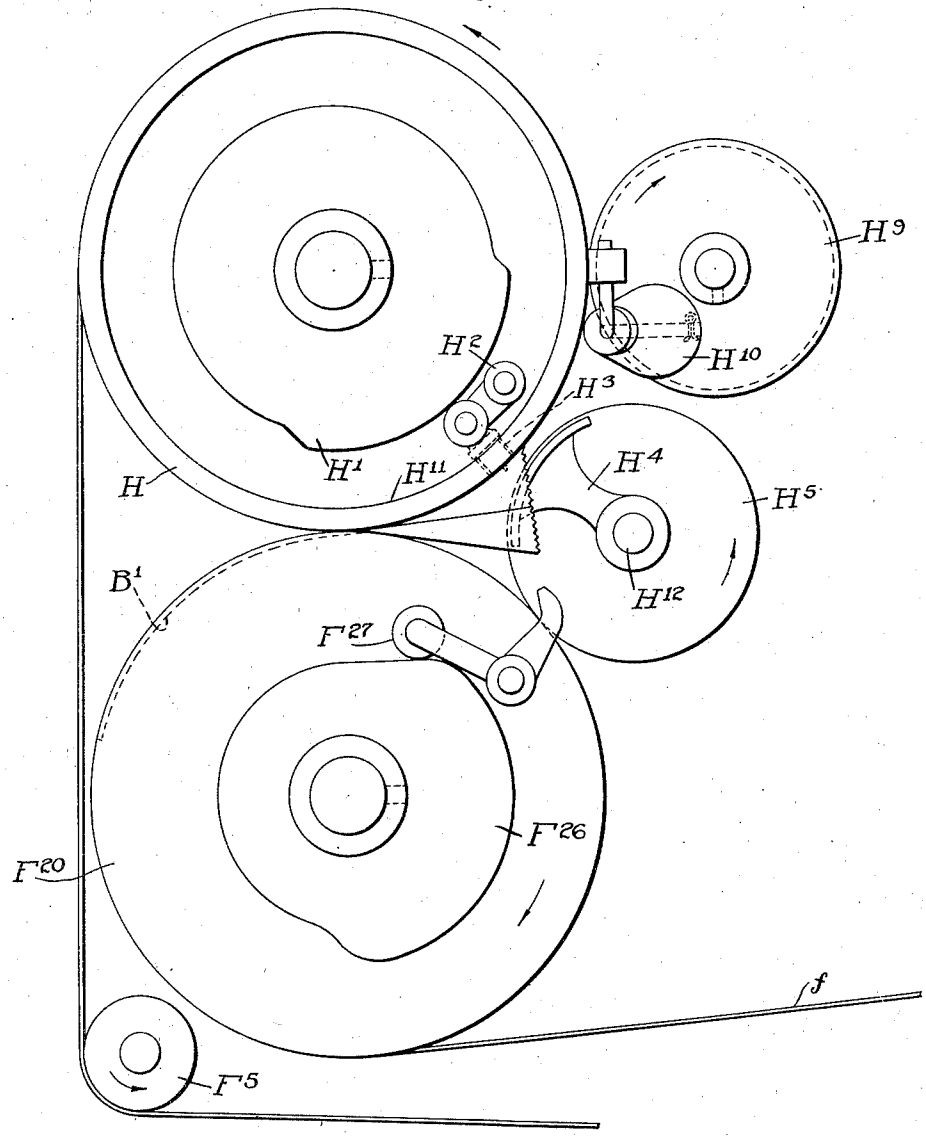

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Fig. 14




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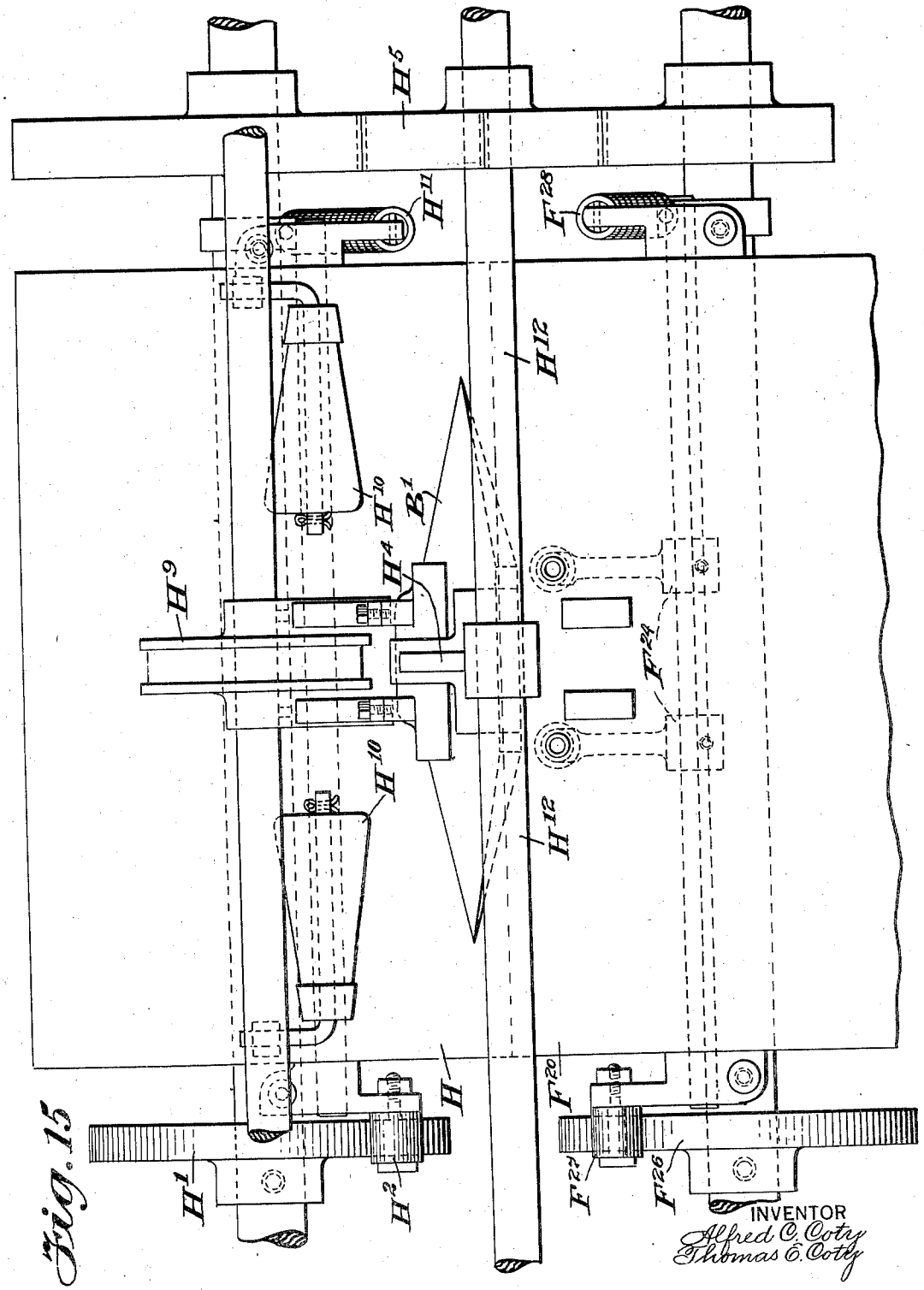



Fig. 15

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Fig. 17

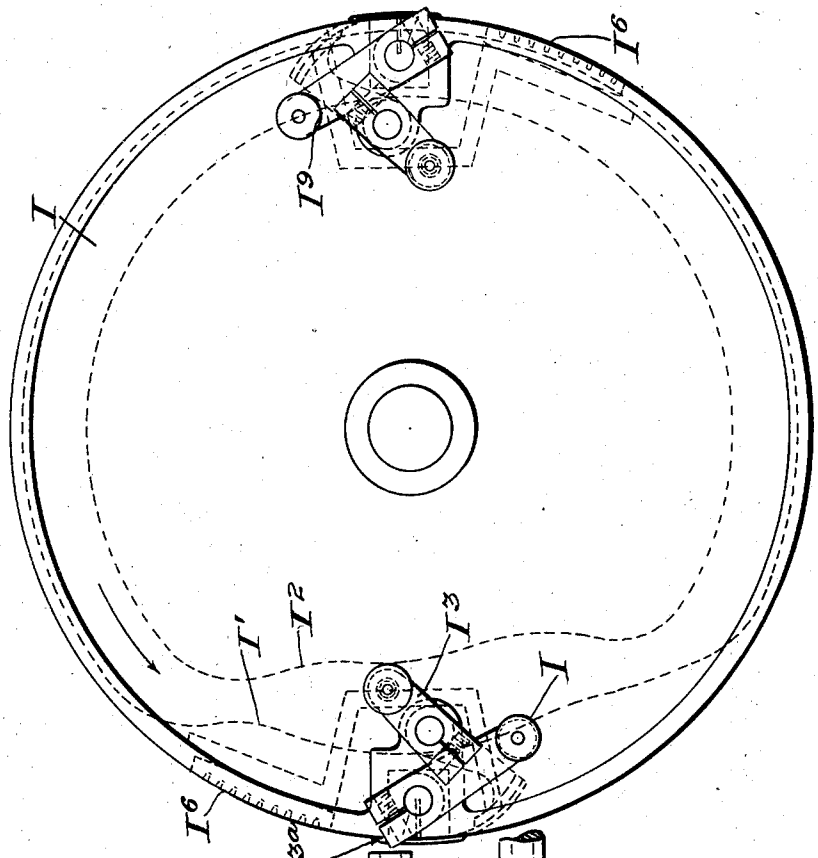
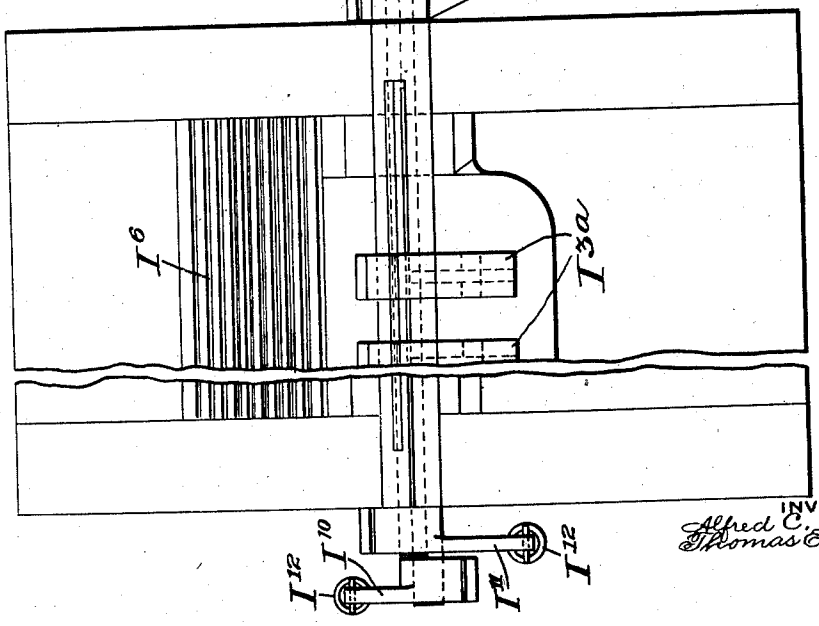



Fig. 16




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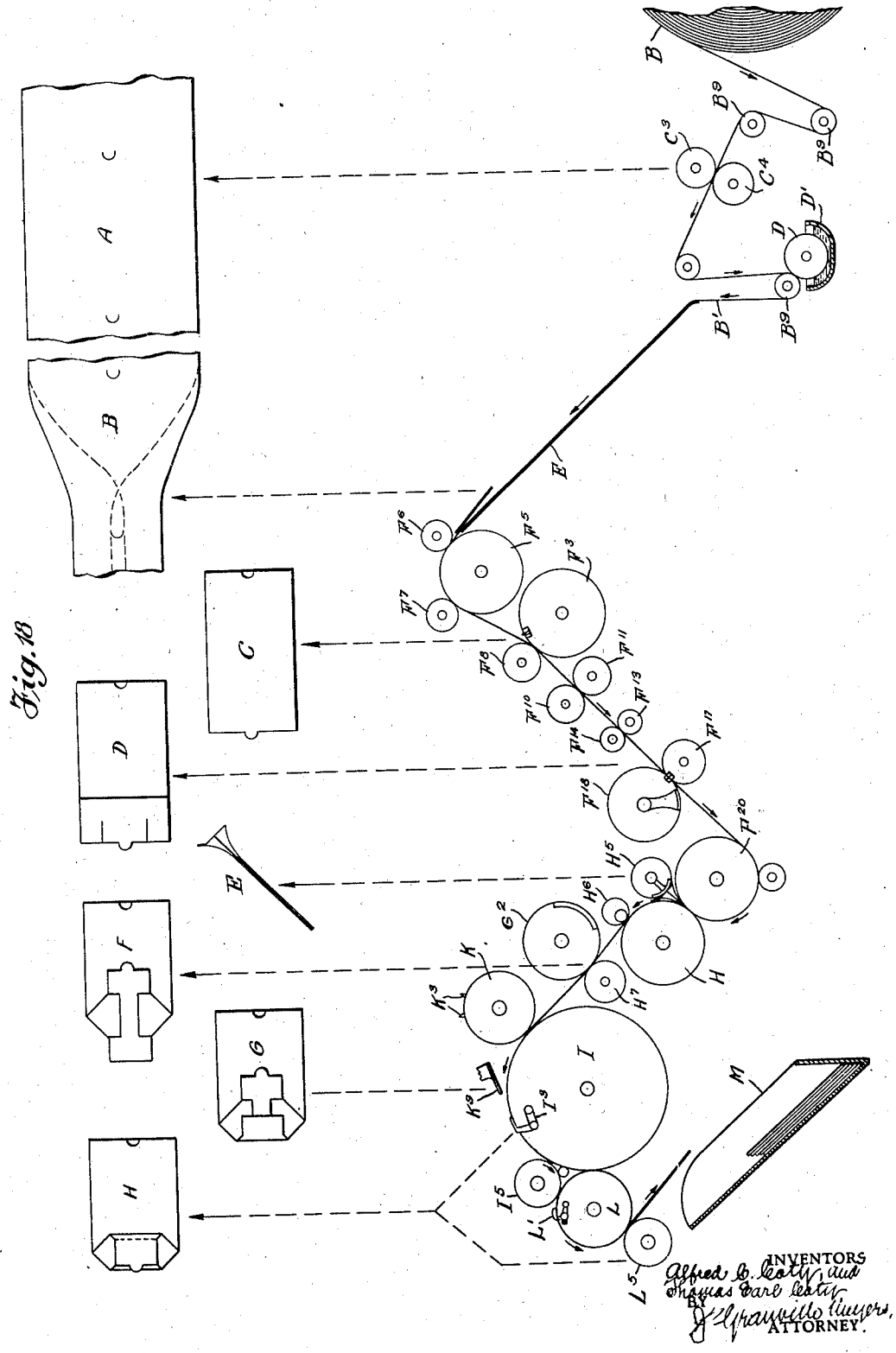



Fig. 18

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Patented Dec. 31, 1929

1,742,174

# UNITED STATES PATENT OFFICE

ALFRED C. COTY AND THOMAS EARL COTY, OF CARTHAGE, NEW YORK

## PAPER-BAG MACHINE

Application filed June 28, 1924. Serial No. 723,031.

Our new machine contains several improvements upon prior machines known to us. These we will outline briefly, and will afterwards describe more fully in connection with the drawings. They are directed to saving space, and to eliminating factors retarding speed of operation which are present in former machines known to us. In general the machine is of the class shown, for example, in Letters-Patent to A. C. Coty, No. 1,119,244, granted December 1, 1914; but our improvements may be used in machines of a different type.

After the web is formed into a tube by overlapping its edges as is common in bag-machines, a tongue is cut in the solid side of the tube by a knife of well known shape (such for example as is shown in Letters-Patent to A. C. Coty, No. 1,450,864, dated May 1, 1922), which leaves a "thumb-notch" in the top of the preceding bag when the latter is severed from the web at the root of the tongue by the cut-off knife, which is arranged to act there. In some prior machines the thumb-knife cuts into a rubber roll, or into a slot in a roll of some other material. As the radius of the sweep of the knife is altered to make a change in the size of the bags manufactured, several sizes of change-gears are required; as the gears wear, lost motion makes the relation of the knife to the slot unreliable, so that the knife may strike the roll and be ruined. Our improved drive for this knife (Figures 3, 10 and 11) uses spur-gears which it is not necessary to change when the knife radius is altered. Two of these gears drive the knife and slot-roll, respectively; and these are connected by transmitting gears carried at the ends of radius links centered on the knife and slot-roll shafts. Right and left screws adjust the distance apart of the first-named spur gears, the links moving the transmitting gears in or out. Bevel-gears drive the mechanism, and one of them is arranged to be moved along its shaft, so that when the knife is shifted, this gear may be brought into mesh and secured. Thus no change-gears are required for the thumb-knife, and bag-sizes may be changed quickly and conveniently.

We have also devised an improved cut-off knife, operating without cams. In prior machines in which the knife has radial movement in its own plane, the wear upon the high point of the cam operating the knife is considerable (the rise being abrupt to make the knife enter and leave the slot quickly); also more power is required and the action is inevitably noisy. In our machine we use no cam or relative movement of the knife and its carrier. The rapid and accurate cut required for speed of operation is effected by making one of the rolls (we have shown it as the slot roll in Figures 12 and 13) a sub-multiple in diameter of the other; that is, the slot-roll is one-half or one-third the diameter of the knife-roll, as here shown. The divergence of the two circumferences is thus much sharper, and there is more room for the entrance and withdrawal of the cut-off knife. This speeds up the machine, and saves power and noise.

Another improvement is in the folding devices for the bag-bottom. In former machines an efficient and useful rotary-folder has been used; but it has been necessary to rotate it at high speed, since the space in which it must act to complete the fold is only about two inches of the bag movement. The paste having been applied to the fold and the radius of gyration being short, snapping it over in this way at high speed is apt to whip off particles of paste, making the bags stick together. In our improved machine, for effecting this final pressing down of the second fold (see Figures 8 and 9) we employ an arm having rotatory reciprocation, as more fully explained later, carrying a presser-plate which by means of the arm accompanies the bag for about sixteen inches of its travel; the circumferential speed of the end of the flap therefore need be only moderate, and the paste is not spattered at all.

Another feature is a cam-operated finger upon the creaser slot-roll (Figures 7, 8 and 9) timed to engage and press down the first fold of the bag-bottom until it is released at the time the swinging arm just referred to begins to turn over the second or final fold, as best seen in Figure 8.

In former machines in which the tube is opened by pins to form the bottom after cuts

are made by the slitter-knives, the pins are apt to tear the paper. We employ a rotary finger (Figures 1, 7, 14, 15), which enters the end of the tube and spreads it open.

The arrangement and timing of the bottoming mechanisms are such that from the time the first creaser engages the tube until the bag is completed at least one of the mechanisms is acting upon the web at all times, there being an overlap so that at the time when the partly formed bag passes from one to the other, two of them act simultaneously and the bag is not released from one control until another engages it. This continuous positive engagement of the bag is of great utility and diminishes waste in operation.

The machines are large and take considerable floor-space. This we diminish by arranging the frame as a saw-tooth structure, which shortens them materially and brings the web better into view for inspection.

The accompanying drawings show one embodiment of our invention. Other embodiments not differing in principle are intended to be covered by our claims.

In the drawings:—

Figures 1 and 1ª taken together are a side elevation of the complete machine. Figure 2 is a side elevation upon a larger scale of the paper reel and its controlling device. Figure 3 is a side elevation of the gearing of the thumb-knife. Figure 4 is a detail of the lateral shifting means for the tube-former. Figure 5 is a detail of the cut-off knife. Figure 6 shows certain operating gears and the hand-wheel used in "threading through" the web at starting. Figure 6ª is a detail of the means for separating the corrugating rolls of Figure 6. Figure 7 shows the improved bag-opening finger. Figure 8 shows our improved folding device for completing the bottom of the bag. Figure 8ª is a detail, partly sectional, of the creasing mechanism shown on the right of Figure 8. Figure 9 shows the delivery mechanism for the completed bags. Figures 10 and 11 are side and end elevations partly in section of the thumb-knife gears, shown also in Figure 3. Figures 12 and 13 are side and end elevations of our improved cut-off knife. Figures 14 and 15 are side elevations of the means for opening the bag to form the bottom folds; Figure 16 is an end elevation of a portion of the bottom forming roll; Figure 17 is a detail end elevation of the cams used with the creaser slot-roll. Figure 17ª is a side elevation of the same parts. Figure 18 is a diagrammatic sketch showing the steps of the passage of the web through the machine.

Describing the machine generally from Figures 1, 1ª, and 18, the paper $B^1$ passes from right to left beginning at the reel B, thence around the first guide roll $B^9$, thence through the tongue-cutter C, around another guide roll $B^9$, down to still another roll $B^9$ working in conjunction with the seam-pasting disc D revolving in the paste-pot $D^1$. Thence the web passes up to the tube-former E, which may be of the type shown in the patent to Coty No. 1,119,244, or of some other form. The central part of the web passes above the tube-former, the lower lines representing its edges. Thence the web passes between the draw-rolls $F^5$ $F^6$ $F^7$ (at the top of Figure 1ª), thence through the cut-off knife, thence through the slitting mechanism shown at the right of Figure 1; thence by the rolls 17—18 and belt F around roll H to the opening finger H; thence through the creasing device and bottom-folding mechanism on the left in Figure 1, where the bottom is completed. Thence the bags pass between delivery rolls which press the folds flat and eject the bags into the box M. This general course of the paper is the same as with other bag-machines, though the instrumentalities which operate upon it are different.

Referring to the more detailed drawings, in Figures 1, 1ª and 2, A is the frame of the machine, usually of cast iron, flanged for stiffness. B is the roll of paper from which the web marked $B^1$ is drawn. The roll is carried on a shaft with bearings which permit its easy replacement. $B^2$ is the shifter-head, which also acts as a brake. $B^3$ is a plate carrying a roller $B^5$ bearing against the end of the roll of paper, the plate being secured to the head $B^2$ by the thumb-screw $B^4$. An arm $B^6$, usually a piece of shafting, projects from a hub $B^7$ mounted upon a screw-shaft carried on the frame of the machine; the hand-wheel $B^8$ rotates the shaft, which is threaded into the hub $B^7$, shifting the hub and brake sidewise to adjust the position of the roll B. Similar devices are in use in the art. The web $B^1$ passes around the guide-rolls $B^9$ to the parts shown in Figures 3, 10 and 11.

In Figure 3, which should be read in connection with Figures 10 and 11, is shown the arrangement of gears for the "thumb-knife". This knife in our machine is mounted on radial arms projecting from the shafts $C^{15}$, $C^{16}$, and is substantially like that shown in the Letters-Patent to A. C. Coty No. 1,453,864, dated May 1, 1923; but the gearing differs in important ways. In our present machine it is unnecessary to change the gears in order to make thumb-notches in bags of different lengths, which has been an objectionable feature in machines known to us. The device as a whole bears the reference letter C, $C^1$, $C^1$ are bevel gears (see Figures 10 and 11, top) by which when one is rotated by a wrench the screw-shaft $C^2$ is revolved; this shaft bears right and left threads, and separates or approximates the bearings of the shafts $C^{15}$, $C^{16}$, carrying the spur gears $C^3$, $C^4$. These do not mesh, but are engaged respectively with the gears $C^6$, $C^5$.

Links $C^7$, $C^8$, are centered upon the shafts $C^{15}$, $C^{16}$, and the stud-shafts of gears $C^5$,$C^6$ maintaining these gears in mesh with gears $C^3$, $C^4$, and with each other. The shafts of gears $C^5$, $C^6$, are carried by a sliding plate $C^{17}$, held in ways secured to the frame of the machine by bolts $C^{18}$. The gear $C^5$ is driven by the bevel gears $C^{12}$, $C^{12}$, one of which is attached to gear $C^5$ and the other is carried on and driven by the shaft $C^{11}$ rotating in the sliding bearing $C^{13}$, secured to the plate $C^{17}$ by bolts $C^{19}$, and driving the gear $C^{12}$ by the square stud $C^{20}$ affixed thereto or formed integral therewith. Bolts $C^{14}$ are adjusted to make the bearing $C^{13}$ fit shaft $C^{11}$ snugly and prevent lost motion.

The operation of this part of the machine is as follows:

When the bevel-gears $C^1$ at the top of the figure are rotated the screw C is revolved and separates or approximates the gears $C^3$, $C^4$; the links $C^7$, $C^8$ draw in or push out the gears $C^5$, $C^6$ and the sliding plate $C^{17}$. The nuts $C^{14}$ being loosened, the gear $C^{12}$ is brought into mesh with its mate attached to gear $C^6$; rotation of the shaft $C^{11}$ turns gears $C^{12}$, thus turning $C^5$, which rotates both $C^4$ and $C^6$, the latter in turn revolving gear $C^3$. We have omitted any representation of the thumb-knife and its slot member, for clearness of illustration; they are sufficiently described in the Coty patent referred to above.

From the thumb-knife C, Figures $1^a$ and 3, the web passes down over the guide roll $B^9$ at the left of Figure 3, then down around the similar roll at the bottom of that Figure, where the seam has paste applied to one side of the web by the disc D, revolving in the paste contained in the tank $D^1$. Thence it passes to the parts shown in Figure 4.

Figure 4 shows the tube-former E. In general this resembles those shown in the Coty patents already named, and consists of a plate, usually with some form of adjustment in width, over which the web $B^1$ passes and over which it is bent down at the sides, as indicated at $B^{1a}$ and $B^{1b}$, which indicate the side-edges of the web. The plate is carried on a bracket which may be moved laterally by a screw the squared head of which is marked $E^2$, the base $E^1$ of the bracket moving in ways upon a base-plate $E^5$, the ways secured by bolts $E^4$, $E^4$. A locking screw $E^3$ secured the bracket in its adjusted position. This part of the machine is old. Draw rollers $E^6$, usually of rubber and conical in form (see Figures $1^a$ and 5), for drawing over the edges of the web to form the lap-seam are also provided.

In Figure 5, which should be read in connection with Figures 12 and 13, the folded web is shown drawn forward by the feed-rolls $F^5$, $F^6$, $F^7$. The latter two rolls have spring boxes and act by pressure; while $F^5$ is driven by a gear from the roll $F^3$ carrying the cut-off knife N, change-gear $F^4$ is carried on a link $F^{20}$ centered on the shaft of roll $F^5$, and slotted on its outer end at $F^{21}$, being also provided with a bolt $F^{22}$ to secure the arm in place. By changing gear $F^4$ and adjusting the position of the link $F^{20}$ bags of different lengths are provided for. The knife-roll is also provided with bevel-gears $F^9$ for driving the shaft $C^{11}$ by means of which the thumb-knife C is operated, the arrangement thus fixing the necessary definite relation between the cuts of the two knives. The roll $F^3$ is driven from gear $F^2$. On the shaft of this gear is a cam $F^{23}$ which by means of a cam-roller $f^{23}$ reciprocates the rod $F^{15}$ (see also Figures 6 and $6^a$) by which the "crimper" is operated, as described later.

The cut-off knife N (see Figures 12 and 13) is carried in a bar $N^1$, and is secured in place by the screws $n$—$n$, the bar being held in place by the screws $N^4$. The carrier $F^3$, which for brevity we have called a roll, is composed of the discs $F^{3a}$, (see Figure 13) notched to receive the bar $N^1$. The knife N strikes in a slot $N^3$ in a bar $N^2$ secured in the roll $F^8$ by screws $N^5$. In practice the adjustment of the bars and the duration and timing of the actions are such that the bag and the web $B^1$ are not released from control when the bag is severed from the web, as mentioned in our opening statement. As there referred to, the diameter of the slot-roll $F^8$ is a sub-multiple of that of the roll $F^3$, the relation here illustrated being one-half; this may be one-third or one-quarter. The divergence of the circumferences is thus made sharper, and the entrance and exit of the blade into and out of the slot $N^3$ is facilitated, permitting higher speed.

The brackets $E^7$, a part only of the lower one being shown in Figure 5, support the "tuber" E and are secured to the frame of the machine.

Figures 6 and $6^a$ show the "inching" wheel F, by which the machine may be operated by hand when occasion arises, (as in threading through the web at starting or after interruption), as well as other parts. To the shaft of this wheel, which is the power-shaft of the machine, the driving motor (not shown) is usually attached or geared in some suitable way. The shaft carries a gear $F^1$, driving the gear $F^2$, shown also in Figure 5. As best seen in Figure $6^a$, in connection with Figures 5 and 6, $F^2$ carries a cam $F^{23}$ operating a link or pitman $F^{15}$ by means of the cam-roller $f^{23}$; the link reciprocates a lever $F^{16}$, pivoted at $f^{16}$ and controls the approach of a roll $F^{14}$ to another roll $F^{13}$, the web $B^1$ passing between them. As the cam $F^{23}$ rotates, its high point moves roller $f^{23}$ away from the center, pulling upon the link $F^{15}$ and lever $F^{16}$, pressing together the rolls $F^{13}$, $F^{14}$. These are corrugated, and the timing is such that they press upon the upper

portion of the bag adjacent to the thumb-notch, but not upon the lower part; the wrinkling of the bag top admits air readily when the bag is shaken to open it. This mechanism has been previously employed.

The gear $F^1$ also drives gear $F^{12}$, which drives the lower corrugating roll $F^{13}$, geared to upper corrugating roll $F^{14}$. The movement of the axis of roll $F^{14}$ toward and away from roll $F^{13}$ is slight, and does not throw their gears out of mesh. Roll $F^{12}$ also drives roll $F^{17}$, which drives the roll $F^{18}$, carrying the slitting knives, one of which is shown in dotted lines at $F^{18a}$; these make the slits necessary in forming the bottom of the bag, and are well known devices. Roll $F^{17}$ also drives roll $F^{19}$ by means of a so-called "idler" $F^{17a}$, introduced to secure the proper direction of rotation of $F^{19}$. Roll $F^{17}$ also carries the belts or tapes *f*, one of which is seen best in Figure 1, and which carry the bar from the slitting roll $F^{18}$ to and around roll $F^{20}$, a finger $F^{24}$ engaging the tongue upon the end of the bag as the other end leaves the slitting roll $F^{18}$.

In the upper part of Figure 6 is shown the paste-tank G and roll $G^1$ taking paste therefrom for the bottom of the bag. These arrangements are well known and do not require detailed description or illustration.

Figure 7 should be read in connection with Figures 14 and 15. Therein the belt or tape *f* (see also Figure 1) holds the bag against the roll $F^{20}$, as already stated, its position being defined by the finger $F^{24}$ (see lower right corner of Figure 7) against which it is pushed by the belt, and the control of which by the cam $F^{26}$ is timed in such a way that it retains its grip on the bag until the latter is opened by the opening finger $H^4$, when the cam lifts the finger to release the bag. The belt passes around the roll H and returns to roll $F^{17}$ (see Figure 6) around the guide-roll or idler $F^5$, which is not in engagement with roll $F^{20}$. When the bag approaches the position shown in Figure 14 it is under engagement by the pin $H^3$, controlled by the cam-roller $H^2$, revolving around the fixed cam $H^1$ (see also Figure 15). At this time the belts *f* (only one of which can be shown) also hold the bag against the roll H, which so engages it until the bag-opening finger $H^4$, (which we believe to be a new instrumentality in these machines) enters the bottom of the bag and spreads it open, after which it passes on around the roll H, the roll $H^9$ pressing open the flaps, while the drawing rolls $H^{10}$, $H^{10}$, hold the sides of the bag in alinement. A spring $F^{28}$ (Figure 15, right) holds the cam-roller $F^{27}$ in contact with the cam $F^{26}$, a similar spring $H^{11}$ performing the same function for cam-roller $H^2$ and cam $H^1$.

Returning to Figure 7, the bag with its bottom flaps spread open passes on between the rolls $G^3$ and $H^7$; roll $G^3$ carries a pad or form $G^2$, conforming to the shape of the flaps to which paste is to be applied; this form receives paste from the roll $G^1$, which takes the paste from the tank G, as already described, and commonly practiced. The roll $G^3$ is in spring bearings, to give pressure against roll $H^7$, the latter roll deriving its motion from the gear $H^8$, which is driven from roll H. This paste mechanism is old.

Figures 8, 9, 16 and 17 should be read together. In Figure 8, we show the creaser mechanism, the roll K carrying two creaser blades $K^3$, $K^3$, spaced the proper distance apart to make the creases at the bases of the first and second flaps of the bag bottom (see also Figure 1 for the complete assembly). Roll K is in spring bearings and presses against roll I, which bears an aliquot relation to roll K. Roll I is provided with two stationary cams $I^1$, $I^2$, (see also Figures 17, $17^a$) with which cooperate the fingers $I^3$, $I^3$, carrying the spring-pressing members $I^{3a}$. Practically the construction embodies two rolls merged, the serrated portions $I^6$ carried by the roll I being diametrically opposed, so that the roll I rotates once for each two revolutions of the roll K carrying the creaser blades, the latter registering successively with the two sets of serrations $I^6$, $I^6$. The cams $I^1$, $I^2$, may be adjusted circumferentially with reference to their supports by means of the set-screws and slots $I^4$. The spring presser fingers $I^{3a}$ hold down the first flap or fold of the bag-bottom until the presser plate $K^9$, to be described, is about to fold over and press down the second flap, whereupon the cam-roller $i^2$ is moved by the appropriate cam to withdraw the finger.

After the actions just described have turned over the first flap or fold of the bag-bottom the presser plate $K^9$ shown in these figures turns over and presses down the second flap to complete the formation of the bag. This construction is best shown in Figure 8. A cam $K^1$ is carried and rotated by the creaser-roll K; this operates a cam-roller *k*, which works in a cam-groove and gives longitudinal reciprocation to a link $K^3$, which in turn gives rotary reciprocation to an arm $K^4$, operating the shoe or presser-blade $K^9$; this is pivoted at *k*, *k* to a radius link $K^8$ centered on the same axis as a stationary cam $K^5$; while the link $K^7$ is reciprocated longitudinally by the cam so that the toe of the shoe $K^9$ follows a path somewhat like that shown in dotted lines at $K^{10}$ adjacent thereto, rocking around the pivot *k* on the radius link $K^8$. The pressing down of the second flap or fold of the bag-bottom continues during a space of about sixteen inches, while the bag is still held to the roll I by tapes or belts such as are in common use in these machines wherever desirable, one of which is shown at *i*, which also pass around the guide-roll $L^6$, and which co-

operate with the tapes *i* (only one of which shows in this side elevation); the latter pass around the roll $I^{14}$ and the pressure-roll $I^5$. The bag leaves the parts of the machine shown in Figure 8 by means of these tapes.

In Figure $8^a$ we show in more detail the means for creasing the flaps at the bottom of the bag and thus causing them to project from the surface of the cylinder I, shown also in Figure 8. It will be seen that the roll K, carrying the creasing blades $K^3$, $K^3$, is here shown in a position advanced from that illustrated in Figure 8, one of the blades having entered its slot in the roll I and the pinch-bar $i^4$ being about to engage the transverse crease at the base of the forward flap. This bar is operated by the crank-arm $L^9$, a roller upon the outer end of which engages the fixed cam $I^2$, which times the operation correctly.

The lever-arm $I^3$, carrying the folding-blade $I^{3a}$ is operated by a cam-roller $i^2$ which travels upon the periphery of the cam $I^1$. When the bag advances from between the rolls I and K the effect of the crease is not only to define the line of flexure, but to cause the flap to lift from the periphery of the roll I (the body of the bag being held down by the usual tapes on the sides, which are commonly employed wherever necessary in this industry) into the path of the folding-blade $I^{3a}$. The cam-roller $i^2$ reaching the cut-away part of the cam $I^1$ at this time, the blade folds over the first flap and holds it down until it reaches the position shown in Figure 8, whereupon the folding-plate $K^9$ folds over the second flap, as already described. Springs (not shown) are commonly employed to hold the cam-rollers in contact with the peripheral cams.

The second blade, also marked $K^3$, creases the rear flap by pressing the web into one of the notches marked $I^6$.

The creasing mechanism here indicated is commonly used and well known; it is illustrated only to show a proper sequence of operations. It will be noted that the mechanism shown in Figure $8^a$ is the second one carried by roll I, which has advanced from the position shown at the bottom of Figure 9, and is not shown in Figure 8.

Figure 9 shows the delivery mechanism for the completed bags. The delivery-roll L carries a gripping finger $L^1$, operated by an arm $L^2$ by means of a cam-roller, which is carried by the roll L around the stationary cam $L^4$. The belts or tapes *i*, $i^1$, in conjunction with the rolls $I^5$ and $L^6$, bring the bag into engagement with the finger L, which holds it until it is engaged by the final delivery roll $L^5$; rolls L and $L^5$ have spring bearings so as to obtain the requisite grip on the bag, which passes from roll $L^5$ to box M, supported from the frame A by the arm $A^1$ or otherwise.

We claim:

1. In a paper-bag machine, a thumb-knife, a slot-roll co-operating with the knife, means for rotating the knife and roll, means for changing the radius of gyration of the knife and roll, and gearing between the knife and roll automatically maintain the knife and roll in proper register irrespective of the changes in their radii of gyration.

2. In a paper-bag machine, a thumb-knife, a slot-roll for the knife, means for rotating the knife and roll upon various radii, and gearing between the knife and roll, the said gearing automatically adjusting its position as the radii of the knife and roll are varied so as to remain in mesh without change of gear-wheels.

3. In a paper-bag machine, a thumb-knife, a slot-roll for the knife, means for rotating the knife and roll upon various radii, comprising gears upon the knife and roll shafts, transmission gears between the gears upon the shafts, and links between the transmission gears and their respective shafts, the arrangements being such that the separation or approximation of the shafts automatically maintains the shaft gears and the transmission gears in mesh.

4. In a paper-bag machine, a thumb-knife, a slot-roll for the knife, means for rotating the knife and roll upon various radii comprising gears upon the knife and roll shafts, transmission gears between the gears and the shafts and links between the transmission gears and their respective shafts, the arrangement being such that the separation or approximation of the shafts automatically maintains the shaft gears and the transmission gears in mesh; a gear for imparting motion to the said several gears, and means for varying the position of the gear so as to remain in mesh by moving it longitudinally upon the shaft which gives it motion.

5. In a paper-bag machine, means engaging a tubular bag, a rotatory finger for opening the tube, means for rotating the finger and means for releasing the tube-engaging means when the finger engages the tube to open it.

6. In a paper-bag machine, tube-engaging means acting before the first crease is formed in the bag bottom, a rotatory finger for opening the tube, means for rotating the finger, and means for releasing the tube-engaging means as the finger engages the tube.

7. In a paper-bag machine, a rotatory tube-opening finger located in advance of the creaser-mechanisms, means for rotating the finger, means for timing it to act at desired times, tube-engaging means for carrying a cut-off part of the tube towards the finger, and means for releasing the tube-engaging means as the finger acts to open the tube.

8. In a paper-bag machine, means for forming a tube from a web, means for cutting the thumb-notch, means for cutting off the bag from the tube, first and second creaser

blades, a rotatory finger for opening the tube located in advance of the creaser blades and means for rotating it, and tube-engaging means carrying the partially formed bag to the first creaser from the finger, with means for releasing the tube-engaging means as the finger opens the tube.

9. In a paper-bag machine, a bottom-forming mechanisms containing a folder-arm having rotatory reciprocation for folding the second flap of the bag-bottom, the folder-arm embracing links, cams for operating them, and a plate journaled upon the links and operated by changes in their relative position to press down the flap.

10. In a paper-bag machine, creaser-mechanism for forming flaps by the fold of which the bottom of the bag is sealed, a finger for folding over the first flap, a cam for operating the finger, a folder-arm for folding over and pressing into place the second flap, and cams for operating the folder-arm in desired relation to the operation.

11. In a paper-bag machine, a folder-arm and means for actuating it to put in place the final flaps of the bag-bottom, the arm composed of two links and a plate journaled to the end of the links, cams for causing relative longitudinal motion of the links so as to swing the plate towards and away from the bag at proper times, and means for swinging the arm about a center so as to advance or retract the plate, the mechanism so timed and acting as to fold over and press into place the second flap of the bag-bottom.

12. In a paper-bag machine, a folder-arm having a rotary reciprocation for folding over the second flap of the bag-bottom, a plate carried by the arm, means for causing a rotary movement of the arm, and means for causing the plate to move towards and away from the bag as the arm moves, the whole timed to fold over and press into place the second flap and so complete the bottom of the bag.

13. In a paper-bag machine, a folder-arm having two links, a plate journaled to the ends of the links, a crank, means for causing the crank to reciprocate the folder-arm about a center, and cams for causing relative longitudinal movement of the links, thereby moving the plate towards and away from the bag.

Signed at Carthage, in the county of Jefferson and State of New York this 9th day of June A. D. 1924.

ALFRED C. COTY.
THOMAS EARL COTY.