No. 787,970. PATENTED APR. 25, 1905.

O. B. ZIMMERMAN & J. M. FOWLER.

CANDY OR BISCUIT CUTTING MACHINE.

APPLICATION FILED NOV. 21, 1904.

3 SHEETS—SHEET 1.

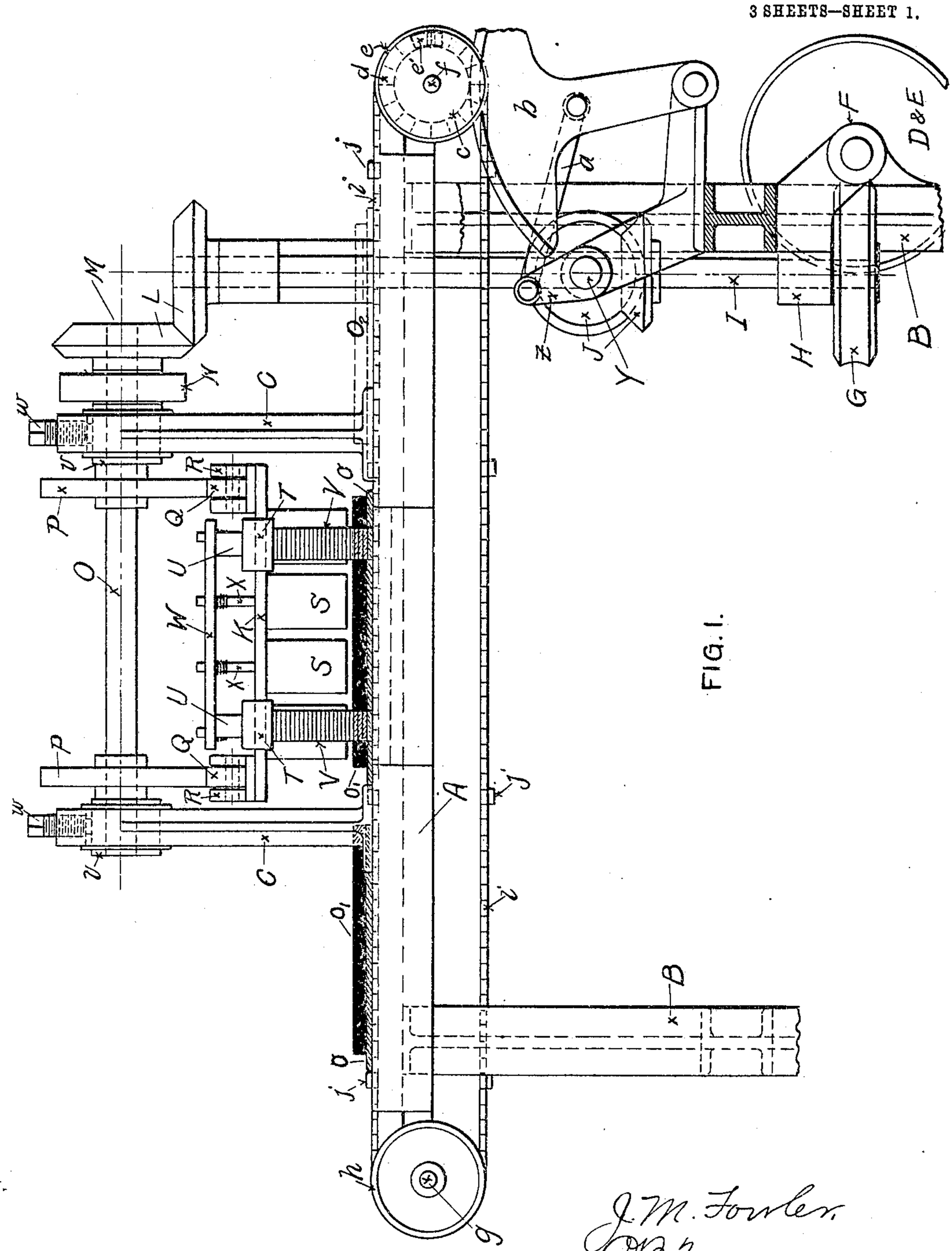

FIG. 1.

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3 SHEETS—SHEET 2.

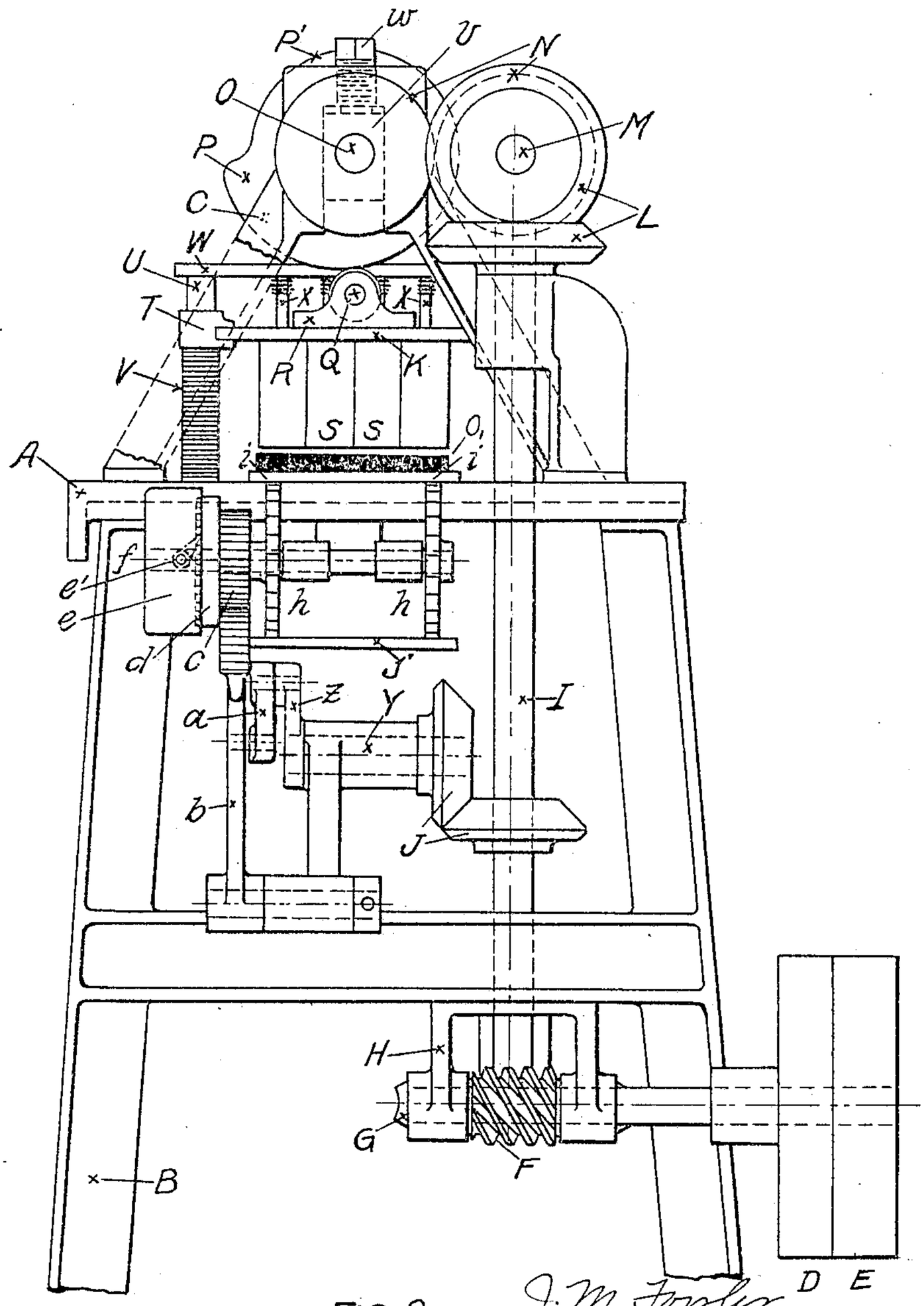

FIG. 2.

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3 SHEETS—SHEET 3.

FIG. 5.

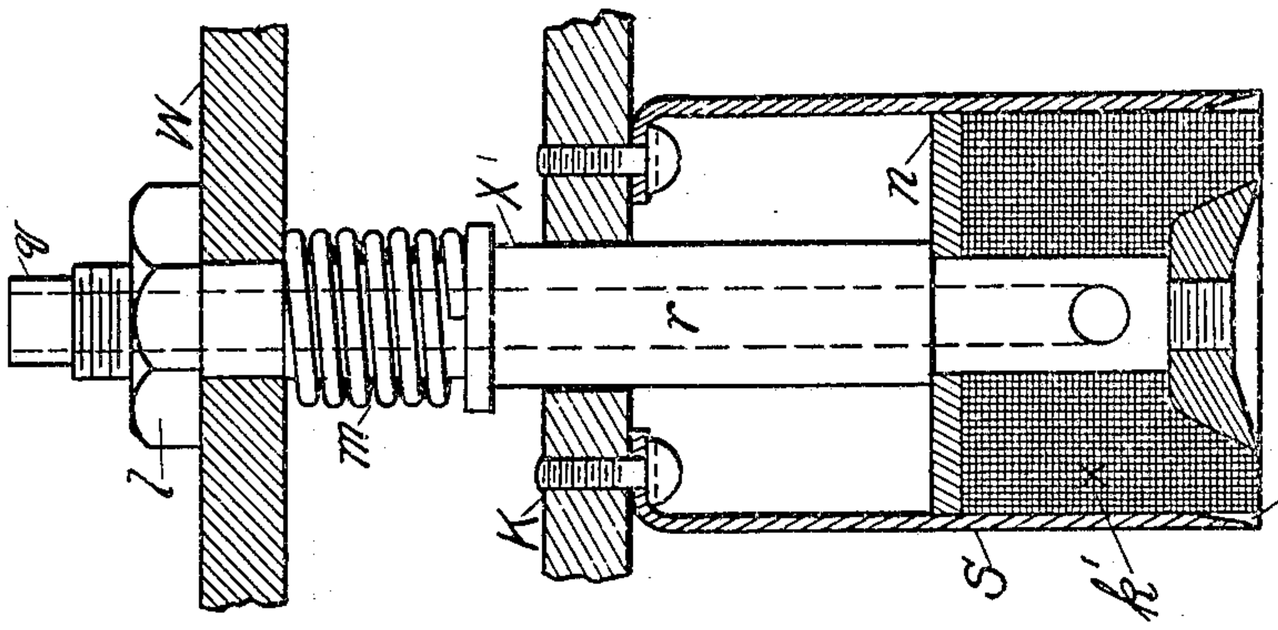


FIG. 4

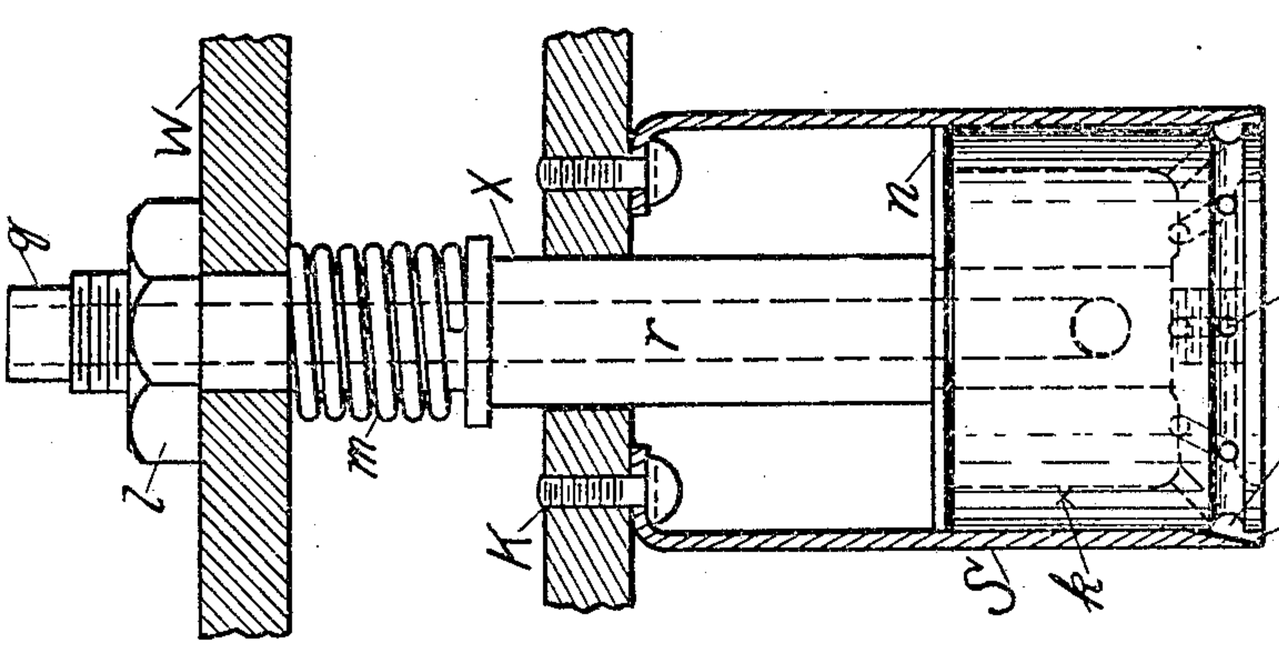
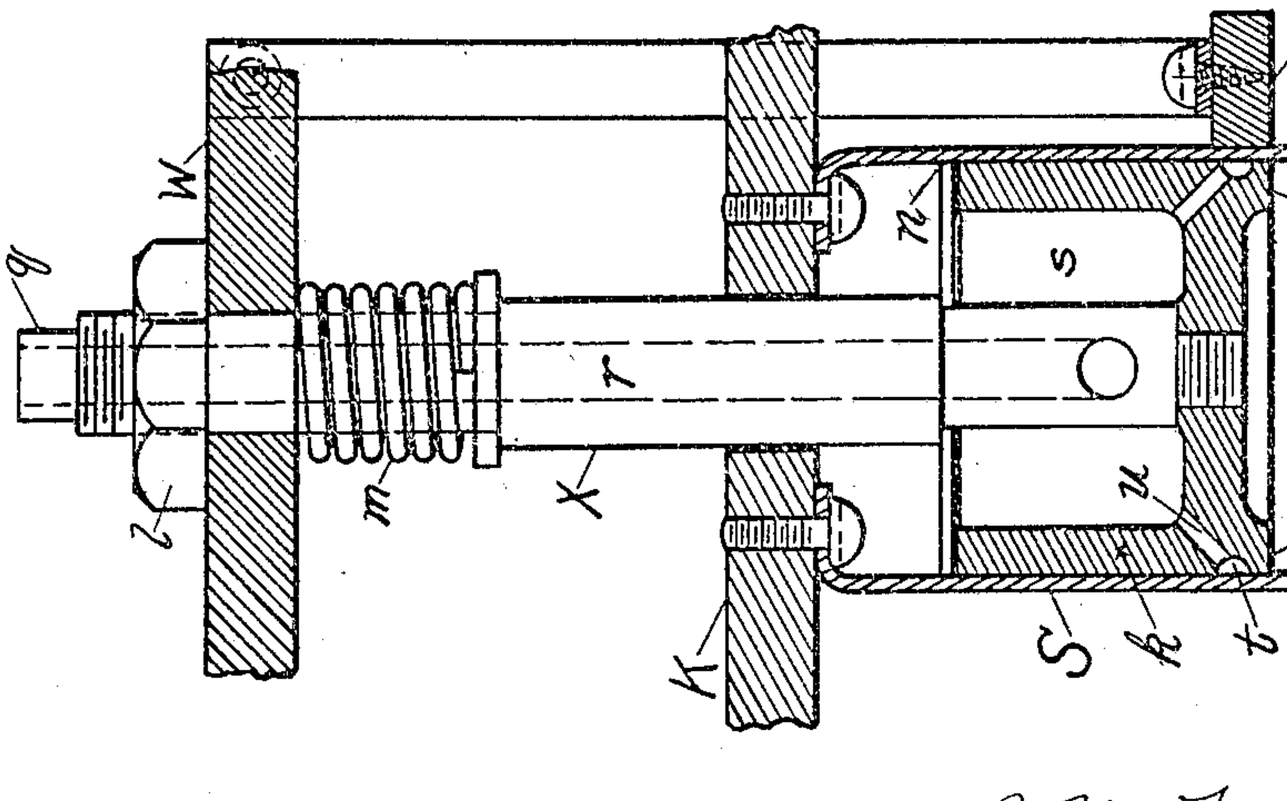


FIG. 3



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No. 787,970. Patented April 25, 1905.

UNITED STATES PATENT OFFICE.

OLIVER B. ZIMMERMAN, OF MADISON, WISCONSIN, AND JAMES M. FOWLER, OF CHICAGO, ILLINOIS; SAID FOWLER ASSIGNOR TO SAID ZIMMERMAN.

CANDY OR BISCUIT CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 787,970, dated April 25, 1905.

Application filed November 21, 1904. Serial No. 233,759.

To all whom it may concern:

Be it known that I, OLIVER B. ZIMMERMAN, residing at Madison, in the county of Dane and State of Wisconsin, and I, JAMES M. FOWLER, residing at Chicago, in the county of Cook and State of Illinois, citizens of the United States, have invented a new and useful Candy or Biscuit Cutting Machine, of which the following is a specification.

Our invention relates to improvements in automatic cutting-machines for candy and biscuit making in which a multiple adjustable hollow cutter acts against a pad with a reciprocating relative motion about an ejector and in which lubrication of the cutter is a prime factor.

The objects of our improvement are, first, to provide for the multiple and rapid forming of the product; second, to provide for the positive ejection of the product from within the cutters; third, to provide for the proper lubrication of the cutters to prevent adhesion and to preserve the form of the product; fourth, to provide for an automatic feed of the stock to be cut to and from the cutters, and, fifth, to provide for the proper adjustment of the various parts to one another, first, for wear; second, on account of the different forms desired and thickness of the stock cut, and, third, on account of the quantity and nature of the lubricant used. We attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 illustrates the front view of the machine. Fig. 2 illustrates the right-hand end view of the machine with the front leg of the cam-shaft support broken away to admit of a clearer view of parts back of it; Fig. 3, a cross-sectional view through the cutters, ejectors, and lubricant-feed; Fig. 4, a similar view showing the external view of the ejector and lubricant-feed mechanism, and Fig. 5 the cutter and another form of ejector with lubricant-feed mechanism.

Similar letters refer to similar parts throughout the several views.

In Figs. 1 and 2 the table A, the legs B B, and the cam-shaft supports C C form the main part of the frame. To the right leg B is fastened the bearing of the tight and loose pulleys D and E, the worm F, and the worm-wheel G, the latter two secured by the bearing H. The worm-wheel G is keyed to the main drive-shaft I, which drives the feed mechanism and the cutting mechanism.

The cutting mechanism is operated through the following train: the bevel-gears L L, the auxiliary shaft M, supported by the cam-shaft supports C C, the spur-gears N N, the cam-shaft O, the cams P P, the rollers Q Q, the bearings R R, and the press-plate K K.

To the press-plate K are fastened the multiple set of cutters S S and the guide-bearings T T. In Figs. 1 and 2 the front bearings only are shown, the rear ones being similarly placed with respect to center lines. The bearings T T slide upon the ejector-plate supports U U, the latter also acting as guides for the press-plate springs V V.

To the ejector-plate W are secured the multiple set of ejectors illustrated in detail in Figs. 3, 4, and 5. The ejector-supports X X are shown conventionally in Figs. 1 and 2.

The stock-feed mechanism consists of the following train: the bevel-gears J J, the crank-shaft Y, the rotating crank Z, the connecting-rod *a*, the oscillating gear-sector *b*, the spur-gear *c*, the ratchet mechanism made up of a ratchet-plate *d*, a ratchet-casing *e*, the pawl *e'*, the sprocket-shaft *f* on the right-hand end, and the idler sprocket-shaft *g* on the left-hand end, to which shafts are secured the sprockets *h h*. Meshing with these sprockets and lying in the grooves throughout the top face of the table A run the feed-chains *i i*, to which at intervals are secured the cross-strips *j j*, their object being to bring the material underneath the cutters and away from them. In this feed mechanism the ratchet-plate *d* has radial teeth upon its face, as indicated in Figs. 1 and 2, into which teeth works the pawl *e'*, secured to the ratchet-casing *e*, as shown in Figs. 1 and 2. The gear *c* and ratchet-plate *d* are fastened together and run loosely upon the shaft *f*. The casing *e* is

keyed to the shaft *f*, so that when the oscillating gear-sector *b* vibrates it rotates the gear *c* and the ratchet-plate *d* back and forth about the shaft *f*, the pawl slipping over the teeth in one direction, but engaging in the other, thereby transmitting the intermittent feed motion to the stock through the chains *i i*, strips *j j*, and the pad *o*.

Figs. 3, 4, and 5 illustrate the cutter in section, the press-plate K, the ejector-plate W, the ejector-supports X X, the ejectors *k*, the adjusting-nuts *l*, the adjusting-springs *m*, the ejector cover-plates *n*, the pad *o*, upon which the stock O′ comes to the cutters S S, as shown in all views, and the external stripper *p*. (Illustrated in Fig. 3 only.)

The operation is as follows: The stock O′ to be cut is blocked out to the proper size and thickness and is stacked upon the separate pads *o o* at the left of the machine relative to Fig. 1. The operator places one of these pads *o* with its sheet of stock O′ upon the table A in front of one of the cross-strips *j*, as shown in Fig. 1. The intermittent-feed mechanism will then carry the pad and stock beneath the cutters, where they halt for the cutting motion produced by the cams P P, following which the pad and stock will move to the right from beneath the cutters S S to a position O^2, Fig. 1, where the finished pieces may be separated from the scrap. This operation is continuous. Owing to the sticky quality of the stock when moist, due to sugar and other components, the proper lubrication of the cutters is essential for a rapid and smooth cutting of such stock. The method of lubrication is as follows: At the top of the ejector-supports X X, Figs. 3, 4, and 5, is a smooth surface *q*, over which is secured a piece of tubing through which the lubricant is conducted. By means of the hole *r* in the ejector-support the lubricant passes to the chamber *s*, closed by the cover-plate *m*, from which chamber *s* it is distributed by means of the holes *u u* to the groove *t*. When the cutters withdraw from the material, having been forced up by the springs V V, they halt for more than half of one cycle of movement, due to the dwell P′ on cams P, in the position shown in Fig. 4. The inside beveled surface *s′* of the cutters S becomes thoroughly lubricated before the next stroke is made. At the same time the lubricant can escape around the edge to wet the bottom surface of the ejectors at *v v*, Fig. 4, thus effectually preventing adhesion and any tendency to change the neat appearance of the product. The product cannot follow up the cutter upon its withdrawal from the stock owing to the ejector *k*. That portion of the stock without the cutter S, known as "scrap," is prevented from rising with the cutter by means of external strippers *p*, Fig. 3, which, if drawn in Figs. 1 and 2 would occupy the spaces between and outside of the several cutters S S. These strippers are fastened to the top plate W, as shown in Fig. 3.

When only slight lubrication is desired, the form of ejector illustrated in Fig. 5 is preferable, in which the metal ejector *k* and chamber *s* are replaced by a felt or fibrous plug *k′*, through which the liquid may be transmitted to the inner periphery of the cutter edge.

The adjustments, first, for wear of the knives and proper cutting pressures is provided for by means of the sliding bearings C′ C′ and the adjusting-screws *w w*, Figs. 1 and 2, the spur-gears N N remaining in contact while the adjustment extends above and below the center line of the auxiliary shaft M.

The adjustment, second, for varying the form and to take the varying thickness of the stock to be cut is obtained by substituting properly-formed cutters and ejectors in place of S S and *k k* and by substituting different stroke-cams for P P.

The adjustment, third, for quantity of lubricant due to viscosity of lubricant used and kind of stock cut is effected, as shown in Figs. 3, 4, and 5, by turning the adjusting-nut 1, which in conjunction with the adjusting-spring *m*, either raises or lowers the position of the ejectors *k k* with respect to the cutters, varying the amount of lubricant that may flow by respectively reducing or increasing the space between the inside surface *s′* of the cutter and the vertical face of the ejector.

We are aware that previous to our application relatively reciprocating cutters and ejectors have been used in this class of machinery, also that vertical and radiating ducts have been used to assist in the distribution of the lubricant to sliding parts, and therefore do not make such claims broadly; but

What we do claim as our invention, and desire to secure by Letters Patent, is the following:

1. In a candy or biscuit cutting machine, the combination of a relatively reciprocating multiple hollow cutter with internal ejectors, and a lubricating-conduit formed in said ejector, terminating so as to permit a lubricant to pass to the cutting edge and bottom of the ejector, substantially as described.

2. In a candy or biscuit cutting machine the combination of a relatively reciprocating multiple hollow cutter with internal and external ejectors, a cutting-pad and a lubricating-conduit formed in said internal ejectors, terminating so as to permit a lubricant to pass to the cutting edge of said cutter and bottom of the ejector, substantially as described and for the purposes set forth.

3. In a candy or biscuit cutting machine, the combination of a hollow cutter with an elastic cutting-pad, an internal ejector having radial lubricating-ducts connected to the hollow of the supporting-stem, and a peripheral groove for the termination of the radial

ducts, substantially as described and for the purposes set forth.

4. In a candy or biscuit cutting machine the combination of an internal ejector having radial ducts connected to the supporting-stem and terminating in a peripheral groove, and a circumscribing hollow cutter having an internal beveled cutting edge arranged to form, during a portion of the cycle of motion a part of the lubricating-duct, substantially as described and for the purposes set forth.

5. In a candy or biscuit cutting machine, the combination of an internal ejector having radial ducts terminating in a peripheral groove, said ducts being connected to a lubricating feed-pipe, with a circumscribing hollow cutter having an internal beveled edge arranged to form during a portion of the cycle of motion a part of the lubricating-duct, and an adjustment to vary the dwell position of the cutter relative to the said peripheral groove, substantially as described and for the purposes set forth.

6. In a candy or biscuit cutting machine, the combination of an internal ejector having radial ducts terminating in a peripheral groove, with a circumscribing hollow cutter having an internal beveled edge, an adjustment to vary the dwell position of the cutter relative to said peripheral groove, and an adjustable pressure-screw to vary the depth of imprint of said cutter upon a cutting-pad, substantially as described and for the purposes set forth.

In testimony whereof we have signed our names in the presence of two subscribing witnesses.

OLIVER B. ZIMMERMAN.
JAMES M. FOWLER.

Witnesses to the signature of Oliver B. Zimmerman:

WILLARD R. DREW,
FRANK DURKEE.

Witnesses to the signature of James M. Fowler:

G. M. TRULL,
ALFRED W. HOPKINS.