F. M. KEANE.

BUTTON MAKING MACHINE.

APPLICATION FILED OCT. 28, 1910.

1,036,857.

Patented Aug. 27, 1912.

7 SHEETS—SHEET 1.

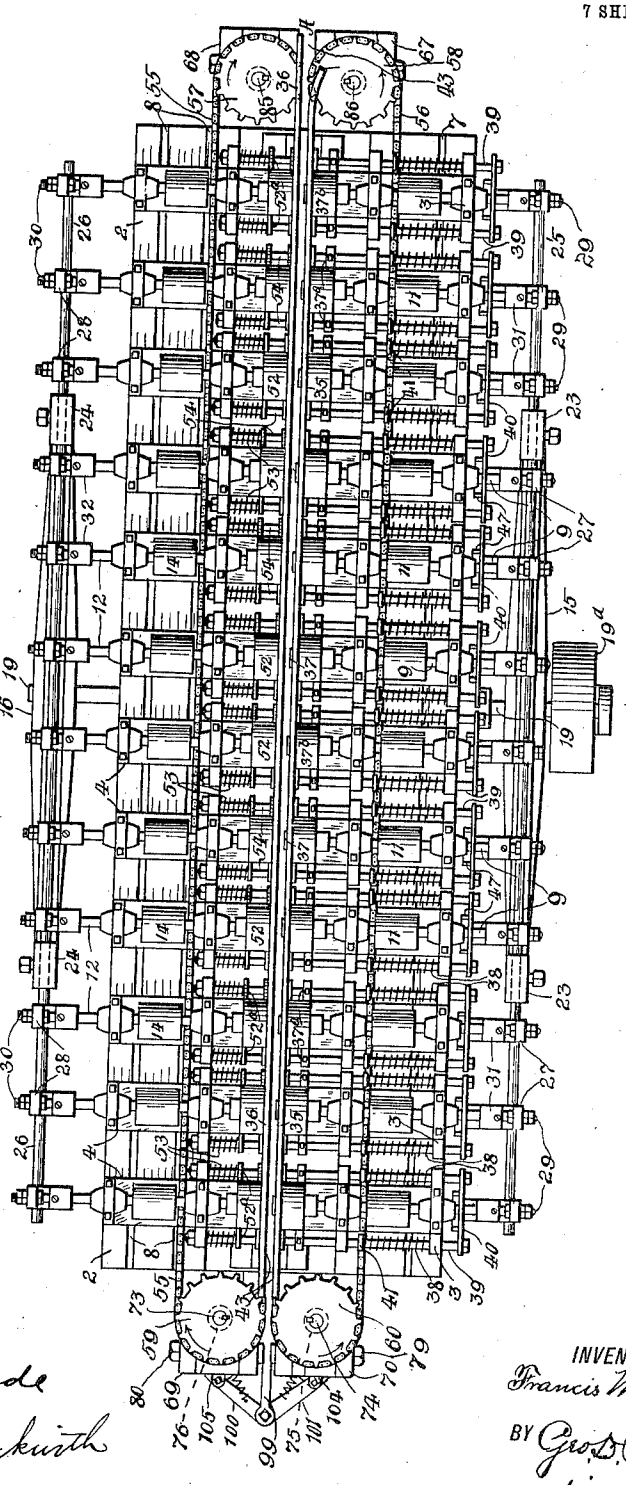

Fig. 1

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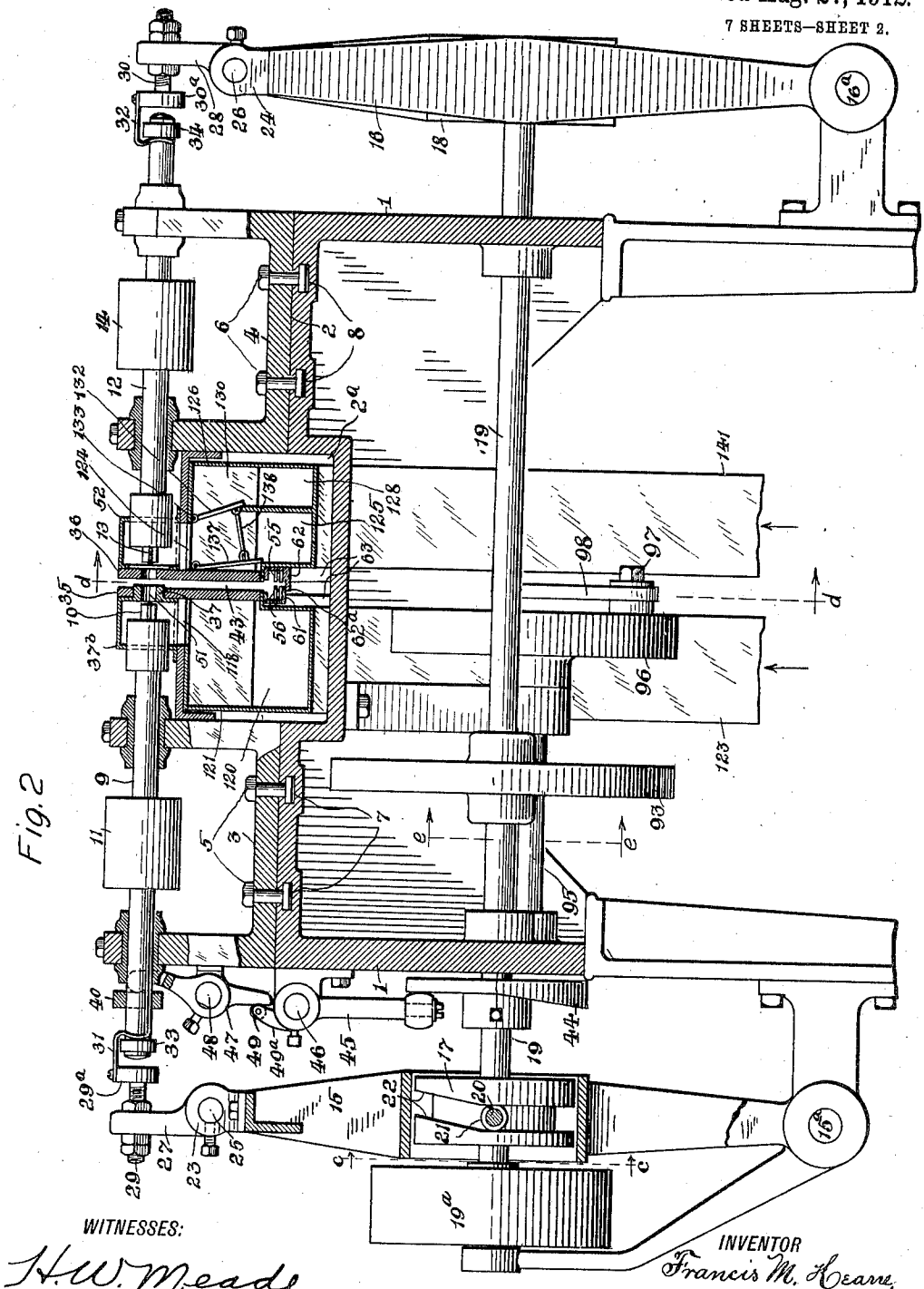

Fig. 2

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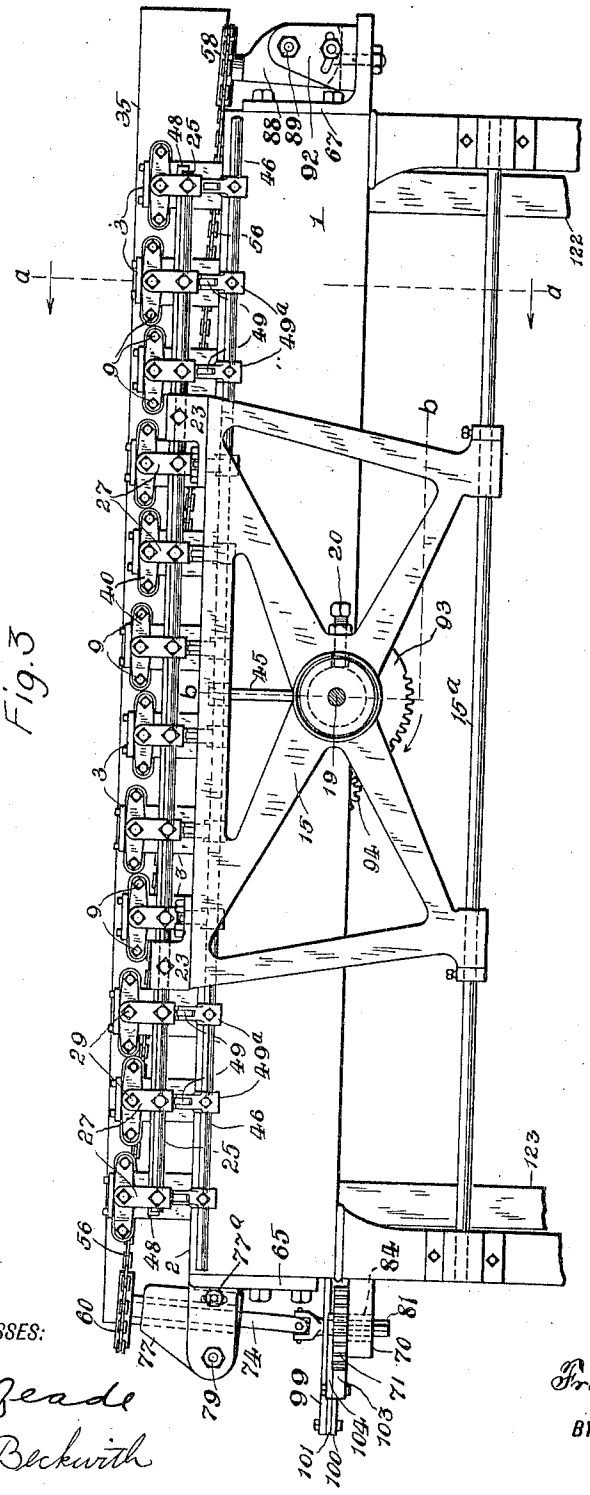

Fig. 3

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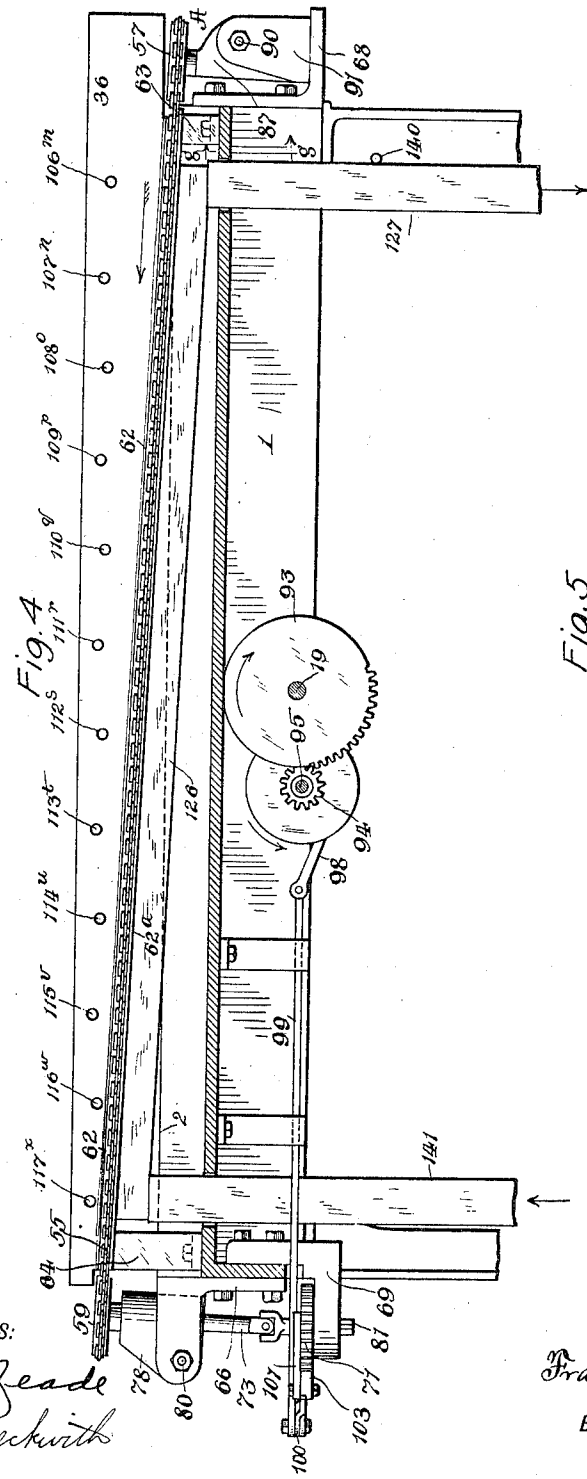

Fig. 4

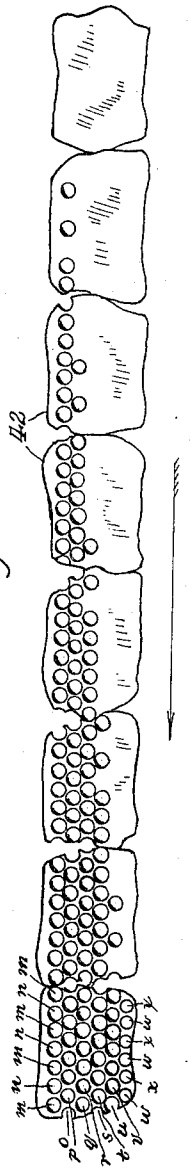

Fig. 5

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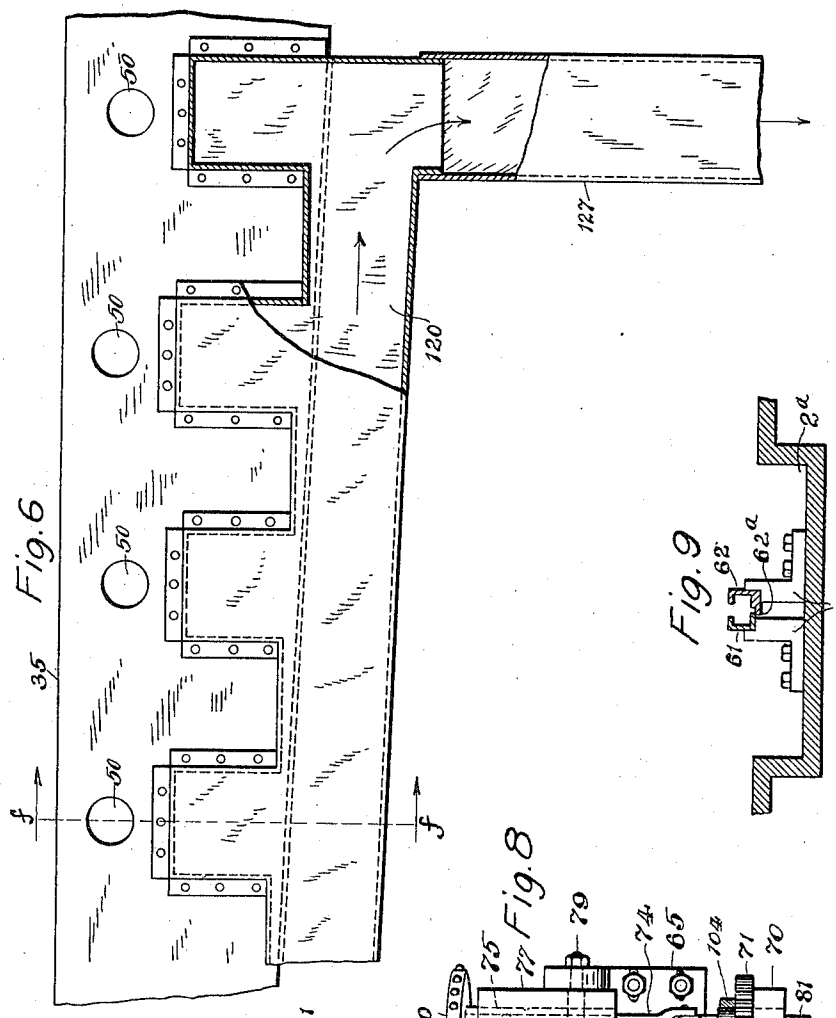

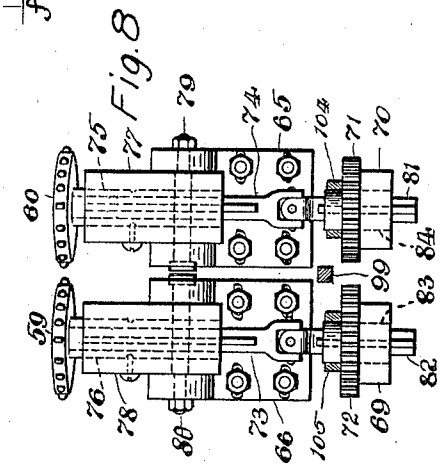

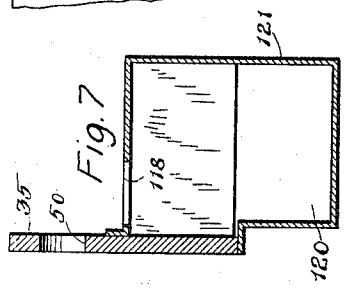

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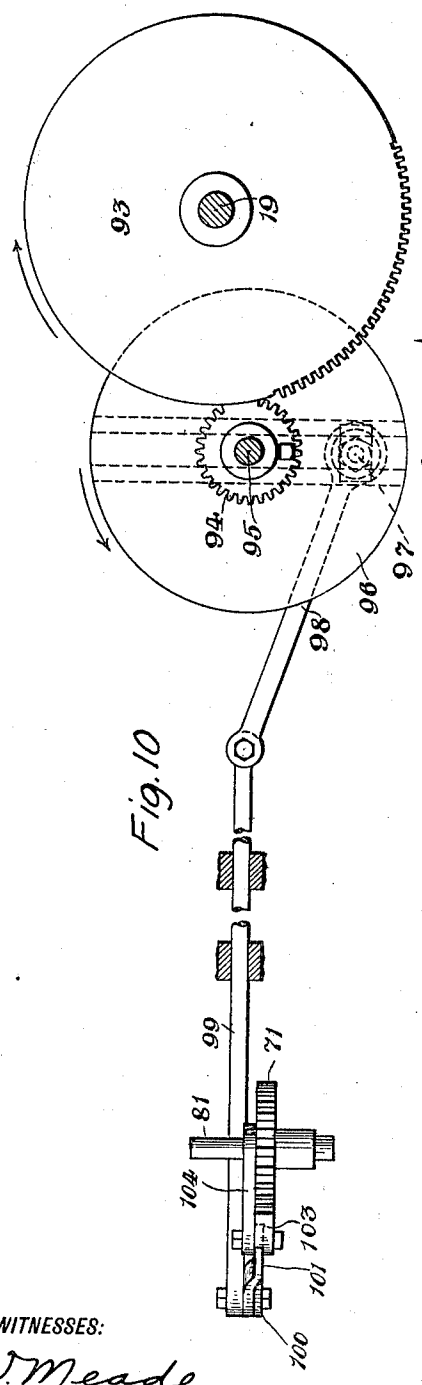

Fig. 10

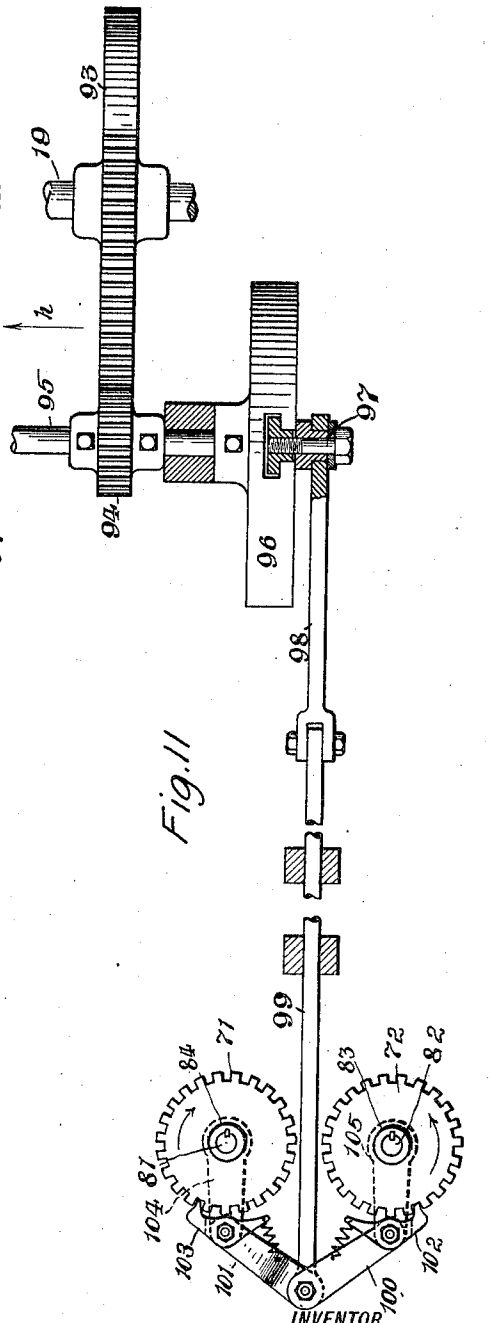

Fig. 11

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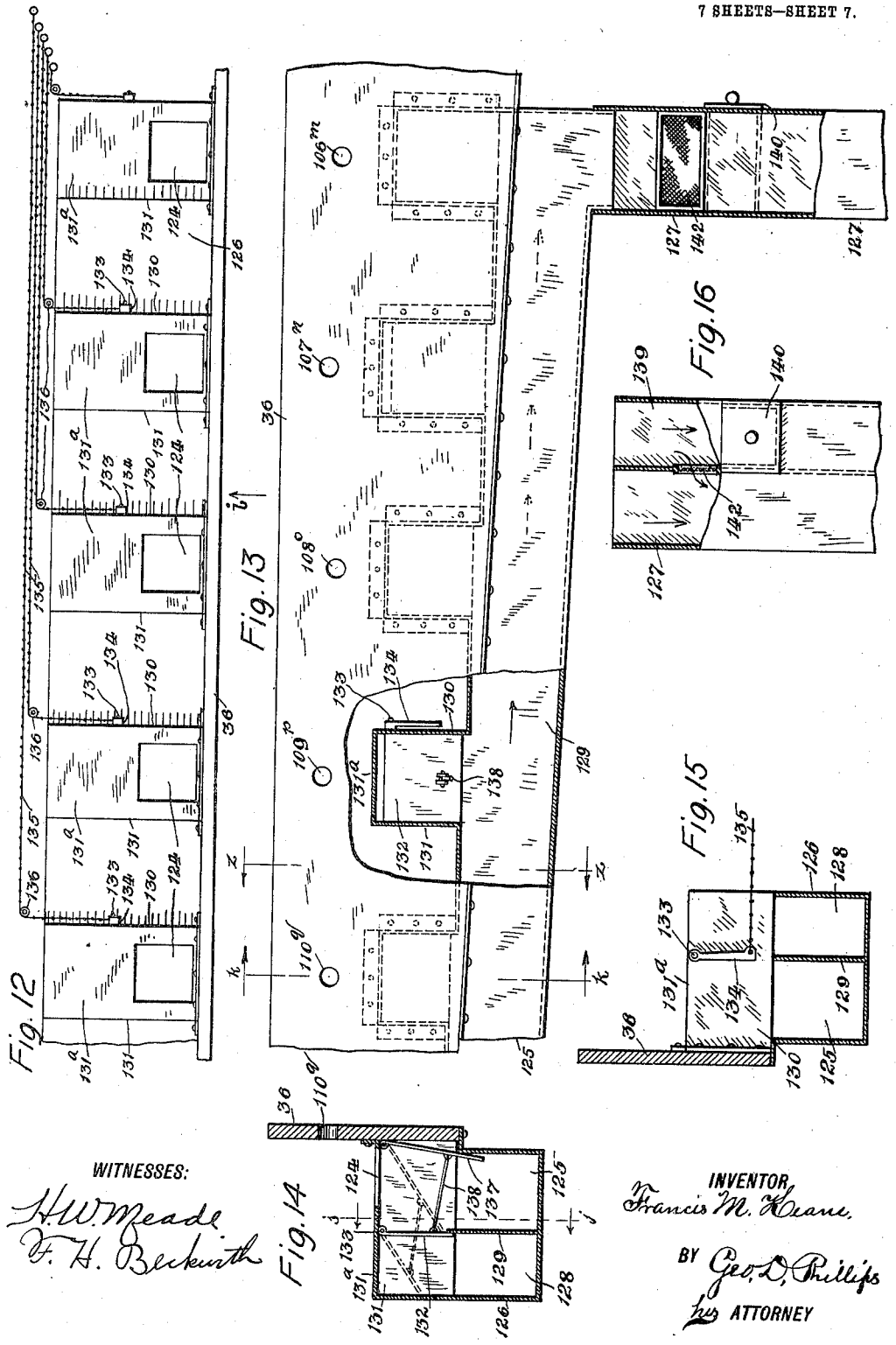

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UNITED STATES PATENT OFFICE.

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BUTTON-MAKING MACHINE.

1,036,857. Specification of Letters Patent. Patented Aug. 27, 1912.

Application filed October 28, 1910. Serial No. 589,561.

To all whom it may concern:

Be it known that I, FRANCIS M. KEANE, citizen of the United States, residing at Botsford Station, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Button-Making Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in button making machines adapted to cut buttons from horn and other like stock, and it has for its object to increase the production by certain improved mechanism and arrangement thereof that will best achieve this result.

Among the several improved features may be mentioned that of adjustably mounting the cutter carrying spindle standards on a horizontal plane and feeding the stock on an incline plane, staggering the cutting spindles and arranging them to correspond to the incline of the feed to more effectively and economically cut the stock with the least possible waste. Arranging the stock feeding sprocket chains on an incline and laterally adjusting the channel irons in which they run, and means for adjusting the sprocket wheels to change the incline of the feed. Independent and interchangeable frames carrying stock guiding plates having cutter holes therein for different sizes of cutters so that different sizes of buttons may be cut on the same machine, one frame having a chamber for chips, and the other having two chambers, one chamber for the general reception and delivery of finished buttons, and a button sampling chamber communicating with each cutter spindle with mechanism for diverting the product from any spindle into the sampling chamber, and operating said mechanism from the stock feeding end of the machine. Skipping one or more buttons in the same row and increasing the number of cutting spindles to cut the intermediate stock and thereby cut as fast as the stock can be fed into the machine. These and other features will be set forth in the following specification.

Referring to the accompanying drawings in which like figures and letters of reference indicate like parts throughout the several views: Figure 1 represents an upper plan view of the machine; Fig. 2 is an enlarged broken sectional view of the machine on line *a—a* of Fig. 3, and one of the spindle actuating levers on line *b—b;* Fig. 3 is a side elevation of the machine and sectional view of the driving shaft on line *c—c* of Fig. 2, and broken view of the legs and air and discharge chutes; Fig. 4 is a sectional view on line *d—d* and *e—e* of Fig. 2, also broken view of the machine legs and air and discharge chutes; Fig. 5 is a detail view of the stock partially cut; Fig. 6 is an enlarged broken side elevation of the chip receiving frame and one of the guide walls comprising the stock feeding channel way; Fig. 7 is a sectional view on line *f—f* of Fig. 6; Fig. 8 is an enlarged detail front elevation of the chain sprocket mechanism and cross sectional view of the actuating rod for same; Fig. 9 is a broken sectional view of the machine bed, cross sectional view of the feed chain channels, and elevation of two of their adjustable supporting standards on line *g—g* of Fig. 4; Fig. 10 is an enlarged detail broken side elevation partly in section of the chain feeding mechanism; Fig. 11 is an inverted plan view of the feeding mechanism looking in the direction of arrow *h* of Fig. 10; Fig. 12 is an enlarged broken upper plan view of the button receiving box or frame; Fig. 13 is an enlarged broken front elevation of the button receiving frame looking in the direction of arrow *i* of Fig. 12, and sectional view of the frame on line *j—j* of Fig. 14; Fig. 14 is an enlarged sectional view of the button receiving frame on line *k—k* of Fig. 13; Fig. 15 is an enlarged sectional view of the button receiving frame on line *z—z* of Fig. 13; and Fig. 16 is an enlarged broken view partly in section of the button and sample button discharge chutes.

1 represents the side walls of the bed, 2 the table portion integral therewith having the central depression to form the channelway 2^a.

3 and 4 are a series of longitudinally adjustable standards mounted on the table portion of the bed and on each side of the central stock feeding line presently to be described. These standards are secured in any of their adjusted positions by means of the bolts 5 and 6 and the T-shaped slots 7 and 8. The standards 3 carry the spindles 9 having the cutters 10 at their inner ends and the

driving pulleys 11, and the standards 4, the spindles 12, cutters 13, and driving pulleys 14.

The spindles are actuated to and from the cutting field by means of the levers 15 and 16—pivoted at 15ª and 16ª—and their cams 17 and 18 mounted on the main shaft 19, having the driving pulley 19ª, shown more clearly at Fig. 2. 20 (see also Fig. 3) is a bolt located in the hub of the lever 15 which carries on its inner end the roll 21 to engage the groove 22 of the cam. It will be understood that the cam 18 is likewise equipped with a similar bolt and roll, but not shown. Brackets 23 and 24 (Figs. 1, 2 and 3) on the end of the levers 15 and 16 carry the rods 25 and 26, and secured to these rods are the series of short levers 27 and 28 carrying the adjusting bolts 29 and 30, whose inner heads carry the spring fingers 31 and 32 adapted to straddle the cutting spindles as shown more clearly at Fig. 2. These fingers engage with the collars 33 and 34 on the spindles to draw said spindles back from the cutting field while the heads 29ª and 30ª of the bolts 29 and 30 engage with ends of the spindles to force them toward the cutting field.

When the stock has been fed the required distance it is held stationary between the guide-plates 35 and 36 during the cutting operation by means of the movable jaw 37 actuated by the springs 38 (Fig. 1) on the rods 39, which rods are anchored in the ears 37ª of the jaws 37, and the cross-bars 40. These rods have a longitudinal movement through the spindle standards 3 and the springs are located between said standards and the fixed collars 41 on said rods.

When the stock 42 (Fig. 5) is being fed through the channel-way 43 (Figs. 1 and 2) the jaws are temporarily retreated through the medium of the cam 44 on shaft 19; lever 45 secured to the rocker shaft 46 (see also Fig. 3) and the levers 47 secured to the second rocker shaft 48. The upper ends of levers 47 are forked to straddle the cutter spindles and engage with the inside faces of the cross bars 40, while their lower ends are engaged by the rolls 49 of the levers 49ª on the rocker shaft 46. The jaws 37 have a longitudinal movement in the holes 50 (Fig. 6) of the guide plate 35, and are provided with central openings 51 for the cutter end of the spindles as shown at Fig. 2. The hooded portions 37ᵇ of the jaws inclose the cutting ends of the spindles to prevent the scattering of chips. 52 are a similar series of hoods embracing the cutter ends of the spindles 12 and for a similar purpose. These latter hoods are normally maintained against the outer face of the guide plate 36 by the springs 53 operating in a similar manner on the rods 54 to the springs on the opposite side of the stock feeding line, as hereinbefore described, except that said springs are located between the ears 52ª of the hoods and the standards 4.

The sections of stock are entered into the channel-way 43 between the guide plates 35 and 36 at the point A, Fig. 1, and they are intermittently fed therethrough on an incline by means of the endless sprocket chains 55 and 56 and the sprocket wheels 57, 58, 59 and 60. These chains run through the incline channel irons 61 and 62 (Figs. 2, 4 and 9) mounted on the adjustable standards 63 and 64 seen at Figs. 4 and 9. As the stock is soft enough to admit of the links of the chains making indentations therein under pressure, the amount of pressure required to effect a sure feeding of the stock is regulated by means of the lateral adjustable character of the supporting standards of said channel irons as seen at Fig. 9. The channel iron 62, Figs. 2 and 9, is provided with the overlapping lip 62ª on which the lower edge of the stock rests so that a support for said stock is always provided regardless of the adjustment of the channel irons. The sprocket wheel supporting brackets 65, 66, 67 and 68 (Figs. 1, 3, 4 and 8) are also adapted to have a lateral adjustment, as shown clearly at Fig. 8, to conform to the lateral adjustment of the channel iron standards before mentioned. The brackets 69 and 70 supporting the ratchet wheels 71 and 72 also have this same lateral adjustment.

The sprocket wheels 59 and 60 are keyed to their shafts 73 and 74 and to the bushings 75 and 76 rotatably mounted in the frames 77 and 78 pivotally supported on the bolts 79 and 80 extending through the ears of the brackets 65 and 66. These frames are clamped in any of their adjusted positions by nuts, one, 77ª, being shown at Fig. 3. The lower ends of these sprocket wheel shafts are connected by universal joints, as shown, to the short ratchet wheel shafts 81 and 82. These latter shafts are also keyed to the bushings 83 and 84, Fig. 8, rotatably mounted in the brackets 69 and 70. When the frames carrying the sprocket wheels are tilted on their pivotal supports to change, if necessary, the angle of the chains, the ratchet wheel shafts are allowed a free vertical movement to readily conform to the changed positions of said frames. The other sprocket wheel shafts 85 and 86, Fig. 1, are rotatably connected to the frames 87 and 88, Figs. 3 and 4, in a manner similar to that explained for sprocket wheels 59 and 60, and these frames are pivotally supported on bolts 89 and 90 extending through the ears of the standards 91 and 92 so that said frames have the same radial adjustment and means for clamping them in any of their adjusted positions as the before mentioned sprocket wheel frames on the opposite side of the machine.

The mechanism for actuating the chain feed consists, Figs. 2, 4, 10 and 11, of the sector toothed gear 93 mounted on the main shaft 19, and the intermittent pinion 94 on the short shaft 95. The number of teeth in the continuously running gear 93 and the pinion being equal, and the toothless portion of the gear and pinion being on the pitch line, the pinion will make one revolution to represent the feed and be held stationary by the contact of said pitch lines, Fig. 10, while the cutting spindles are in operation.

The crank plate 96 on the shaft 95 carries the adjustable wrist pin 97 for varying the length of the feed to suit the cutting of large or small buttons presently to be described. The connecting rod 98 connects with said wrist pin and one end of the horizontally operating rod 99, while the other end of said latter rod connects with the arms 100 and 101 carrying the pawls 102 and 103 adapted to engage the ratchet wheels 71 and 72. The short arms 104 and 105 are journaled on the bushings 83 and 84 (see also at Fig. 8).

As before mentioned, the stock is entered into the channel way 43 between the guides 35 and 36 and at the point A, Figs. 1 and 4, and rest on the projecting lip 62^a, Figs. 2 and 9, of the inclined channel iron chain guide 62 and is fed along by the contact therewith of the chains 55 and 56. To increase the product or cutting capacity of machines of this character, and to cut the stock as fast as it can be fed, the stock is advanced by each impulse or stroke of the feeding mechanism a distance equal to the diameter of one or more buttons, plus the intervening scrap or waste, and increasing the number of cutting spindles so as to cut the intervening stock that has been skipped. As the stock is wide enough to cut out the several rows of holes as shown at Fig. 5, the cutting spindles on each side of the stock feeding line are arranged in pairs each pair operating on each row or line represented by the holes *m o q s u w*. The holes 106^m, 107^n, 108^o, and 109^p, etc., in the guide plate 36, Fig. 4, admit the cutter ends of the spindles 12, Figs. 1 and 2. The pair of holes 106^m and 107^n are equal distance from the lip 62^a, on which, as before stated, the stock rests. In like manner each successive pair of holes is equal distance from said lip, but on a lower plane.

At the entrance of the stock into the feeding channel 43, Fig. 1, the cutter for hole 106^m, Fig. 4, will cut the first hole *m*, Fig. 5, of the top line of holes. The feeding mechanism will then advance the stock to cut the second hole *m* to the right. The stock will then be advanced far enough for the cutter for hole 107^n to cut the intermediate hole *n* in the stock and so on throughout the entire upper line of holes, which holes represent so many buttons cut out. As the stock advances, the cutters for holes 108^o and 109^p will operate, and, being on a lower plane, will cut the holes *o p*, Fig. 5, in the second line of holes in the stock in the same manner and so on with respect to the cutters in the other holes, viz.: 110^q, 111^r, 112^s, 113^t, 114^u, 115^v, 116^w and 117^z for the remaining lines of holes in the stock. The distance between the several pairs of holes in the guide plates are less by one-half of a hole than the distance between the holes of the pair, so that the holes of one line will be intermediate of the holes in the lines above and below, thereby avoiding unnecessary waste of stock. In other words, the distance between the last hole 107^n and the hole 108^o is less by one-half of a hole than the distance between 106^m and 107^n, or between 108^o and 109^p, etc. As soon as the feeding mechanism has advanced the stock the required distance, the jaws 37, Fig. 2, will advance and hold the stock while the series of cutting spindles 9 are brought into operation to form one side of the buttons, the chips falling through holes 118 (see also Fig. 7) into the chamber 120 of the frame 121, and are carried from thence down the discharge chute 122, Fig. 3, by means of a current of air drawn up through the pipe 123, which latter is also seen at Fig. 2. As soon as one side of the buttons has been finished, the cutter spindles 9 are retreated and the cutter spindles 12 are brought into action to complete the opposite side of the buttons and sever them from the stock, the chips and buttons falling through holes 124 (see also Figs. 12 and 14) into the chamber 125 of the frame 126, and are carried from thence through the discharge chute 127, Figs. 6, 13 and 16, to a separator (not shown).

To ascertain the quality of work being done by each individual cutter spindle at any time without disturbing the operation of the machine, the second or sample compartment 128 Figs. 2, 13, 14 and 15, is provided to run parallel with the compartment or chamber 125, the two chambers being divided a portion of the way by the partition 129, the remaining portion of the upper inclosed box-like structure, formed by the sides 130, 131 and top 131^a, is shut off by the trap door 132, supported on the rod 133. It will be understood that this box-like structure and trap door is provided under each of the cutting ends of the spindles 12, and to avoid confusion the same figure of reference will be applied to the same individual elements. On each trap door rod is attached the lever 134, and to each of these levers is attached the cord or chain 135, Fig. 12, running over the pulleys 136 to the end of the machine where the operator sits. The trap door 132 is connected to the second and longer trap door 137, Figs. 2 and 14,

by the rod 138, so that, when the operator desires to inspect the work of any cutter, the proper cord is pulled and the trap door 132 is carried over into the dotted position shown at Fig. 14 and through the medium of the connecting rod 138 the second trap door is carried into the dotted position shown to close the chamber 125 and shunt the button that would otherwise fall into this chamber, into the sample chamber 128, where it will be conveyed down through the chute 139 and into the drawer 140, Figs. 4, 13 and 16, and close to the operator where they can be readily inspected, the same principle of air suction being employed to convey the contents of both chambers 125 and 128 as employed for the chamber 120, but by means of the separate air intake 141 shown at Fig. 2. As the drawer 140 will make a dead end to the chute 139 and liable thereby to interfere with the direct air suction for the regular button discharge chute 127, the wire screen 142 is placed in the partition wall dividing the two chutes.

As before mentioned, this machine is adapted to cut various sizes of buttons by simply providing different cutters and interchangeable chip and button receiving frames 121 and 126, which frames carry the guide plates 35 and 36 and the hoods 37 and 52. In changing from one size of button to another, these frames are removed and replaced by others whose guide plates have holes for the size for the cutter required and properly spaced so as to cut the stock economically, then the spindle standards 3 and 4 are laterally adjusted to bring the cutters into alinement with the holes in the guide plates of the replaced frames, and the parts on rods 23, 25, 26, 46 and 48 are adjusted to conform to the adjusted positions of the standards.

While I show the stock as being supported on a lip of one of the channel irons for the chains, other well known means may be employed, or the support can be dispensed with entirely and the grip of the chains depended upon to maintain the incline feed of the stock. The chains could be dispensed with and other well known means could be employed for feeding the stock.

While I show the cutter spindles arranged and operating in pairs, each pair operating on a different line, it will be understood by those skilled in the art that the spindles could be arranged to operate in groups of three or more, which would enable the stock to be fed with greater rapidity with a correspondingly increased production.

Having thus described my invention, what I claim is:—

1. In a button making machine having a series of cutter spindles and guide plates having cutter holes therein, a frame having a chamber to receive finished buttons and a button sampling chamber parallel therewith, means for temporarily shutting off the product of any spindle from the button chamber and depositing said product in the sampling chamber.

2. In a button making machine having a series of cutter spindles, a frame having a chamber to receive finished buttons and a button sampling chamber, means for shutting off communication between any one of the cutter spindles and the button receiving chamber and depositing the product of said spindle into the sampling chamber, and means at one point of the machine for depositing the product of any one spindle of the series into the sampling chamber.

3. A button making machine comprising a horizontal bed, standards mounted thereon, a series of opposed cutter spindles in said standards, means whereby said standards are adjusted to vary the distance between the spindles to permit the use of different sized cutters, removable guide plates between which the stock is adapted to be fed on an incline plane, said plates having holes to admit the spindle cutters, and means for intermittently feeding the stock.

4. A button making machine comprising a horizontal bed, standards mounted thereon, a series of opposed cutter spindles mounted in the standards, means whereby said standards are adjusted to vary the distance between the spindles to permit the use of different sized cutters, removable guide plates having holes to admit the spindle cutters, an inclined support for the stock, means for intermittently feeding the stock between the guide plates, and means for actuating the spindles to and from said guide plates.

5. A button making machine comprising a horizontal bed, standards mounted thereon, a series of opposed cutter spindles mounted in the standards, means whereby said standards are adjusted to vary the distance between the spindles to permit the use of cutters of different sizes, removable guide plates having holes to admit the spindle cutters, an inclined support for the stock, means for intermittently feeding the stock between the guide plates, the cutter spindles on each side of the feeding line arranged in staggered pairs, each pair the same distance from the inclined stock support, and each alternate spindle on each side of the stock feeding line the same distance from the bed, the distance from each pair of holes being less than the distance between the holes of the pairs.

6. A button making machine comprising a horizontal bed, a series of opposed standards mounted thereon, cutter spindles in said standards, an incline support for the

stock, said standards varying in height from the inclined stock support to enable buttons to be cut on different lines, or rows, means for adjusting the standards to vary the distance between the cutter spindles, removable guide plates on each side of the stock feeding line having holes to admit the spindle cutters, means for feeding the stock, and means for changing the angle of the feed and stock support.

7. A button machine comprising a horizontal bed, standards mounted thereon, a series of opposed cutter spindles mounted in the standards, means whereby said standards are laterally adjusted to and from each other to vary the distance between the spindles to permit the use of different sized cutters and the insertion of other spindles and standards.

In testimony whereof I affix my signature in presence of two witnesses.

FRANCIS M. KEANE.

Witnesses:
JAMES FEELEY,
GEO. D. PHILLIP.