No. 614,786. Patented Nov. 22, 1898.

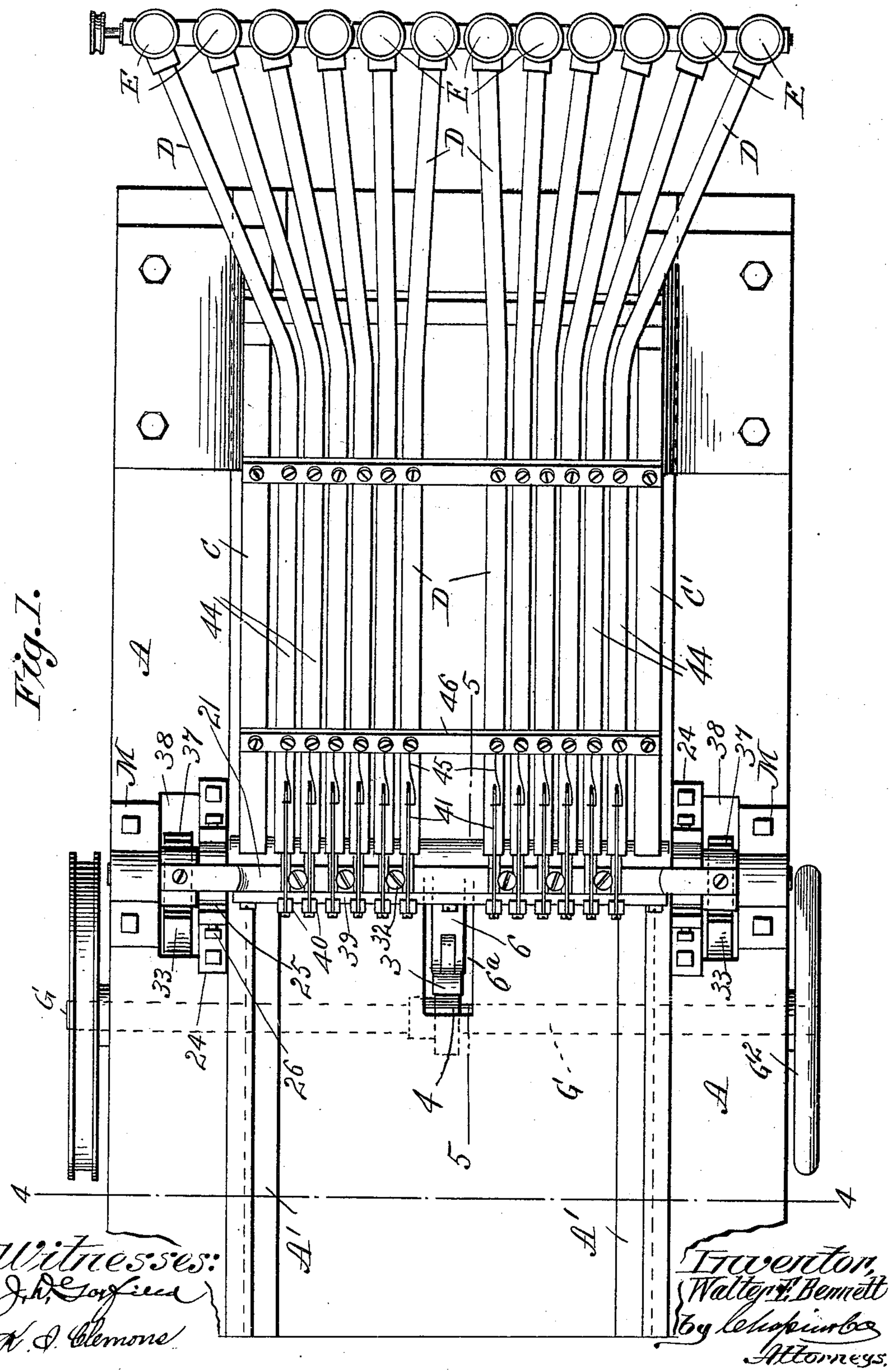
W. E. BENNETT.

BUTTON CARDING MACHINE.

(Application filed Dec. 30, 1897.)

(No Model.) 6 Sheets—Sheet 1.

Fig. 1.



Witnesses:
J. L. Gorfield
N. S. Clemons

Inventor,
Walter E. Bennett
by Lehmpierbo
Attorneys.

No. 614,786. Patented Nov. 22, 1898.

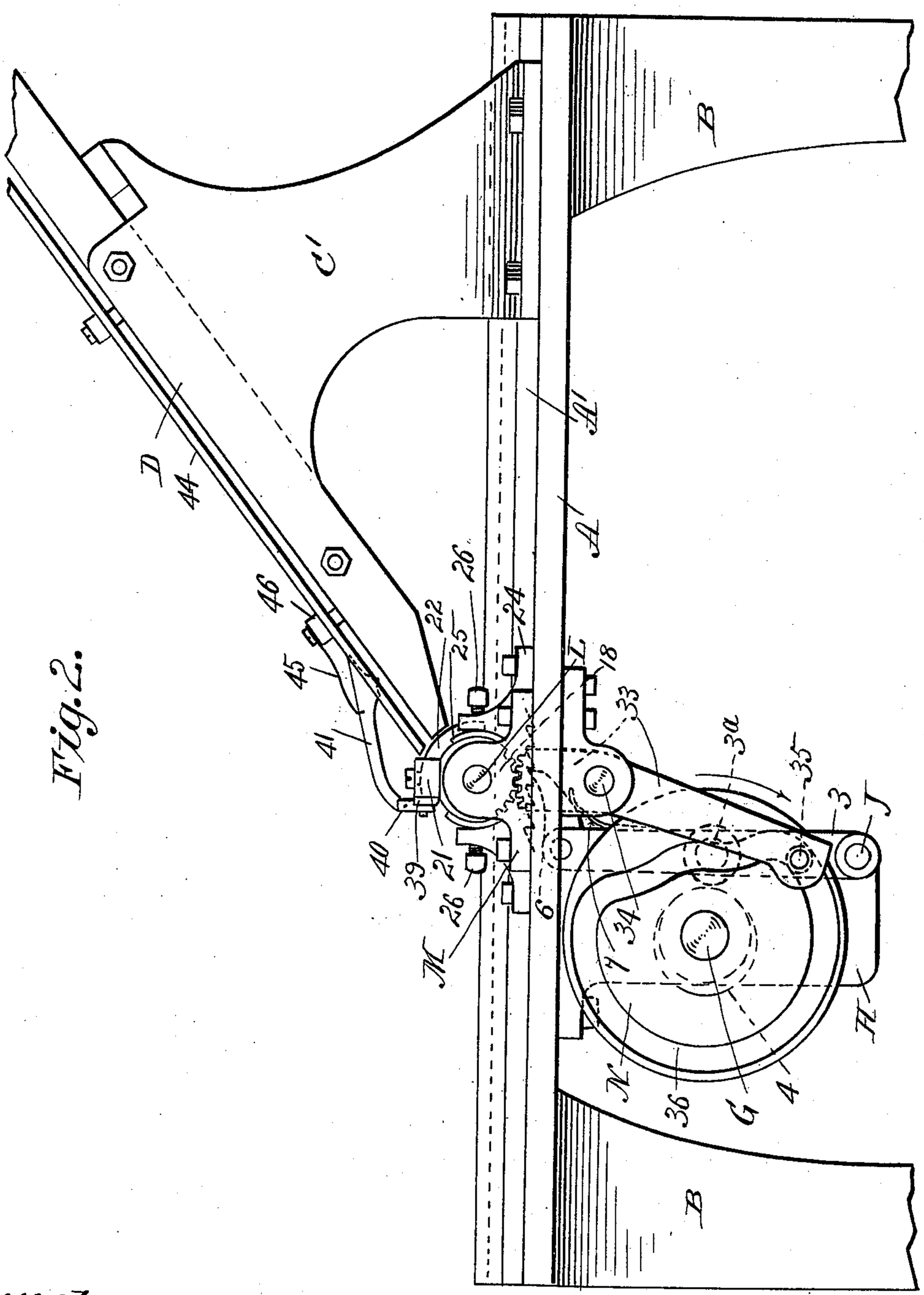
W. E. BENNETT.

BUTTON CARDING MACHINE.

(Application filed Dec. 30, 1897.)

(No Model.) 6 Sheets—Sheet 2.

Fig. 2.



Witnesses:
J. D. Garfield
K. A. Clemons.

Inventor,
Walter E. Bennett,
by Schupinbo
Attorneys.

No. 614,786. Patented Nov. 22, 1898.

W. E. BENNETT.

BUTTON CARDING MACHINE.

(Application filed Dec. 30, 1897.)

(No Model.)

6 Sheets—Sheet 3.

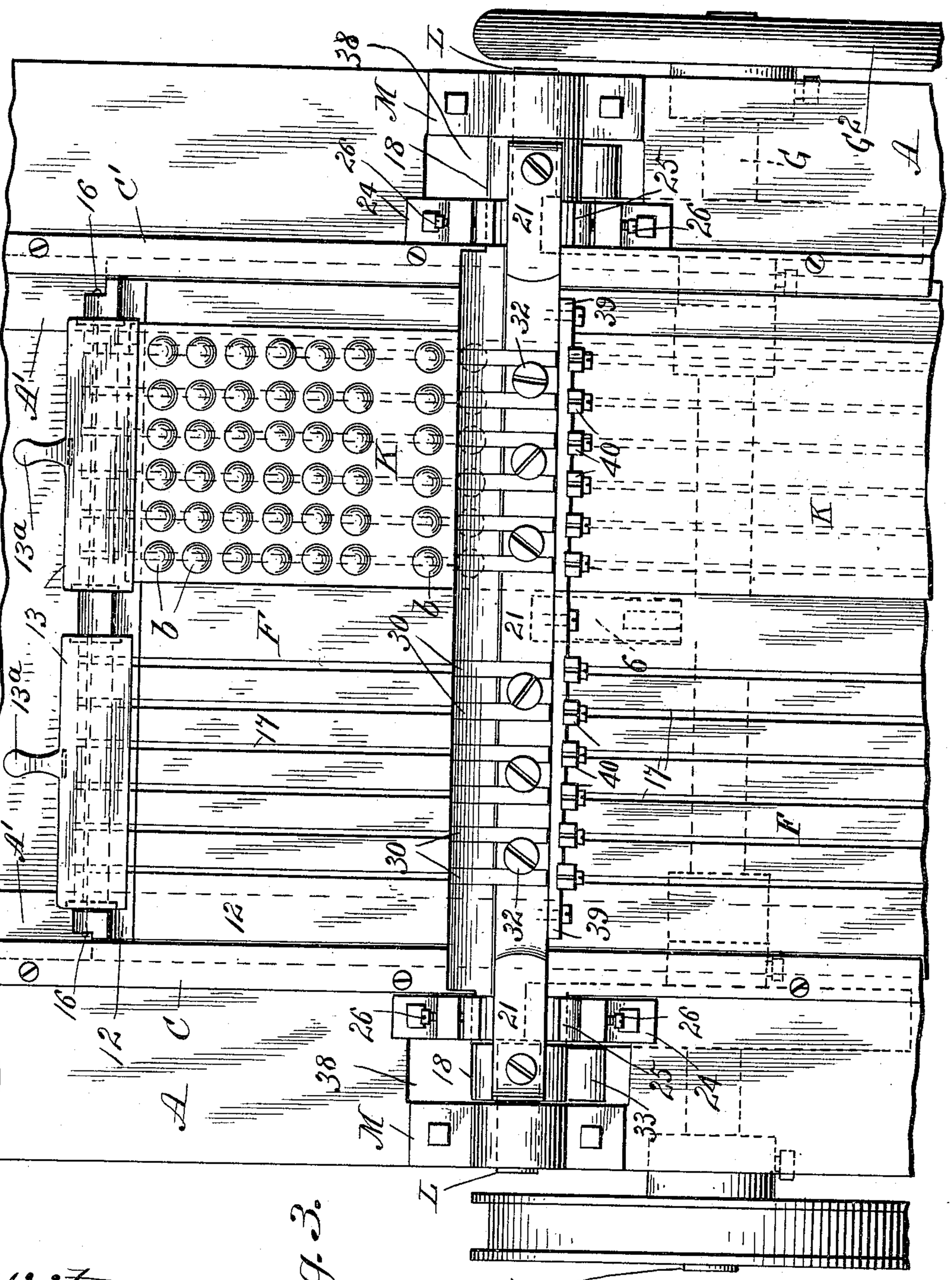


Fig. 3.

Witnesses:
J. D. Garfield
K. L. Clemons

Inventor:
Walter E. Bennett,
by Lehmpinckles
Attorneys.

No. 614,786.

Patented Nov. 22, 1898.

W. E. BENNETT.

BUTTON CARDING MACHINE.

(Application filed Dec. 30, 1897.)

(No Model.)

6 Sheets—Sheet 4.

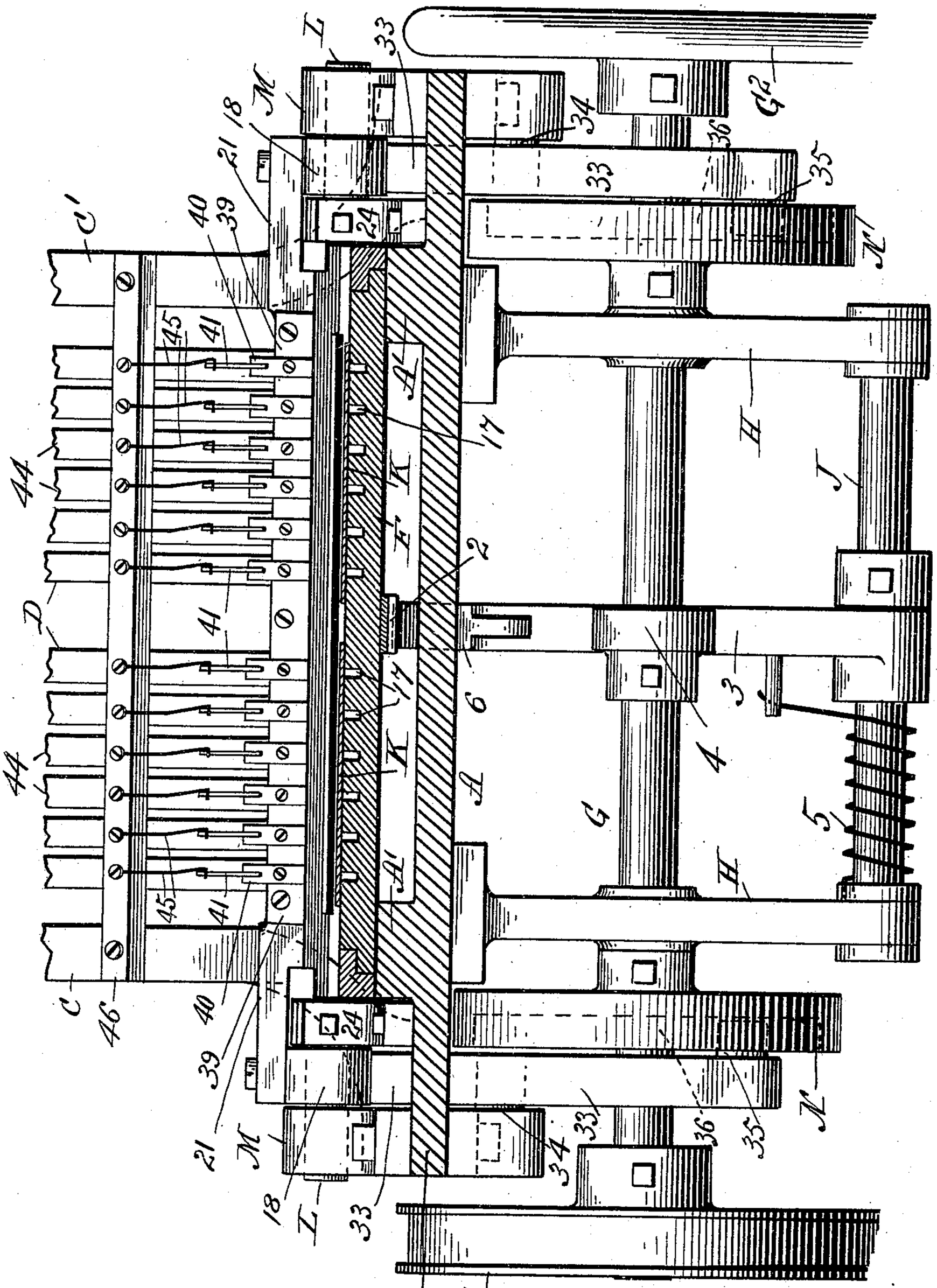


Fig. 4.

Witnesses:
J. H. Gorfield
K. D. Clemons

Inventor,
Walter E. Bennett,
by Coleman & Coleman
Attorneys.

No. 614,786. Patented Nov. 22, 1898.

W. E. BENNETT.

BUTTON CARDING MACHINE.

(Application filed Dec. 30, 1897.)

(No Model.) 6 Sheets—Sheet 5.

Fig. 5

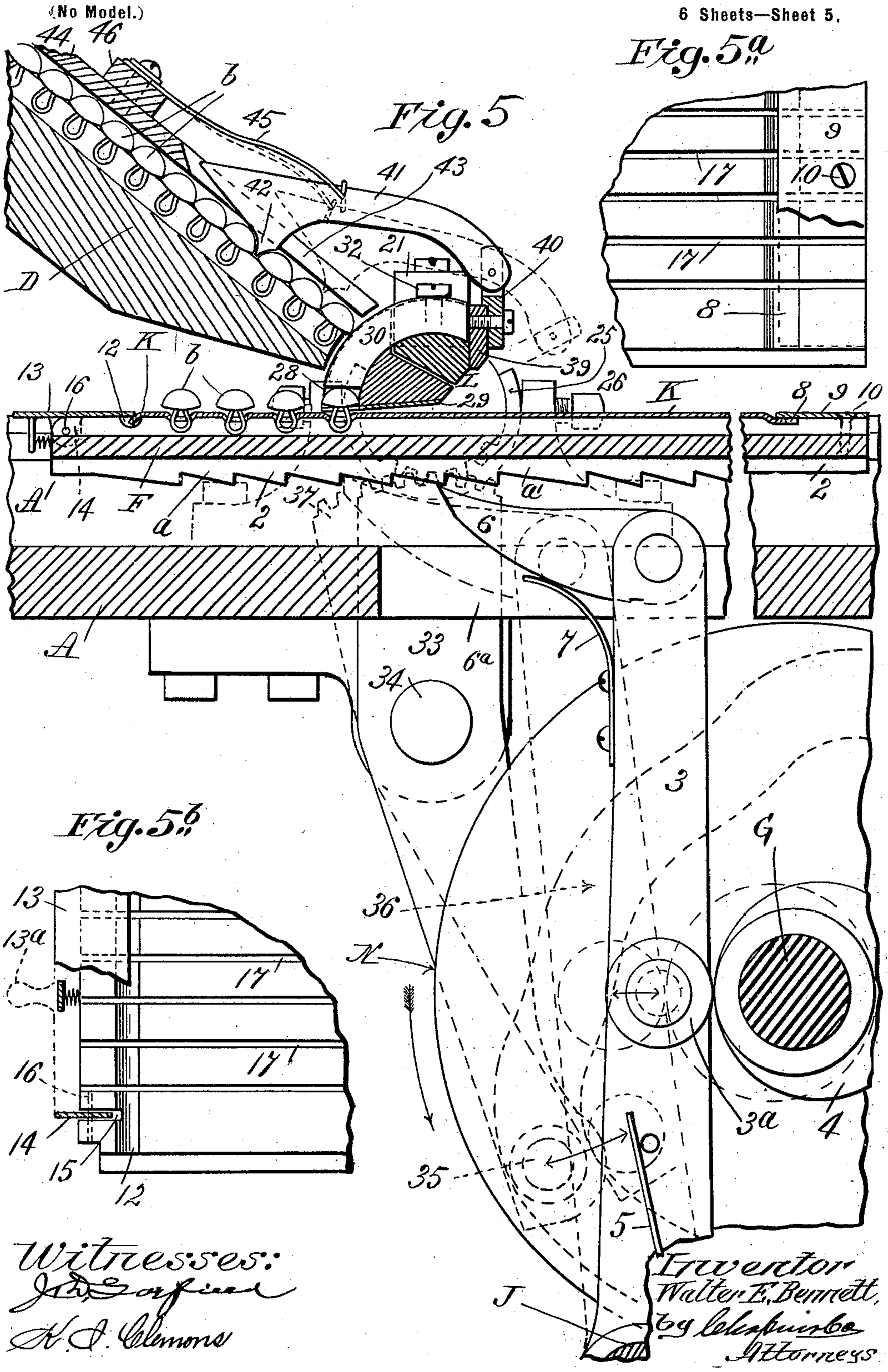


Fig. 5a

Fig. 5b

Witnesses:
J. L. Orrell
H. A. Clemons

Inventor
Walter E. Bennett,
by Coleman & Co
Attorneys

No. 614,786. Patented Nov. 22, 1898.

W. E. BENNETT.

BUTTON CARDING MACHINE.

(Application filed Dec. 30, 1897.)

(No Model.) 6 Sheets—Sheet 6.

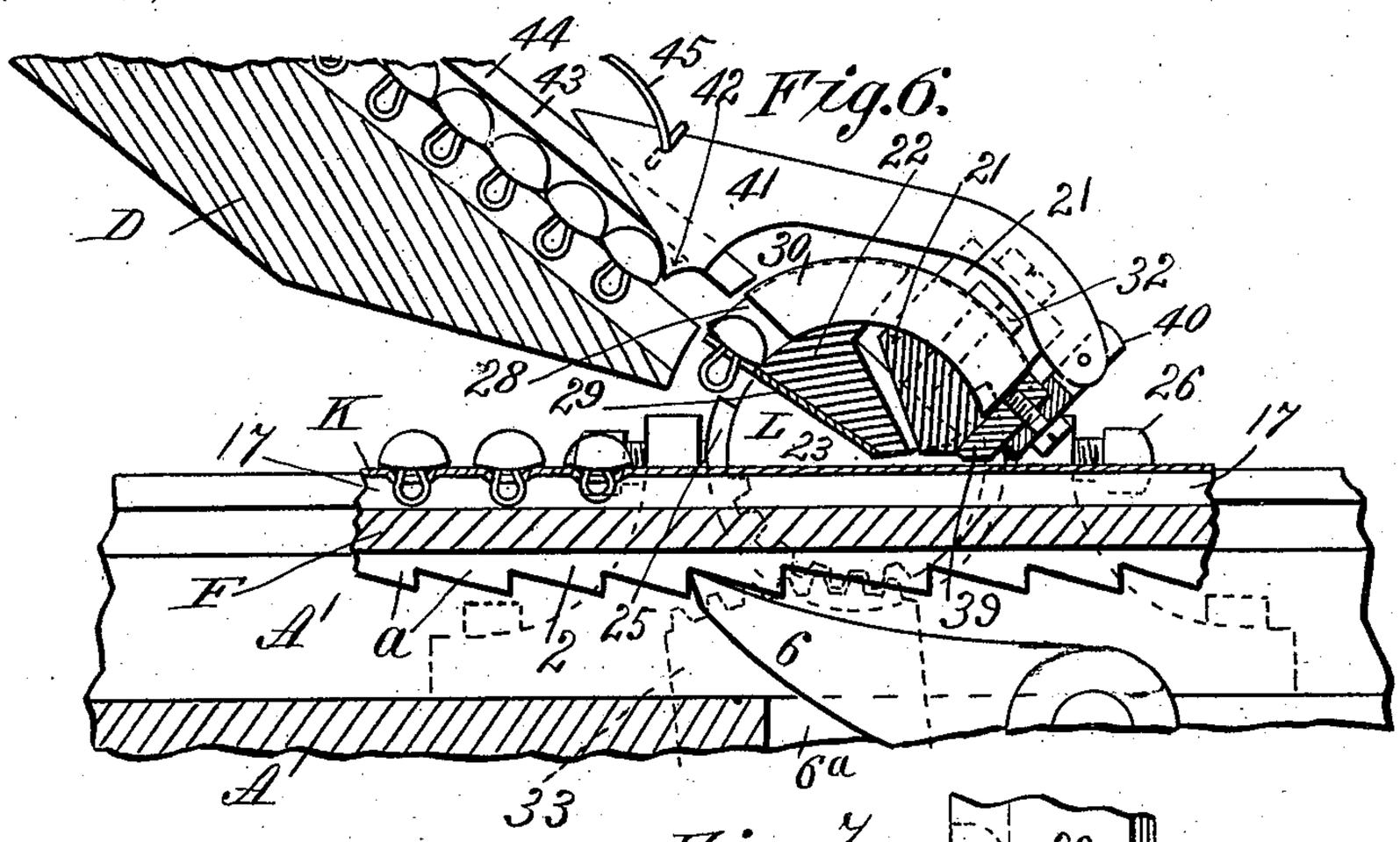


Fig. 6.

Fig. 7

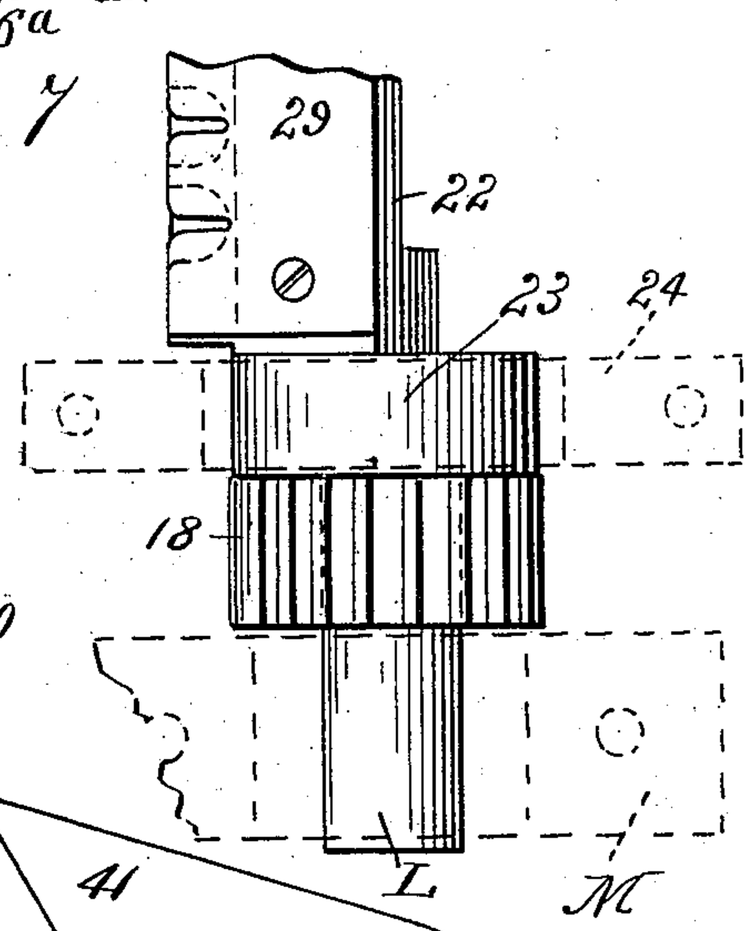
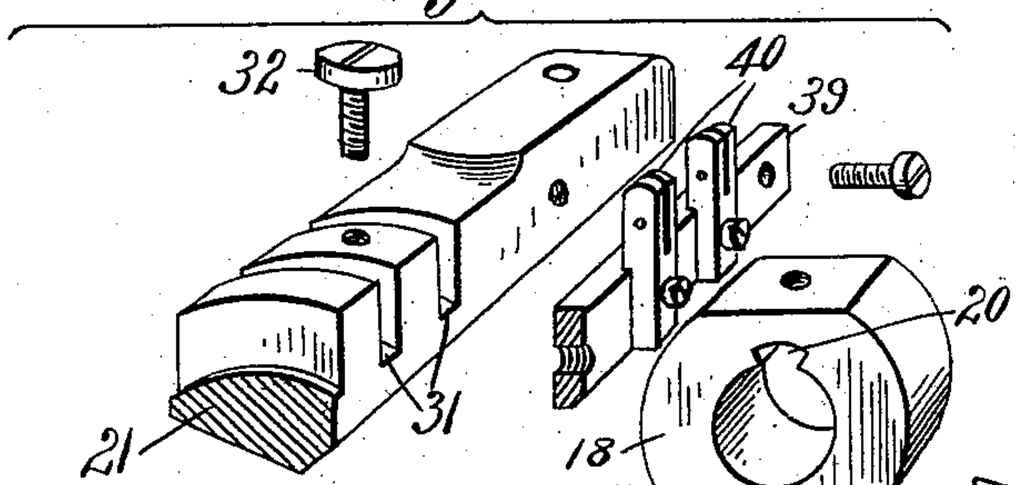


Fig. 8.

Fig. 9.



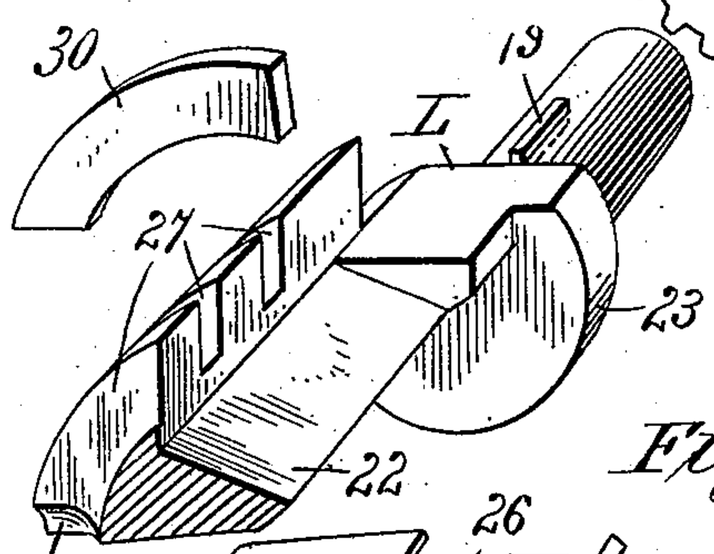
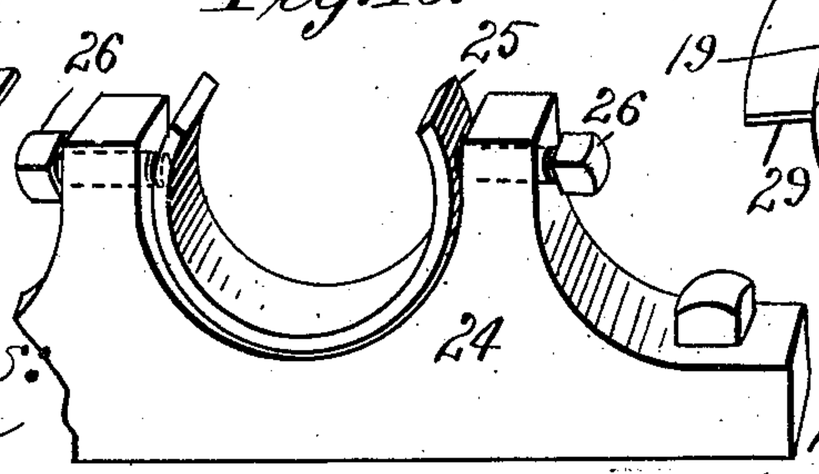
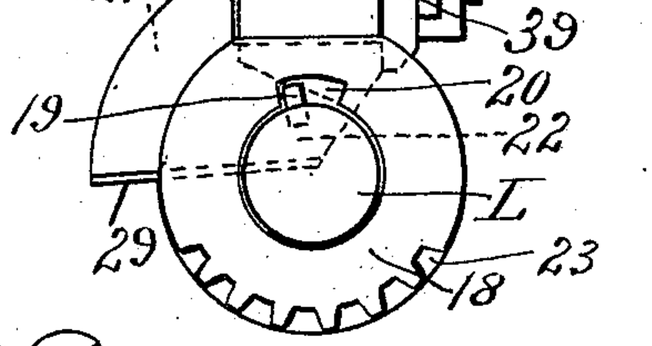


Fig. 10.





Witnesses:
J. D. Goepfiert
H. S. Clemons

Inventor:
Walter E. Bennett,
by Lehmpus & Co.
Attorneys.

UNITED STATES PATENT OFFICE.

WALTER E. BENNETT, OF PORTSMOUTH, NEW HAMPSHIRE, ASSIGNOR TO THE MORLEY BUTTON MANUFACTURING COMPANY, OF SAME PLACE.

BUTTON-CARDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 614,786, dated November 22, 1898.

Application filed December 30, 1897. Serial No. 664,620. (No model.)

To all whom it may concern:

Be it known that I, WALTER E. BENNETT, a citizen of the United States of America, residing at Portsmouth, in the county of Rockingham and State of New Hampshire, have invented new and useful Improvements in Button-Carding Machines, of which the following is a specification.

This invention relates to the manufacture of shank-buttons, and particularly to that class having loop-shaped wire shanks; and the object of the invention is to provide a machine to which buttons may be fed from a hopper or series of hoppers and by the action of the machine set in symmetrical form in continuous rows or in groups on a strip of paper, cardboard, or other suitable material with their shanks projecting through said material; and the invention consists in the construction and arrangement of the machine, as fully set forth in the following specification, and pointed out in the claims.

In the drawings forming part of this specification, Figure 1 is a top plan view of a machine embodying this invention. Fig. 2 is a side elevation of the machine. Fig. 3 is an enlarged plan view of the central part of the machine with certain of the parts shown in Fig. 1 removed. Fig. 4 is a sectional elevation of the machine taken on line 4 4, Fig. 1, but on the same scale as that shown in Fig. 3. Fig. 5 is a longitudinal section on a line following substantially line 5 5, Fig. 1, and considerably enlarged. Figs. 5^a and 5^b are plan views of portions of the opposite ends of a plate to which a strip of the button-receiving paper or cardboard is secured. Fig. 6 is a sectional view of some of the parts shown in Fig. 5, but in a different position. Fig. 7 is a plan view of one end of a button-receiving bar extending transversely across the machine. Fig. 8 is an end view of said bar shown in Fig. 7 with a button-separating finger shown in position thereon. Fig. 9 shows in perspective parts and portions of parts constituting said button-receiving bar. Fig. 10 is a perspective view of a frictional bearing for each end of said button-bar.

Referring to the drawings, A represents the table of the machine, supported at a proper height on legs B. On opposite sides and near one end of said table are the two frames C and C′ for supporting at a suitable angle to the table A a series of button-troughs D in two equal groups, as shown in Fig. 1, arranged one on each side of the longitudinal central line of said table, with the lower ends of said troughs terminating in proximity to the surface of the said table. Said troughs D at their upper ends are connected to suitable hoppers E for receiving buttons. The construction of this part of the machine—viz., the mechanism for feeding the shank-button from said hoppers down through a series of troughs—forms no part of this invention, and either the form of hopper and trough shown herein or any other suitable form may be used; but the devices for insuring the delivery of buttons one at a time from the ends of said troughs and preventing the column of buttons therein from pressing upon the button about to issue from the end thereof are especially adapted to this machine and will be described farther on.

The table A is made, preferably, in one piece and is usually of cast-iron, having two ribs A′, running lengthwise thereon, cast integral therewith. Said ribs are planed off to form bearing-surfaces for the sliding plate F, the edges of which rest on said ribs, and suitable gibs screwed to said ribs overlap the edges of said plate, forming guides for said plate F in its passage through the machine. The said plate has a step-by-step movement through the machine, imparted thereto by the engagement of a pawl with the ratchet-bar 2, located on the under side of said plate midway between said ribs A′. The length of each step of said sliding plate in its said intermittent movement determines the distance between each transverse row of the buttons *b*, being set by the machine. (See Fig. 3.) Means for imparting to the plate F the said step-by-step movements are provided as follows: A main driving-shaft G is supported under the table of the machine in the hangers H, bolted to said table, and is provided with a driving-pulley G′ on one end and a balance-wheel G^2 on the other end thereof. Below said main shaft G and to one side thereof is

a shaft J, also supported in said hangers H, on which shaft an upstanding arm 3 is pivotally supported by one end and on which is located a cam-roll 3^a, which is held in contact with the edge of a cam 4 on said main shaft G by the tension of a spring 5, one end of which engages a pin in the side of said arm, and the opposite end of which is fixed to one of said hangers. On the opposite end of the arm 3 is a pawl 6, pivotally connected therewith by one end, and whose opposite tapered end is held in engagement with the toothed face of the ratchet-bar 2 by a spring 7, secured to the edge of the arm 3 by one end, its free end bearing on the under side of the pawl 6. A suitable slot 6^a is cut through the table A to permit the necessary movements of the said pawl 6. Hence the rotation of the driving-shaft G will impart to the arm 3 a reciprocating movement and cause the pawl 6 to move said plate to the extent of one tooth for one complete revolution of said shaft.

It will be seen by referring to Fig. 5 that the extent of backward movement of the arm 3 is nearly sufficient to engage two teeth of the ratchet-bar 2, the extreme forward movement of the pawl being indicated by dotted lines and the extreme rearward movement by full lines. The purpose of this lost motion in the action of the pawl is to provide means for moving said plate F at certain intervals to a greater distance than is represented by the spaces between the buttons *b* on the card, (see Fig. 3,) which spaces coincide with the length of the teeth *a*. To this end, after a certain number of rows of buttons have been set, space will be left between the last row of one group and the first row of the next succeeding group sufficiently wide to permit the cutting up of said strip of paper in pieces having one or more groups thereon, and to provide for this space certain teeth of the ratchet-bar 2 (one of which is shown in Fig. 5, indicated by *a'*) are made of a length corresponding to nearly the extreme throw of the pawl 6, and thus the arrangement of the teeth of the ratchet-bar determines the grouping of the buttons on the strip of paper passed through the machine. The said sliding plate F may be of any convenient length. Several of them are usually provided for each machine to the end that while one of said plates is passing through the machine the operator may prepare the others to be operated upon, which preparation consists in applying thereto the strips of paper K or other material which are to receive the buttons, the said plates being provided with means for clamping said strips to the opposite ends of said plates, which clamps are constructed as follows, reference being had to Figs. 5, 5^a, and 5^b: Near the end of said plate F a transverse groove 8 is cut of slightly less depth than the thickness of the button-receiving material K, and the end of the strip of said paper or other material is then laid in said groove, and a plate 9, which overlaps said groove more or less, is then clamped down against the said material by a screw 10 passing through the plate 9 and entering the sliding plate F. This end being secured, the paper is then stretched smoothly over the top of said plate, and the opposite end thereof is turned down into a groove 12, located near the forward end of the plate F, and the spring-held plate 13, partly overlapping said groove, clamps said paper between its edge and the edge of the said groove. The said plate 13 is supported on the end of the plate F by two lugs 14 thereon entering suitable slots 15 in the said plate F near the edges thereof on opposite sides of said plate, and pins 16, passing through said slots and lugs, pivotally support said plate in such position that when turned down on the edge of the paper it will lie closely against said plate F, with its upper surface scarcely projecting above the plane of the upper surface of the paper. Said plate 13 extends somewhat beyond the forward end of the plate F, and near its center is provided with a downwardly-projecting lug (see Fig. 5) at right angles to the plate 13 and in proximity to the end of said plate F, and between this lug and the end of said plate is located a spiral spring the tension of which is sufficient to firmly clamp said paper K to said plate, as described.

For the convenient manipulation of the plate 13 a projection 13^a, which may be grasped by the fingers, is provided. Said plate F is provided with the longitudinal grooves 17 of sufficient depth and width to receive the shanks of the buttons, which by the movements of the machine are forced down through the paper K and into said grooves, and there are as many of the latter as there are to be longitudinal rows of buttons on the strip of paper to be operated upon. The button-setting mechanism which receives the buttons from the said troughs D and places them in proper order on the strip of paper K, as described, is constructed as follows: A button-receiving bar L is supported for an oscillatory movement in bearings M, located on opposite sides of said table A, said bar lying at right angles to the line of movement of the plate F and the center of its oscillatory movements coinciding practically with the plane of the top of the paper K. On each end of said bar and close to the ends of said bearings are the pinions 18, which serve to oscillate said button-bar by the engagement therewith through the feather 19 in said bar and the slot 20 in the said pinion. Said slot is made wider than said feather to the end that said pinions 18 may have a certain degree of rotary movement on said bar within the limits of said slots 20 without imparting any rotary movement to said button-receiving bar. The purpose of this characteristic of said pinions is to provide means for imparting certain movements to the finger-bar 21, which is secured by its ends to the upper side of said pinions,

which are planed off to receive said bar, as shown in Figs. 8 and 9. Thus the part of said button-receiving bar L comprised between the pinions consists of two separate bars—one the part 22 of said bar L and preferably made integral with the bearing ends thereof, and the other the finger-bar 21, secured to the pinions 18, which is adapted to move toward and away from the part 22 of the said bar L. The said part 22 of the button-receiving bar L is of irregular polygonal shape in cross-section, but having as a whole a segmental or triangular form, the apex of the triangle lying near the center of oscillation of the bar, and the bar 21 is of such shape that when they are in contact, as at the end of the button-setting movement shown in Fig. 5, a cross-section of said two bars represents practically a one-third part of a circle whose center is the axial center of the bar L.

At each end of the part 22 of the bar L is the hub 23, the upper surface of which is planed off to coincide with the slot at the top of the pinion 18, and said hubs are provided with bearings 24, (see Fig. 10,) in which are the springs 25 for partially encircling said hubs, and screws 26 pass through the said bearings, their points lying against the sides of said springs near their ends, and whereby by the operation of said screws said hubs may be clamped with more or less force by said springs. The purpose of providing a controlled resistance against which the oscillatory movements of the button-receiving bar L must be effected is to steady the movements of said bar and to prevent the independent movements of the finger-bar 21 from imparting any movement to the said bar L. The said portion 22 of said bar L is provided with a number of annular grooves 27, concentric with the axis of the said bar, and at the lower end of each of said grooves, as shown in Fig. 9, is formed a semispherical pocket 28, one-half of which is in each wall of said groove 27, said pocket being of about the dimensions of a button-head and adapted to receive buttons from the ends of the feed-troughs. It will be observed that the number of feed-troughs D of grooves 27 in the button-receiving bar L and of grooves 17 in the plate F is equal, and that both of said grooves 27 and 17 are central vertically with the center of the feed-troughs. The bottom of said pockets is closed by a plate 29, secured to the under side of the button-receiving bar L and extending out to the outer edge of said grooves 27, said plate being provided with slots located transverse to the axis of the bar L and centrally under the end of said grooves 27, which slots are adapted to receive the shanks of the buttons lying within the said pockets 28 and maintain them in a proper position for being passed down through the paper K into the grooves 17 in the plate F, over which said grooves 27 are centrally in line.

The function of the above-described part of the button-receiving bar L is, when the said bar occupies the position shown in Fig. 6, to receive in the pockets 28 a series of buttons and then remain at rest, held by the friction of springs 25 until the finger-bar 21, actuated by the free movement of the pinion 18 on the bar L, brings the ends of the fingers 30, supported in said finger-bar 21, into contact with the tops of said buttons, and then the continued movement of the pinion overcoming the resistance imposed by the springs 25 rotates the button-receiving bar L, and the shanks of the buttons projecting through the plate 29 are forced through the paper K into the grooves 17 in the plate F, the position of the parts at this point being shown clearly in Fig. 5. Said fingers 30 of the finger-bar 21 are of substantially the same form and dimension as the grooves 27 in the part 22 of the bar L and are adapted to lie in and move in said grooves and are supported by one end in the finger-bar 21, which is provided with slots 31 to receive them, as shown in Fig. 9, and a screw 32, having a head wide enough to overlap two of said slots, serves to secure the fingers in position therein.

With the parts in the position shown in Fig. 5 and the buttons having had their shanks forced down through the paper by the fingers 30 the next movement of the machine consists in the retrograde movement of said fingers 30 relieving the buttons in the pockets of all pressure. The first part of this retrograde movement of the finger-bar 21 is independent of the bar L and away from the part 22 thereof, and as soon as the said bar has moved far enough to bring the edge of the slot 20 in the pinion 18 against the side of the feather 19 the movement is imparted to said part 22 of the bar L, and the said two parts of the bar then move as one. The above-mentioned independent movement of the bar 21 causes the fingers 30 to withdraw from the pockets 28, into which they were partially projected by the button-setting movement in the opposite direction. Immediately after the commencement of this movement of the fingers 30 and finger-bar 21, the part 22 of the bar L meanwhile remaining stationary, the pawl 6, moving forward, engages a tooth of the ratchet-bar 2 and moves the plate F one step forward, which movement draws the buttons out of their pockets 28, and immediately the bar L is oscillated back to the position shown in Fig. 6.

The function of the slot 20 in the pinion 18 and the frictional resistance to rotation applied to the hub of the bar L is from the above description apparent, viz: The slot 20 permits sufficient movement to the finger-bar to move into position to clamp the buttons in their pockets 28 on the movement of the button-bar toward the plate F and permits said finger-bar to move back, releasing the buttons from pressure during the forward feed movement of the plate F, and the frictional resistance put upon the bar L holds said bar sta-

tionary to permit the clamping of the buttons in the pockets 28 and at the end of the button-setting operation holds said bar stationary while the feed movement of the table is effected, whereby said buttons may be by the engagement of their shanks with the paper drawn out of their pockets in said bar without liability of having their shanks pulled out of said paper.

It will be noted by referring to Figs. 5 and 6 that the bottom of the button-receiving bar L, to which is secured the plate 29, lies just above the axial center of the bar L, to the end that when the limit of the oscillatory movement of the bar L toward the plate F has been reached the pockets 28 will be inclined slightly downward toward the paper K. This facilitates the withdrawal of the buttons from the pockets and prevents any friction between the bottom of the said bar and the paper on the plate during the forward feed of the latter.

Means for imparting rotary movements to the pinions 18 are provided as follows: Two cam-wheels N (see Fig. 4) are secured to the driving-shaft G, and levers 33, pivotally hung to the under side of the table at 34, are provided at one end with a stud 35, engaging with the cam-groove 36 in said cam-wheels N, and at their opposite ends are provided with segment-shaped racks 37, engaging with the teeth of the pinions 18. Slots 38 through the table A are located between the bearings M for the ends of the bar L and the bearings 24 for the hubs 23 of said bar, and the upper end of each of the said levers 33 passes up through said slots to engage the said pinions. The cam-grooves 36 in said cam-wheels N are made of such shape as to give to the button-bar L its requisite movements and to provide for its requisite periods of rest.

To insure the delivery of but one button at a time into the pockets 28 or the button-bar L and to relieve that button from the weight of the rest of the column lying in the feed-trough B, the following devices are provided, the construction of which is shown in Figs. 8 and 9 of the drawings: On the back side of the finger-bar 21 is secured by screws or otherwise a bar 39, to which are secured the posts 40, one opposite the center of each of said feed-troughs. Said posts 40 are slotted at their upper ends, and in said slots are secured by one end the fingers 41, which extend over the top of the bar L, as shown in Figs. 5, 6, and 8, and a downwardly-projecting point 42, near the opposite end of said fingers, which passes through a slot 43 in the end of the flat bar 44, which forms the top of said feed-troughs, and said point 42 bears upon the buttons in said trough. Said finger 41 is held lightly in contact with said buttons by a spring 45, secured by one end to the cross-bar 46, on which the bars 44 are supported, and bears by its opposite end on the top of said fingers. As the button-receiving bar L begins its rearward movement from the position shown in Fig. 5 the end of the column of buttons in any one of the feed-troughs bears on the edge of the finger 30, which at this stage of the operation completely fills the grooves 27, and as said bar L moves rearward the point 42 of said finger 41 being spring-held against the buttons in the feed-trough is drawn down over the last three buttons in said trough (starting from the position shown in Fig. 5) and striking said buttons with more or less force hits the last one of the row just as the pocket 28 arrives in position to receive it, and thus insures its entrance into said pocket. As the button-receiving bar L rotates forward again the fingers 41 are pushed again over the three last buttons, those between the said point 42 of said finger and the button-bar being held in the trough by the contact of the last button with the edge of the finger 30, as described. This constant movement of the buttons in the trough prevents them from becoming jammed therein, thus insuring the rapid running of the machine.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a button-carding machine, a suitably-supported table, a plate for receiving a strip or strips of button-receiving material, having a step-by-step movement along said table, a series of button-feeding troughs whose delivery ends terminate in proximity to said table, a button-receiving bar supported for an oscillating movement transversely of said table in proximity to the ends of said troughs, and receiving buttons therefrom, means for imparting to said bar an oscillatory movement for conveying buttons to said button-receiving material, and means on said bar for forcing the shanks of said buttons through said material, substantially as described.

2. In a button-carding machine, a suitably-supported table, a plate for receiving a strip or strips of button-receiving material having a step-by-step movement along said table, a series of grooves in said plate for receiving the shanks of buttons, a series of feed-troughs, an oscillating bar consisting of two parts, one movable relative to the other, located transversely of said table and receiving buttons from said troughs, means for oscillating said bar as a whole, for conveying buttons from said feed-troughs to said button-receiving material, and means for moving one part of said bar relative to the other for forcing the shanks of said buttons through said button-receiving material, substantially as described.

3. In a button-carding machine, a suitably-supported table, a plate for receiving a strip or strips of button-receiving material, having a step-by-step movement along said table, a series of grooves in said plate for receiving the shanks of buttons, a series of feed-troughs, an oscillating bar consisting of two parts, one movable relative to the other, and located transversely of said table, pockets in one of said parts for the reception of buttons, means

for oscillating said bar as a whole for conveying buttons from said feed-troughs to said button-receiving material, and means for moving one part of said bar relative to the other, for clamping said buttons in said pockets and for forcing their shanks through said button-receiving material, substantially as described.

4. In a button-carding machine, a table, a series of feed-troughs, a grooved plate for supporting a strip or strips of button-receiving material, means for moving said plate step by step on said table, a two-part oscillating bar one of whose parts is movable relative to the other, pockets in one of said parts for receiving buttons from said feed-troughs, means for moving the other of said parts first independently for clamping the button in said pockets and then moving both of said parts as one piece for conveying said buttons to a button-receiving material and forcing the shanks of said buttons through said material, and mechanism for separating the end button in said feed-troughs from the rest at the moment of its delivery to one of said pockets, substantially as described.

5. In a button-carding machine, a table, a plate movable longitudinally thereon for supporting a strip or strips of button-receiving material, a series of button-feeding troughs, an oscillating button-receiving bar supported transversely on said table in proximity to the ends of said troughs and receiving buttons therefrom, means for imparting oscillating movements to said button-receiving bar for conveying buttons from said troughs to said button-receiving material and forcing the shanks of said buttons therethrough, and means for imparting to said plate movements comprising a series of steps of uniform number and length, alternating with one step of greater length than the steps of said series, substantially as described.

WALTER E. BENNETT.

Witnesses:
H. A. CHAPIN,
K. I. CLEMONS.