

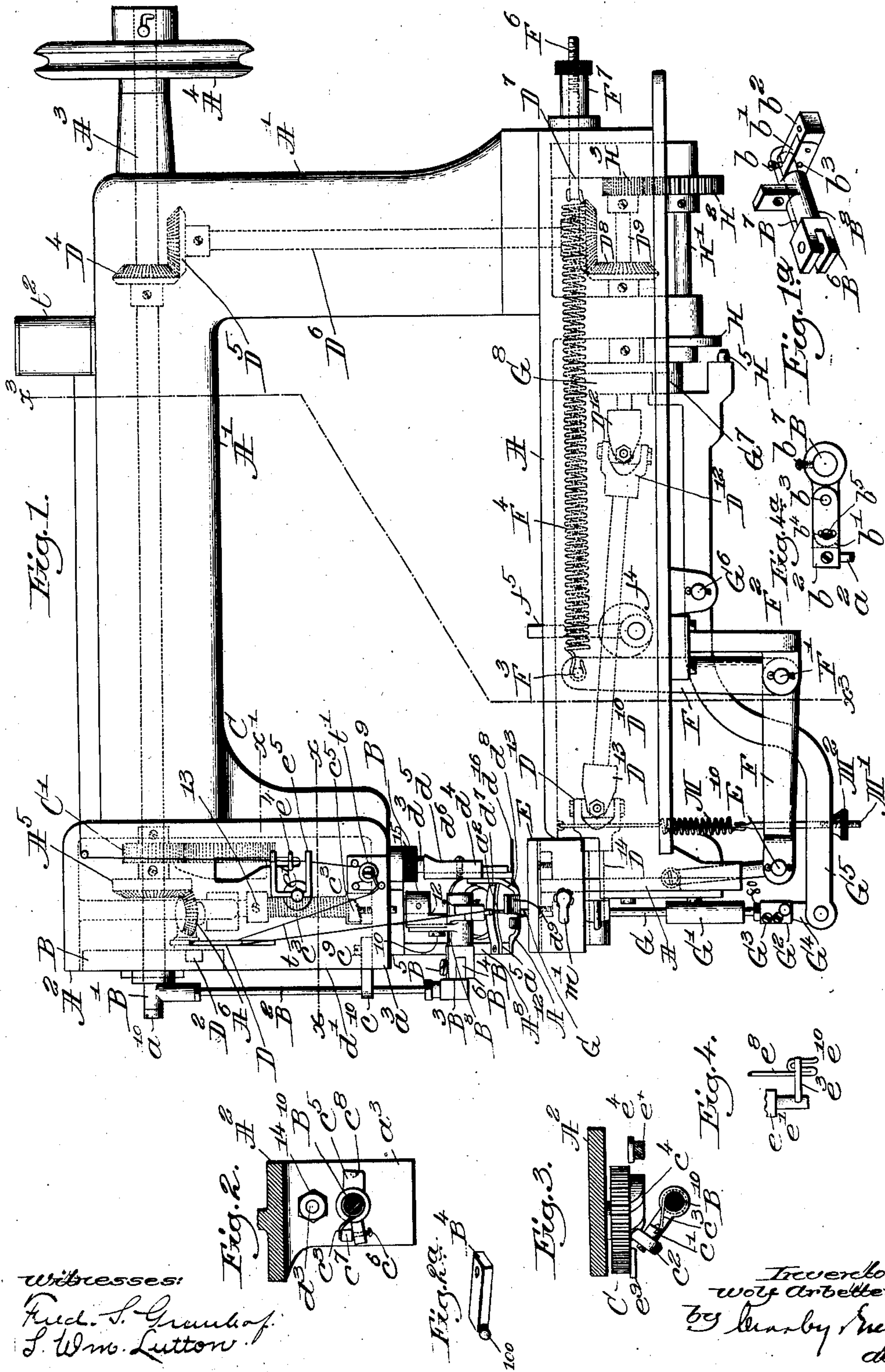
No. 830,699.

PATENTED SEPT. 11, 1906.

W. ARBETTER.
SEWING MACHINE.

APPLICATION FILED OCT. 5, 1904.

4 SHEETS—SHEET 1.



Witnesses:

Fried. S. Grunhof.
S. Wm. Lutton.

Inventor.
Wm. A. Better,
by Lewis Gregory
attys.

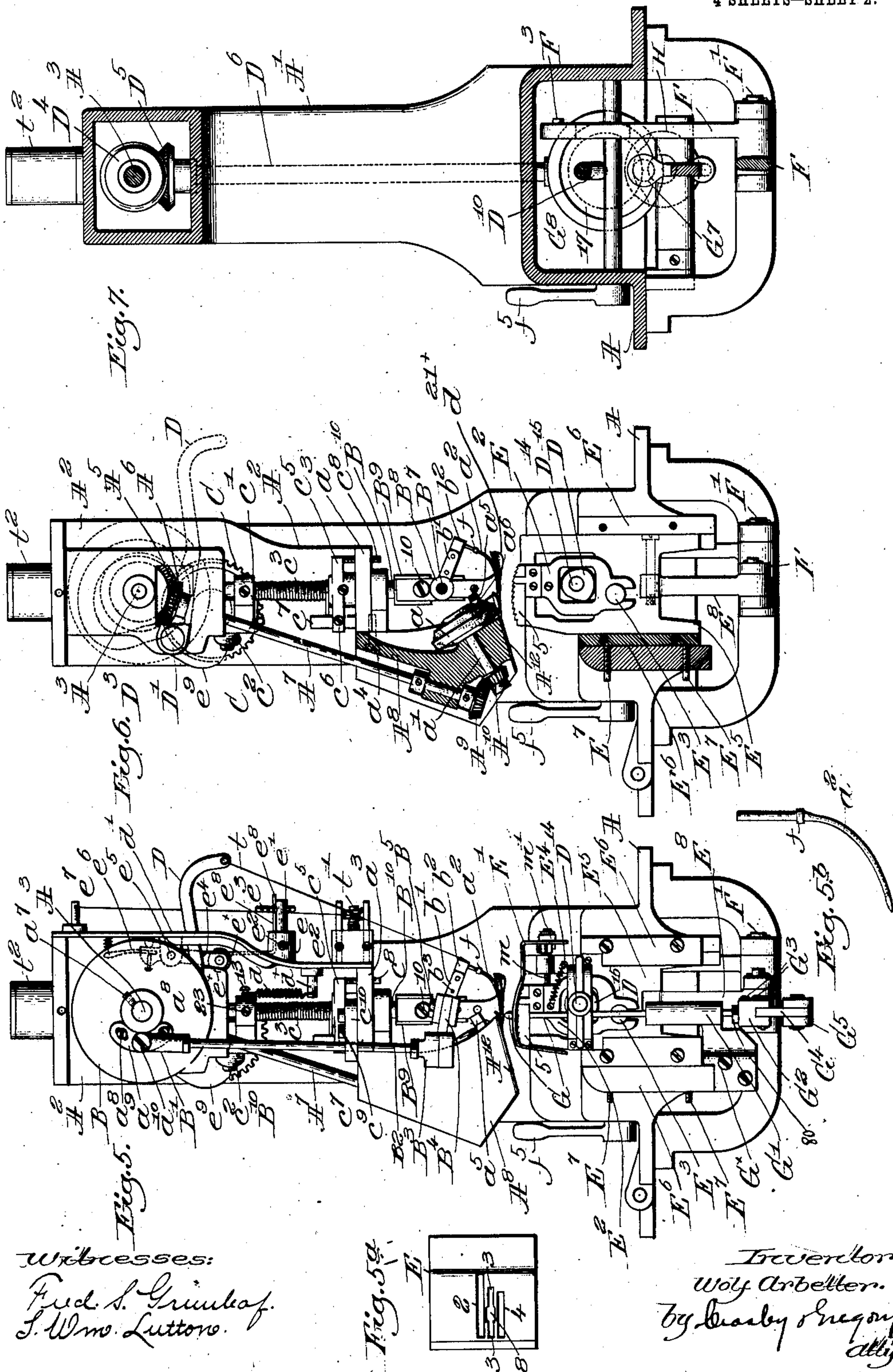
No. 830,699.

PATENTED SEPT. 11, 1906.

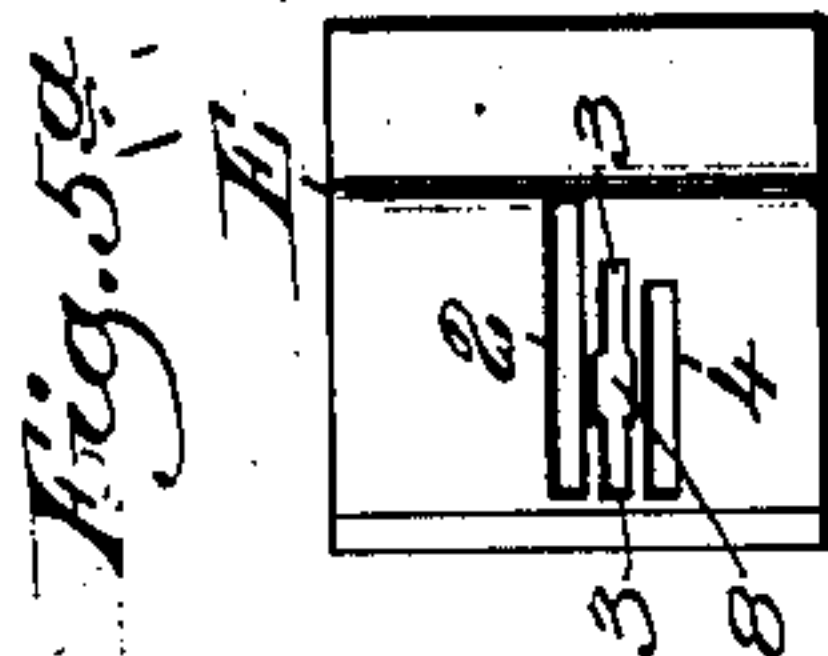
W. ARBETTER.
SEWING MACHINE.

APPLICATION FILED OCT. 5, 1904.

4 SHEETS—SHEET 2.



Witnesses:
Fred. S. Grunkef.
J. Wm. Lutton.



Inventor.
Wolff Arbetter.
by Garby & Gregory
attys.

No. 830,699.

PATENTED SEPT. 11, 1906.

W. ARBETTER.
SEWING MACHINE.

APPLICATION FILED OCT. 5, 1904.

4 SHEETS—SHEET 3.

Fig. 8.

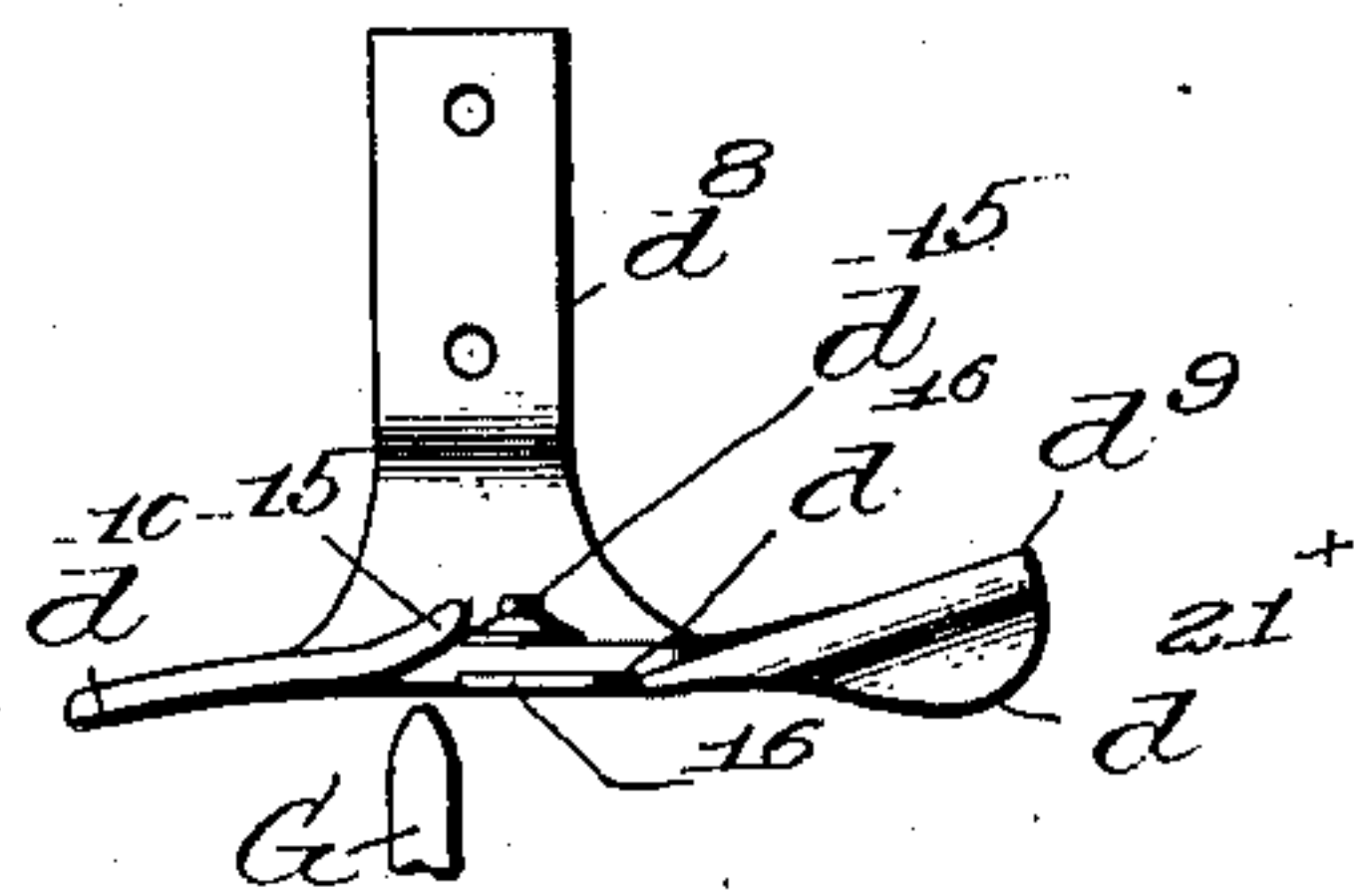


Fig. 9.

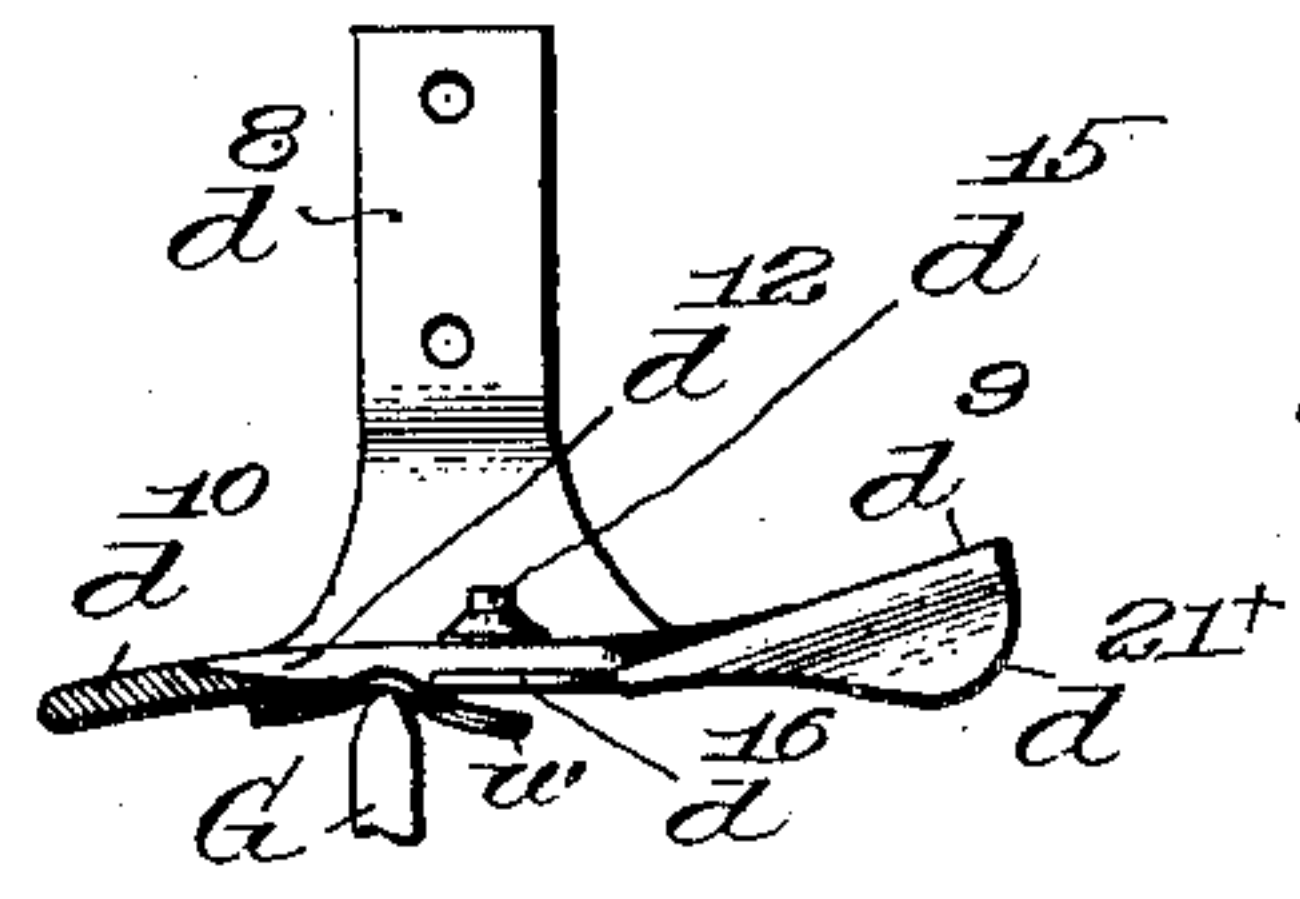


Fig. 10.

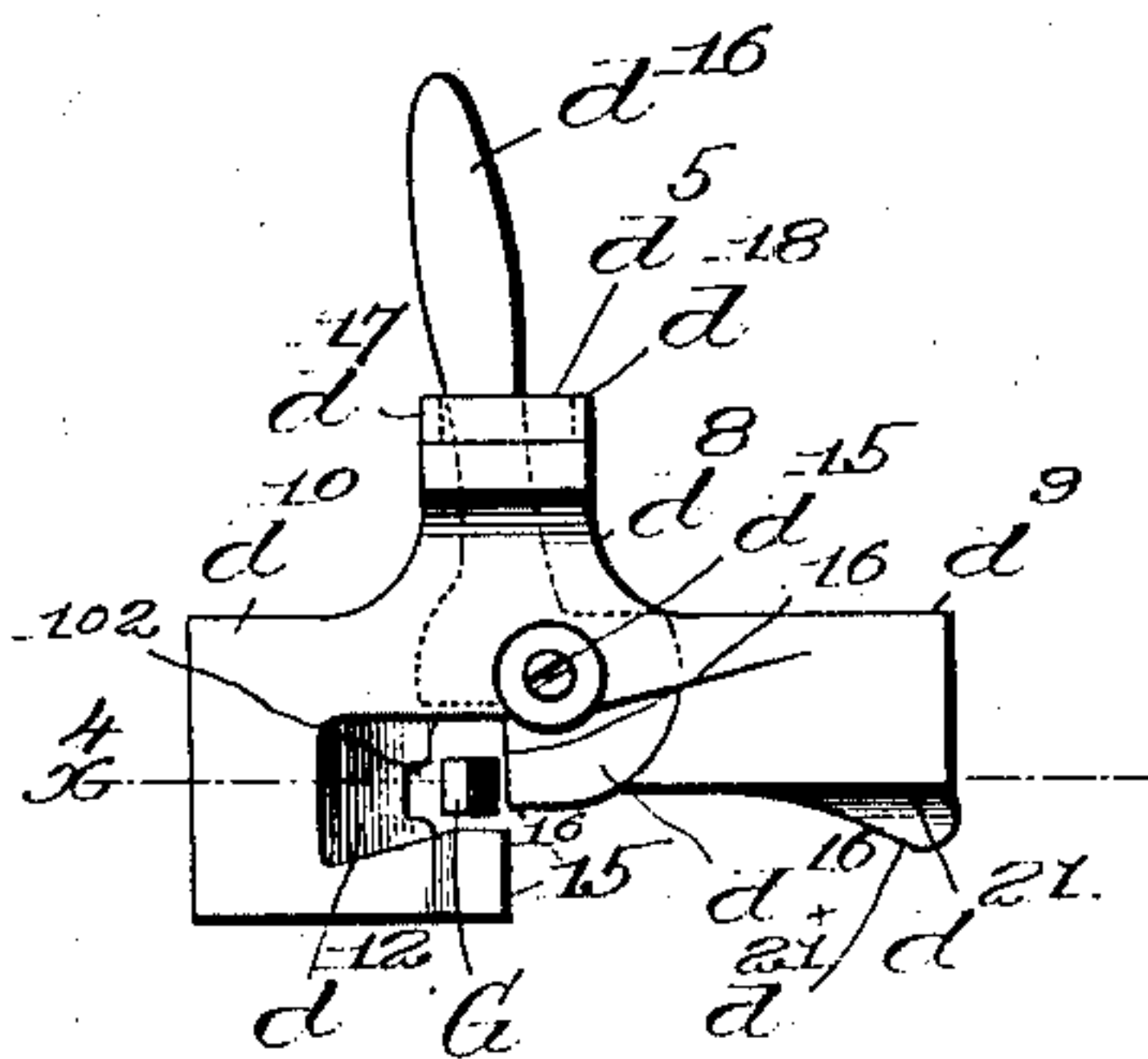


Fig. 11.

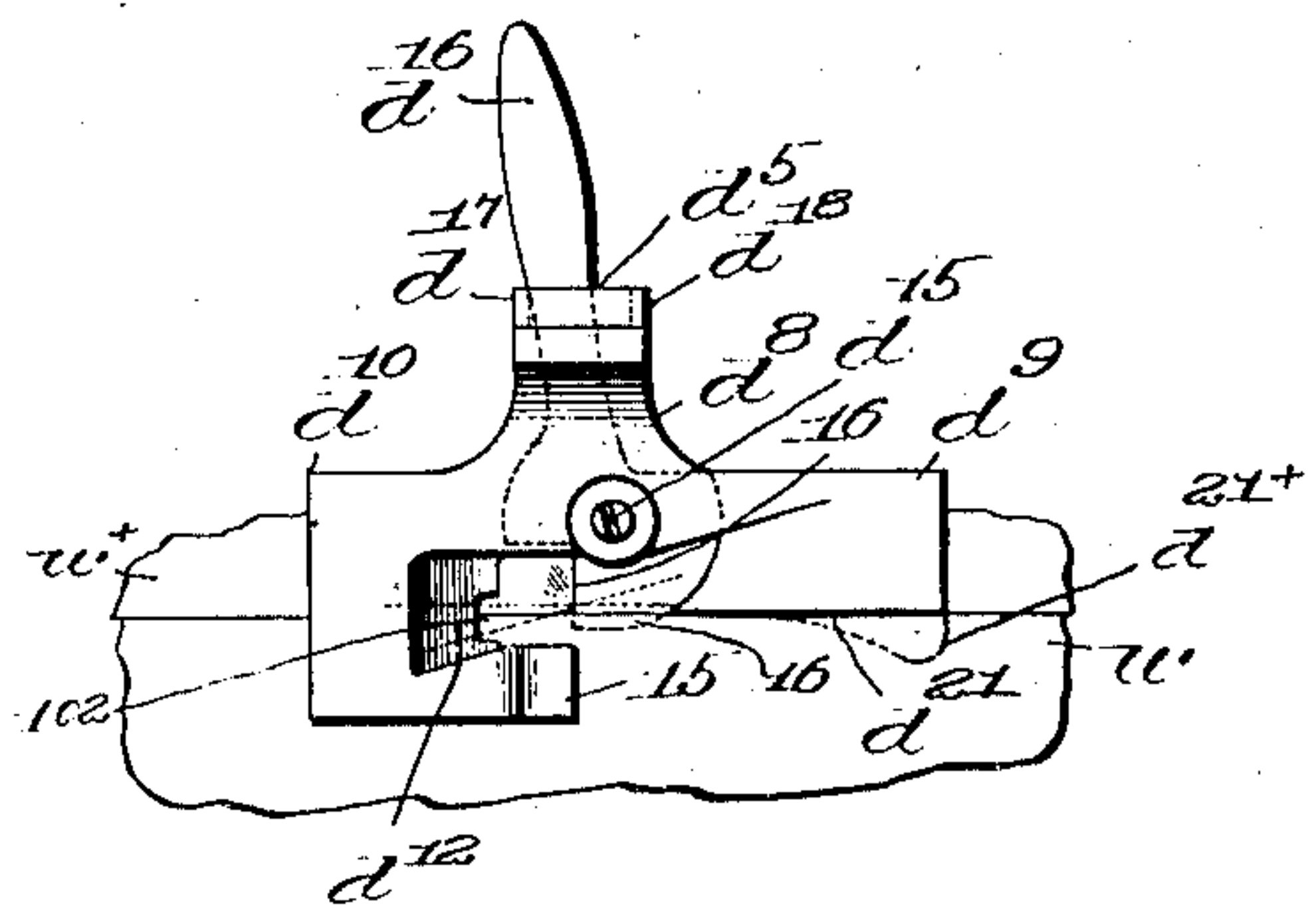


Fig. 12.

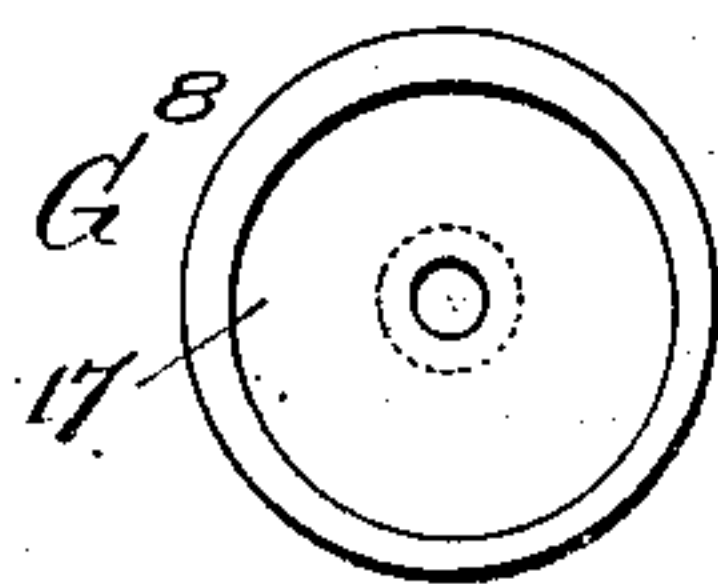
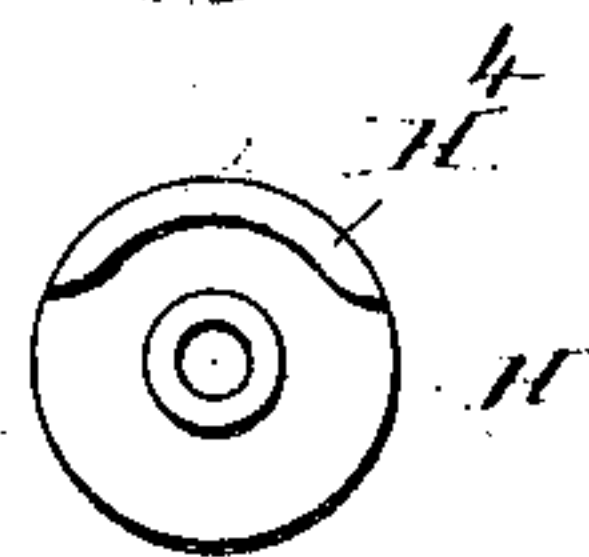


Fig. 13.



Witnesses:
Fried. S. Grumbaf.
J. Wm. Lutton.

Inventor.
Wm. Arbetter,
by Crosby & Gregory
attys.

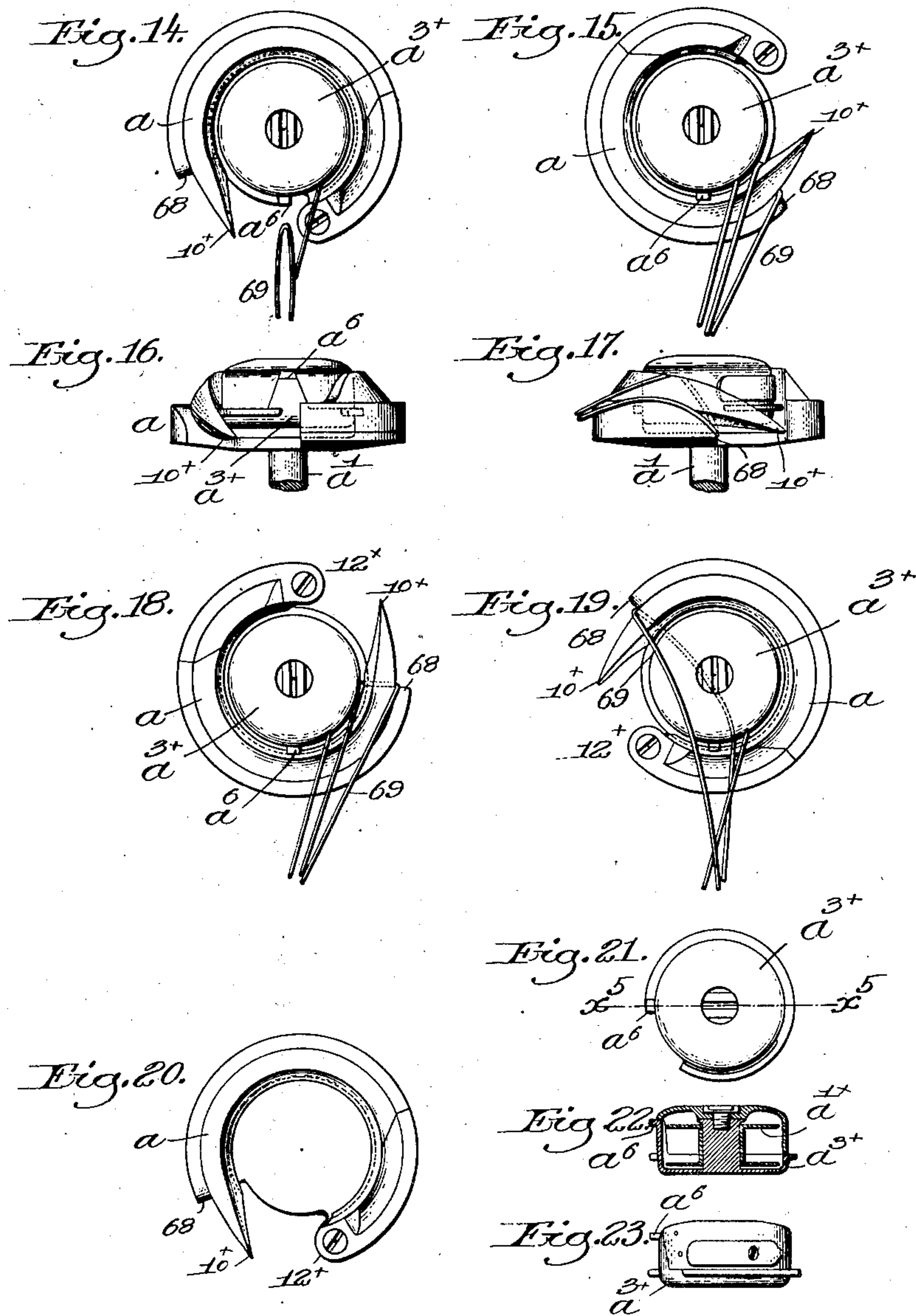
No. 830,699.

PATENTED SEPT. 11, 1906.

W. ARBETTER.
SEWING MACHINE.

APPLICATION FILED OCT. 5, 1904.

4 SHEETS—SHEET 4.



Witnesses:

Fred. S. Grunke.
S. Wm. Lutton.

Inventor.
Wolff Arbetter,
by Crosby & May.
Attys.

UNITED STATES PATENT OFFICE.

WOLF ARBETTER, OF CHELSEA, MASSACHUSETTS, ASSIGNOR TO
ARBETTER FELLING MACHINE COMPANY, OF BOSTON, MASSA-
CHUSETTS, A CORPORATION OF MAINE.

SEWING-MACHINE.

No. 830,699.

Specification of Letters Patent.

Patented Sept. 11, 1906.

Application filed October 5, 1904. Serial No. 227,218.

To all whom it may concern:

Be it known that I, WOLF ARBETTER, a citizen of the United States, residing at Chelsea, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Sewing-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention is intended as an improvement on the class of machines represented in United States Patent No. 630,385, dated January 7, 1902, and devised more especially for felling with a blindstitch, the needle being manipulated to make in the fabrics to be united—such, for instance, as the inturned edge of a lining and the body of the material—substantially the stitch made in first-class work by a hand-needle, with the exception that I employ two threads, the needle at one stitch entering the lining and at the next stitch the body of the material to which the lining is to be connected. The machine is also adapted for other work in the manufacture of clothing.

Figure 1 is a right-hand side elevation of my improved machine, the presser-foot being shown as elevated and the bender elevated in its working position. Fig. 1^a is a detail showing the needle-carrier detached. Fig. 2 is a partial section below line *x*, Fig. 1. Fig. 2^a is a detail showing the arm B⁴ detached. Fig. 3 is a detail of some of the means employed for controlling the line of approach of the needle as it enters the material in making the felling-stitch, one thrust of the needle being in a line diagonal to the direction of the feed of the work, the needle at such time entering the lining or inturned portion of the fabric, and at the next thrust of the needle it moves in a plane substantially parallel with the direction of feed, the needle then entering the body of the garment or material to which the inturned edge is being stitched. Fig. 4 is a detail of the slack-thread-controlling means below the line *x*, Fig. 1. Fig. 4^a is a detail of the needle-carrying arm and needle. Fig. 5 is a front or left-hand end view of the machine shown in Fig. 1. Fig. 5^a shows the top of the throat-plate or work-support detached. Fig. 5^b shows the needle detached

and enlarged together with the bend. Fig. 6 is a front view of the machine with some of the parts removed and other parts broken out to show chiefly the means for actuating the take-up, means for actuating the loop-taker, and the work-feeding means. Fig. 7 is a vertical section in the irregular line *x*³, Fig. 1. Fig. 8 shows in side elevation the presser-foot and bender, the material being omitted between the same, the bender, however, being in its inoperative position. Fig. 9 shows a section through the rear end of the presser-foot with the bender and the material thereon, the latter bending it preparatory to the entrance of the needle into the body of the cloth. Fig. 10 is a plan view looking down on the presser-foot, Fig. 8, the section-line *x*⁴ showing the line of section for Fig. 9. Fig. 11 is a plan view looking down upon the presser-foot, Fig. 9, showing, however, the whole foot and the body of the material and the lining to be attached thereto, the path of movement of the needle in making the stitch being designated by the crossing dotted lines. Fig. 12 shows the cam G³ detached. Fig. 13 shows the cam H detached. Figs. 14 to 19 show the loop-taker and bobbin-case detached and enlarged and in different positions with relation to the thread. Fig. 20 shows the front face of the loop-taker with the bobbin-case removed. Figs. 21 to 23 show the bobbin-case detached, Fig. 22 being in section in the line *x*⁵, Fig. 21.

The framework of the machine consists, essentially, of a bed-plate A, having rising therefrom an overhanging arm A', provided with a head A², that contains the working parts of the stitch-forming mechanism to be described, including not only the needle, but the under-thread carrier shown as a circularly-moving loop-taker contained in a bobbin. The overhanging arm has bearings to sustain the main shaft A³, upon which is mounted a driving-pulley A⁴, that may be connected with said shaft in any usual way and be driven either by a belt or by any other usual or suitable driving means.

The shaft A³ has at its front end a bevel-gear A⁵, that engages a smaller bevel-gear A⁶ on an inclined shaft A⁷, (shown best in Fig. 6,) the lower end of said shaft being sustained in a bearing of a framework A⁸, that

supports the coöperative part or member of the stitch-forming mechanism, said member, as herein illustrated, being of the class represented in the well-known Wheeler & Wilson sewing-machine and comprising a revoluble loop-taker a , inclosing a bobbin a^x , carrying a second thread; and the shaft a' extended from the back of the loop-taker, (see Fig. 6,) is upwardly inclined from a horizontal plane, and a line intersecting the longitudinal axis of said shaft if prolonged would intersect, substantially, the longitudinal axis of the needle-carrier to be described. By locating the axis of the loop-taker to intersect the longitudinal axis of the shaft carrying the needle-arm a larger space is allowed for access to the bobbin when it is to be removed from the loop-taker, and the strain on the loop of thread while the loop-taker is passing there-through is reduced, and consequently the liability of breaking thread during the stitching. The point of said loop-taker when taking a loop of needle-thread crosses the plane of movement of the curved needle a^2 , to be described, and back of the point of said needle. The back side of the loop-taker is convexed, as shown in Fig. 6, to permit the point of the curved needle in its forward thrust to pass and cut the plane of movement of the point a^{2x} of the loop-taker, this being essential in order that said point may engage the loop of needle-thread carried by the curved needle without any liability of the loop-taker contacting injuriously with the point of the needle. The shaft A^7 has at its lower end a bevel-gear A^9 , that engages a bevel-gear A^{10} on the inclined loop-taker shaft and rotates said shaft at the proper speed, said loop-taker being rotated twice to each in-and-out thrust of the curved needle.

The framework A^8 , sustaining the loop-taker, is connected with the lower end a^3 of the head A^2 by means of suitable screws, one of which is shown at a^4 , Fig. 6, by dotted lines, said framework being provided at its lower end with a cross-bar a^5 , (see Fig. 1,) having a notch with which engages a projection a^6 of the bobbin-case a^{3x} , (see Fig. 16,) the cross-bar and projection preventing the rotation with the loop-taker of the bobbin-case containing the usual bobbin (shown in Fig. 22) on which the thread is wound.

The front end of the shaft A^3 has secured to it by a set-screw a^7 (see Fig. 5) a disk B , upon which is adjustably secured by screws a^8 a plate a^9 , into which is screwed a stud-screw a^{10} . This stud-screw receives over it the hub B' of a block fast on a rod B^2 , having secured to its lower end a socket B^3 , composed of two parts shaped to embrace a ball-like head 100, (see Fig. 2^a,) extended outwardly from an arm B^4 , that is jointed by a screw B^5 with the slotted head B^6 of the needle-carrier B^7 , (see Fig. 1^a,) extended through

a bearing B^8 , connected by screw 10 with a block B^9 , attached to the lower end of a rock-shaft B^{10} , to be described.

I find it desirable to steady and guide the rod B^2 in its lateral movements, and consequently I have connected with the part a^3 of the head by screws c^9 a slotted plate c^{10} , having a slot in which said rod is guided.

The inner end of the needle-carrying shaft B^7 has connected thereto by a screw b an adjustable needle-carrying arm b' , said arm being composed of two parts b' b^2 , the part b^2 being pivoted upon the part b' by a pivot b^3 , (see Fig. 4^a,) the part b^2 being slotted, as represented at b^4 , to receive a clamp-screw b^5 , by which to attach the part of the arm b^2 to the part of the arm b' . This construction permits the path of movement of the needle to be adjusted accurately to the loop-taker, that said needle may travel close to the convexed back of the loop-taker as the latter enters the loop of thread thrown out from the needle. By slackening the screw a^8 on the disk B the timing of the needle may be regulated so that its point will terminate at exactly the proper position with relation to the loop-taker. The rock-shaft B^{10} in this instance of my invention is mounted in suitable bearings in the head A^2 and its bottom plate a^3 , that said shaft may be oscillated somewhat in order that the needle may at one thrust enter the body material substantially parallel with the direction of the feed and with the inturned or folded edge of the lining or other inturned portion to be attached to the body material and at the next thrust may enter the lining or infolded material at a slight angle or diagonally with relation to said edge and the direction of feed, as necessary when making the usual felling-stitch by hand. The shaft B^{10} is also capable of being reciprocated somewhat in the direction of its length in its bearings, and near its end said shaft has adjustably connected thereto by a set-screw 23 an arm c' , provided at its extremity with a roller c^2 , which is normally kept pressed by a spring c^3 , represented as coiled about said shaft and connected at one end with said collar and at its other end with stud c^7 , rising from the head against the acting face of the needle-swinging cam c^4 . (Shown in detail, Fig. 3.) This cam is connected with or forms part of a gear C , pivoted on a stud of the framework and rotated by a toothed gear c' , fast on the main shaft A^3 , said cam being rotated once to every two revolutions of said main shaft.

The rock-shaft B^{10} has connected with it just above the plate a^3 of the head A^2 a cross-bar c^5 , provided at one end with an adjusting device c^6 , shown as a screw (see Figs. 2 and 6) and adapted to meet the stop c^7 , erected on the plate a^3 , the turning of said adjusting device limiting the extent of oscillation of the rock-shaft due to the spring c^3 and insuring

just the proper position for the curved needle a^2 when the same is about to enter the body material in making the stitch substantially parallel to the folded edge of the lining or other material being attached to the body material.

The height of the cam c^4 controls the extent of the rocking movement of the rock-shaft B^{10} , and consequently determines the path of movement of the curved needle in approaching the cloth when said needle is to make what is called the "diagonal" stitch—that is, when it enters the folded edge of the lining out of parallelism with relation to its folded edge when attaching the lining or whatever is being attached to the body material. By adjusting, however, the arm c' on the rock-shaft the position occupied by the needle when about to make its thrust in making the diagonal stitch may be changed, this being desirable for some classes of goods. To define the position of the curved needle to the particular material being stitched, so that it will work in one or another arc at a greater or less distance above the work-support, I employ a controlling device c^8 , shown as a screw extended through the plate a^3 of the head, said screw contacting with the under side of the cross-bar c^5 .

The under side of the cross-bar c^5 , near one end, is beveled (see Fig. 1) to constitute a toe that is sustained on said controlling device c^8 , and as the rock-shaft is turned after each stitch by the cam c^4 , acting on the roller c^2 , the diagonal stitch having been made, the beveled part of the toe riding on the controlling device raises the rock-shaft and needle so that the needle is moved into a higher arc at its next thrust when the needle is to enter the folded edge and does not penetrate the body material.

A spring d , (shown only in Fig. 5,) connected with a screw 13 and with a stud d^x , sustained by plate d' , used as a sort of cover for part of the apparatus working in the head of the machine, acts normally to keep the rock-shaft B^{10} pressed downwardly and the cross-bar c^5 in contact with the screw c^8 .

The plate a^3 at the lower end of the head A^2 , Fig. 2, has a vertical hole that receives the threaded shank d^3 of the presser-foot carrier d^4 , said threaded shank being provided above and below the plate a^3 with suitable nuts 14 15, (see Figs. 1 and 2,) by which to adjust just the presser-foot carrier vertically into exactly its proper position with relation to the path of movement of the needle. The front side of this presser-foot is grooved, as shown by dotted lines, Fig. 1, to receive a slide d^5 , adapted to be connected with the presser-foot carrier by a screw d^6 . The slide has threaded holes for the reception of screws d^7 , (see Fig. 1,) by which to attach thereto the shank d^8 of the presser-foot, which for the purposes of the special machine herein de-

scribed is of peculiar construction. This presser-foot has an upturned toe d^9 and a heel d^{10} , the front end of which is also upturned, as at 15, and between said upturned end of the heel and the body of the presser-foot is a needle-throat d^{12} , the shape of which is best shown in Figs. 10 and 11. This throat presents a thin edge next the bender and is notched, and the rear end of the throat is widened, as shown in Figs. 10 and 11, to afford space in which the point of the needle may move after passing through the material both when in its straight or in its diagonal thrust. (See dotted lines, Fig. 11.) The notch in said edge receives and prevents the cutting of the shuttle-thread connected with the cloth when the material is being fed and avoids pressure on the thread as the take-up acts to set the stitch.

The presser-foot has pivotally mounted thereon by a stud-screw d^{15} a throat-plate closer shown as a lever that may be moved between stops d^{17} and d^{18} , (shown by dotted lines, Fig. 11,) said stops being formed by cutting a notch in the lower end of the slide d^5 . The front end of the presser-foot has a concaved projection that extends downwardly and toward the folded edge of the material w , to be stitched to the body material w^x , said projection running under the folded edge and aiding in slightly turning the same upwardly away from the body material just ahead of the stitching-point, thus aiding the point of the needle in entering unerringly said folded edge without touching the body material.

The front end of the throat-plate closer is substantially circular, excepting where it is notched or cut out to leave an edge 16, and by turning the throat-plate closer into the position Fig. 11 the space d^{12} may be enlarged making the same of sufficient size for the thickest goods; but by turning the throat-plate closer into its other position, so that it is arrested by the stop d^{18} , the space may be closed, as when thinner goods is being stitched. The needle as it enters and retires from the lining, the inturned edge of which crosses the edge 16 and abuts the guiding edge d^{21} of the front end of the presser-foot, nearly touches the edge 16.

I believe that I am the first to make provision for closing the throat-space in a presser-foot to accommodate various different thicknesses of fabric, and this feature I intend to claim broadly, especially in a machine for felling automatically with a stitch such as herein described; but I am not aware that the adjustment of the space of a throat-plate is of any utility in any other class of sewing-machine.

From the foregoing description it will be understood that the entire stitch-forming mechanism is sustained from the front end of the gooseneck and that it is all located at

one and the same side of the material being stitched.

The shape of the loop-taker or hook is shown in Figs. 14 to 20, and the same back of its point 10^x has a shoulder 68, that catches one-half of the loop of the needle-thread 69 and carries it about the bobbin-case a^{3x} , having the projection a^6 , that coacts with the notch referred to in the bar a^5 of the framework A^8 to prevent the rotation of the bobbin-case with the loop-taker. The loop-taker has a heel 12^x , and the point 10^x of the loop-taker is bent downwardly. (See Figs. 16 and 17.) The under side of the loop-taker is somewhat conical, as represented, so that it may rotate in the concaved side of the needle while the latter is in the material and is being retracted therefrom. The needle-thread between the eye of the needle and the cloth is bulged out to form a loop as the needle is withdrawn, so that the point of the loop-taker may easily enter said loop. To renew the under or second thread, the workman will remove the screw 10 and disconnect from rock-shaft B^{10} the bearing sustaining the needle-carrier and move said bearing aside to thus afford access to the bobbin-case contained within the chamber of the loop-taker. The lower end of the framework A^8 has a plate A^{12} , that acts as a shield between the rotating loop-taker and the material being stitched, said plate also contacting with the upper side of the material being fed through the machine and supporting the material at that side opposite that on which the cloth-feeding means to be described acts.

I have now described all the parts of the machine sustained from the gooseneck with the exception of the take-up. This take-up consists, essentially, of a lever D , mounted on a stud D' (see Fig. 6) and having a stud D^2 , (see dotted lines, Fig. 1,) that enters an irregular cam-groove D^3 , (shown only by dotted lines, Fig. 6,) cut in the rear side of the disk B , said cam imparting one complete stroke to the take-up for each stitch. The take-up lever is extended through a slot in the plate d' and has at its end a hole through which is led the needle-thread t , the same being taken from any suitable tension device to which the thread is led from a spool t^2 . The face of the plate d' has a boss e , (see Fig. 5,) that receives a stud e' , held adjustably in said boss by a screw e^2 . The outer end of the stud receives a fork e^3 , preferably of wire, the shape of which is best shown in Fig. 1, the arms of said fork occupying a horizontal position and parallel each with the other. By adjusting the stud e' longitudinally the fork may be placed at a greater or less distance from the plate d' when it is desired to vary the amount of slack thread that is to be taken from the tension device and spool as the lower end of the take-up is moved outwardly. The further in the fork the more slack thread that will be taken

off during the outward movement of the lever e^4 , the thread taken off during the formation of the stitch in the body material being stored up to be thereafter delivered to the needle as it makes the next stitch in the infolded material or lining.

The device coacting with the fork e^3 for drawing off the needle-thread and delivering the slack to the needle at its diagonal thrust comprises, essentially, a lever e^4 , pivoted at e^5 on an ear extended backwardly from the plate d' . The upper end of this lever has connected therewith an arm e^6 , to which is attached a spring e^7 , that acts normally to draw the lower end of said lever, forked or shaped as best shown in Fig. 4, inwardly, that it may move said fork inwardly as the needle is to be moved in its thrust where it enters the infolded material or lining. To move this lever, however, to draw off the thread to be stored and given up for the diagonal thrust of the needle, I have employed a projecting cam e^9 , (see Fig. 3,) attached to the gear C . Said cam when rotated for substantially one hundred and eighty degrees from the position 1, Figs. 1 and 5, meets the roller and stud e^x , carried by said lever e^4 , and moves the forked lower end e^8 thereof outwardly, so that the needle-thread t , embraced by the notch e^{10} and located behind the fork e^3 , is brought in contact with the rear side of said fork sooner or later in its outward movement to thus draw more or less thread from the spool, according to the position in which the fork e^3 has been adjusted or occupies as the thread is bent for a greater distance about said fork, the closer the fork is to the head.

The needle a^2 , herein shown carried by the portion b^2 of the two-part needle-carrying arm, is grooved at its convexed side, the groove leading from the eye into the shank, (see dotted lines, Fig. 5^b,) and said needle near the lower end of the shank is surrounded by a band f . The needle-thread is led through said band therein along the groove in the convexed side of the needle and then through the eye of the needle from the convexed side thereof.

The main shaft has a bevel-gear D^4 , (see Fig. 1,) that engages a bevel-gear D^5 on an upright shaft D^6 , the lower end of which below the bed-plate has a bevel-gear D^7 , that engages a bevel-gear D^8 on one end of a compound shaft D^9 , sustained in suitable bearings depending from the bed-plate. This compound shaft has an intermediate member D^{10} connected by a gimbal-joint D^{12} with the shaft D^9 , and the left-hand end (see Fig. 1) of the intermediate part D^{10} of said shaft is also connected by a gimbal-joint D^{13} with a short shaft D^{14} , which shaft carries the feed-cam D^{15} . The gimbal-joints are provided that the shaft D^{14} , carrying the feed-cam, may rise and fall as required with the carriage E^5 , carrying the work-support E .

The carriage E^5 , provided with a stud E^3 , is adapted to be moved vertically in guideways E^6 , secured to the front end of the bed A, one of said guideways being adjustable by screws E^7 to provide for wear in the movement of the parts. The carriage E^5 at its lower end has pinned to it a link E^8 , that in turn is pinned at E^{10} to an arm F of a bell-crank lever having its fulcrum on a stud F' , held in a depending bracket F^2 of the frame. The upper end of the elbow-lever F has a stud F^3 , with which is connected a spring F^4 , said spring being attached at its opposite end to a threaded rod F^6 , made adjustable longitudinally by a nut F^7 to thereby increase or decrease the stress of the spring and cause the work on the plate E to be forced upwardly against the underside of the material sustained during the feeding action by the presser-foot and the plate A^{12} .

To depress the work-support E for the removal or application of the work, I employ a pressure-plate controller, shown as a cam f^4 , (see dotted lines, Fig. 1,) having a handle f^5 , said cam when turned contacting with the end of the elbow-lever F and pushing the same in the direction of the arrow thereon, thus depressing the work-support. The top of the work-support (shown in Fig. 5^a) has a series of slots 2, 3, and 4, in which rise and fall the separate feed-prongs 5 of the feeding device E^2 , having the usual four motions common to sewing-machines. The prongs are carried by a yoke slotted at its lower end to embrace and slide on a roller-stud E^3 as said yoke is raised and moved horizontally by cam D^{15} , employed for moving the feeding device for feeding the work, the yoke being moved downwardly and backwardly by a spring E^4 as the feed-dog retires from the yoke preparatory to again reengaging the work.

The machine is provided with a bender G to act upon one side of the work w (shown in Fig. 9) and slightly bend the work upwardly that the needle a^2 in approaching the work may enter and retire from the same side thereof as usual in blindstitching. The bender herein used is represented as a bar, the upper end of which rises in the enlarged space 8 of the slot 3 of the work support or plate E. This bender is movable vertically in a guide G' , held by screws G^x to a fixed part of the machine, and the lower end of the bender enters a two-part split clamp or socket G^2 and is held therein by clamp-screws G^3 in any position in which said bender may be adjusted vertically by turning the nut 80 on the threaded part of the bender. It is very advantageous at times, and especially when thin stock is being used, to be able to adjust the bender vertically with the greatest nicety with relation to the clamp carrying the same in order to thereby secure just the proper position for the bender and stock when the needle penetrates the stock. The split clamp

has jointed to it a link G^4 , in turn jointed to a lever G^5 , having its fulcrum at G^6 , said lever at its inner end being forked (see Fig. 1) and provided with a stud G^7 , (shown by dotted lines, Figs. 1 and 7,) that enters a chamber 17, cut in the face of the bender-moving cam G^8 , fast on the shaft G^9 . The face of this cam is shown in Fig. 12, and the chamber is concentric and presents a flange varying in thickness, the inner wall of said flange acting on the roller or other stud G^7 and moving the bender up and down.

Owing to the provision herein for the first time made by me, so far as I am aware, of moving the bender only preparatory to alternate strokes of the needle in penetrating and retiring from the material, such movement being necessary, as it is desired only to bend the material when the needle is to penetrate the body of the material, I have provided means for holding the bender out of operation, stopping its movement just before the needle is to be moved to penetrate the infolded edge or lining of the material to be stitched to the main part or body of the material. It will be understood that the needle in its diagonal thrust is to penetrate only the lining or folded part and not the main body of the fabric to which the intumed edge or lining is to be stitched; but whenever the needle is to engage the body of the material and not penetrate therethrough, but enter and emerge from the same side thereof, then the use of the bender is necessary. In other words, the bender has one up-and-down movement to each two thrusts of the needle. To render inoperative, therefore, the bender during alternate stitches, I have provided bender-suspending means, herein represented as a cam H, (see Figs. 1 and 13,) said cam being connected with a shaft H' , having a gear H^2 meshing with a pinion H^3 on the shaft D^9 , the shaft H' being rotated once to two revolutions of the shaft D' . The cam H has a flange H^4 extended therefrom throughout a portion of its periphery, said flange being pointed at one end in the direction of rotation of the shaft H' to engage the outer side of the projection H^5 of the lever G^5 , thus preventing any movement of said lever until the flange retires therefrom, said flange when acting upon the projection H^5 simply holding the lever with the roller-stud G^7 thereof in such position with relation to the inner edge of the flange forming the essential part of the cam G^8 as to prevent that cam from contacting with said stud.

When the inner side of the flange of the cam H is acting against the under side of the stud H^5 , the bender occupies its inoperative position, and the roller-stud G^7 in the space 17 of cam G^8 , the latter also rotating, occupies a position rather close to the shaft D^9 , and at such time a spring M, connected at its upper end with the bed-plate A and having

connected with its lower end a screw-rod M', extended through a hole in the lever G⁵ and provided with a nut M², is stretched, and the stress of said spring is exerted on the lever G⁵; but said lever does not obey the spring, owing to the fact that the flange of the cam H prevents such action. When, however, the flange of the cam H retires from the stud H⁵, the spring M immediately acts and raises the bender, it contacting at its upper end with the under side of the cloth. It will thus be seen that the bender meets the under side of the material to bend the same with a blow due to the force of the spring M, and, having bent the material and the needle having penetrated the bent portion thereof and retired therefrom, then the cam G⁸ in its further rotation meets the stud G⁷ and moves the lever G⁵ in a direction to lower the bender, putting it in its inoperative position that it may be held there by the cam H during the next stitch. To increase or decrease the length of the feed-stroke, and consequently the length of the stitch, I have provided a screw m, (see Fig. 5,) having a suitable handle m', by which said screw may be rotated in order to place its inner end in proper position to meet the yoke as the same is retracted by the spring E⁴.

The machine herein described is an improvement over the machine described in the United States patent referred to, in that the rising-and-falling motion to provide for varying thicknesses of the material is dispensed with. I am enabled to do this by providing the rising-and-falling work-support having a feeding device movable therewith.

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

1. In a machine of the class described, a spring-sustained work-support having a feed-opening, a work-feeding device carried by said work-support, a presser-foot, means to actuate said work-feeding device to feed the material over the work-support under the presser-foot, combined with stitch-forming means located above the material, and comprehending a curved thread-carrying needle and revoluble second thread-carrier to pass its thread through a loop of needle-thread, means to reciprocate said needle to enter and emerge from the same side of the material, and means for moving said needle to insure its entering at one thrust the material passing the work-support and presser-foot, and at another thrust to enter a portion of a superimposed ply of material moving between the work-support and presser-foot.

2. In a machine of the class described, an unyielding presser-foot, a work-support having a feed-opening, a lever independent of said work-support and pivotally connected therewith, a spring acting on said lever to force the work-support toward the presser-foot, combined with stitch-forming means

located above the material, and comprehending a reciprocable curved thread-carrying needle and a revoluble second thread-carrier to pass its thread through a loop of needle-thread and form in the material a series of blind stitches.

3. In a machine of the class described, a stationary presser-foot, a carriage, guide-ways to receive said carriage, a work-support sustained at the upper end of said carriage, a lever, a device connecting said lever and said carriage, a spring connected with said lever and acting normally to move the work-support toward said presser-foot, stitch-forming mechanism located wholly above the presser-foot and comprising a curved eye-pointed thread-carrying needle and a revoluble looper, means to reciprocate said needle to enter and emerge from the same side of the material, and means for moving said needle to insure its entering at one thrust the material passing between the work-support and presser-foot, and at another thrust to enter a ply of material lying on the material that is clamped between the work-support and presser-foot, means to feed the material, and a device acting on said lever to depress the work-support for the removal of or insertion of work.

4. In a machine of the class described, a loop-taker, means to move it, a rock-shaft having a bearing, a needle-carrying shaft in said bearing, said shaft having a two-part arm, one part adjustable on the other part, a curved needle carried by the adjustable part on said arm, and means to turn said rock-shaft between one and the next thrust of the needle, the adjustment of the movable part of said arm carrying said needle, providing for positioning the needle correctly with relation to the path of movement of the under side of the coacting loop-taker.

5. In a machine of the class described, a rock-shaft having a bearing, a cross-bar carried by said rock-shaft, a needle-carrying shaft sustained by a bearing in said rock-shaft, a needle in said needle-carrying shaft, means to turn said rock-shaft between one and the next stitch, and an adjustable device to insure the elevation of said rock-shaft and the needle-carrying shaft at alternate thrusts of the needle in the material.

6. In a machine of the class described, a rock-shaft having a bearing, a needle-carrying shaft sustained in the bearing of said rock-shaft, a needle in said needle-carrying shaft, a cam, and an arm connected with the upper end of said rock-shaft, a spring surrounding said rock-shaft and acting normally to keep said arm in contact with said cam, said cam meeting said arm and turning said rock-shaft to place the needle in position to enter the material for its diagonal thrust.

7. In a machine of the class described, stitch-forming mechanism for making blind-

stitches, a spring-sustained work-support, a bender, and means for moving the same that its acting end may rise above the work-support whatever the position of the work-support due to variations in thickness of work.

8. In a machine of the class described, a loop-taker, a rock-shaft having a bearing, a needle-carrying shaft mounted in said bearing and provided with a needle, a rotating shaft having a disk provided with an adjustable plate having a stud, a link embracing said stud, and means connecting said link with the needle-shaft, the adjustment of said plate so timing the movement of the needle that its point will terminate at exactly the proper position with relation to the loop-taker.

9. In a machine of the class described, a rock-shaft, having a bearing at one end, an arm connected with said rock-shaft near its other end, a roller carried by said arm, a needle-carrying shaft mounted in the bearing of said rock-shaft, and provided with a needle, and a needle-swinging cam to act on the roller of said arm to turn the rock-shaft and needle-carrying shaft, and means acting normally to maintain said roller in contact with said cam.

10. In a machine of the class described, a rock-shaft, having a bearing at one end, an arm connected with said rock-shaft near its other end, a roller carried by said arm, a needle-carrying shaft mounted in the bearing of said rock-shaft and provided with a needle, a needle-swinging cam to act on the roller of said arm to turn the rock-shaft and needle-carrying shaft, means acting normally to maintain said roller in contact with said cam, a bar connected with said rock-shaft, and an adjusting device to limit the extent of movement of said arm toward said cam.

11. In a machine of the class described, a rock-shaft having a bearing and a cross-bar having a beveled toe, and a needle-carrying shaft located in said bearing and provided with a needle, a device with which said toe contacts, and a cam to turn said rock-shaft that said toe resting on said device may raise the rock-shaft and needle-carrying shaft at alternate stitches when the needle is to enter only the lining.

12. In a machine of the class described, stitch-forming mechanism comprising an eye-pointed needle and complementary under-thread carrier both located at one side of the material, means to actuate said stitch-forming mechanism a spring-sustained work-support to sustain the material, a bender, actuating means therefor to cause said bender to bend the material at one stitch, and means to hold said bender in its inoperative position at a succeeding stitch.

13. In a machine of the class described, stitch-forming mechanism comprising a curved eye-pointed needle and a comple-

mental under-thread carrier, means to actuate said needle that it may penetrate the material for alternate stitches in planes at different angles, a bender, and means to cause said bender to bend the material only when the needle is to enter the body of the material.

14. In a machine of the class described, a spring-sustained work-support having a bender-passage, a presser-foot having a space, a bender, and means to raise the bender through the bender-passage of the work-support to force part of the work into the space of the presser-foot; combined with a stitch-forming mechanism comprising a needle, a complementary rotatable loop-taker carrying a second thread, and means to reciprocate said needle in the general direction of movement of the work over the work-support, the point of the needle entering the work sustained by the bender.

15. In a machine of the class described, stitch-forming mechanism to form a succession of blindstitches in the material, a slotted work-support having a bender-passage between its slots, said support presenting a surface occupying a position in a horizontal plane at right angles to said slots to support in the same plane at opposite sides of said slots the material to be stitched, a presser-foot provided with a space above the bender-passage of the work-support, said foot also presenting a guiding edge for guiding a ply of material being blindstitched to material on which it is laid, work-feeding mechanism sustained below said work-support, mechanism to actuate the work-feeding mechanism that it may rise through the slots in the work-support above the upper side of said support, a bender located below the work-support, and means to move the bender to act upon the work and force a part thereof into the space of the presser-foot to be entered by the needle.

16. In a machine of the class described, means located wholly at one side of the material for forming a series of blindstitches, said means comprising an eye-pointed thread-carrying needle, and a revoluble loop-taker to control a second thread and carry the same through a loop of needle-thread, a work-support, a carriage on which said work-support is mounted, a guideway for said carriage, means to move said carriage in said guideway, a yoke mounted on said carriage and provided with feed-points, and means to move said yoke on said carriage and cause said feed-points to engage and move said material.

17. In a machine of the class described, a work-support, a spring acting normally to keep said work-support in its elevated position, a carriage, means to move said carriage vertically in said work-support, a yoke provided with feed-points, a compound shaft

one part of which is sustained in the frame carrying the work-support and has a feed-actuating cam, a bearing for the opposite end of said compound shaft, and means to rotate the same, said compound shaft acting to rotate the feed-cam in any position of the work-support due to difference in thickness of material.

18. In a machine of the class described, stitch-forming mechanism located wholly above the material and adapted to make a series of blindstitches as described, combined with a presser-foot to bear on the material, and means to vary the throat-space in the presser-foot to accomodate differences in thickness of goods.

19. In a machine of the class described, stitch-forming mechanism located wholly above the material, a work-support to sustain the material, means to cause the needle of said stitch-forming mechanism to penetrate the body of material in a line substantially parallel with the infolded edge of a lining to be attached thereto, means to cause said needle at its next movement to penetrate the infolded lining, and means to draw off thread during the formation of the stitch in the body of the material and give up the slack so formed to the stitch made in the infolded edge of the lining.

20. In a machine of the class described, a work-support, a curved eye-pointed needle, a needle-carrying shaft, means to sustain said shaft, means to turn said needle-carrying shaft that the needle may penetrate the goods, a presser-foot having a throat widened toward the rear end of said foot that the needle may have ample play in said throat both when meeting the material at its straight and diagonal thrust.

21. In a machine of the class described, a work-support, a curved eye-pointed needle, a needle-carrying shaft, means to sustain said shaft, means to turn said needle-carrying shaft that the needle may penetrate the goods, a presser-foot having a wide throat and a curved guide located at the front end of the foot.

22. In a machine of the class described, a work-support, a curved eye-pointed needle, a needle-carrying shaft, means to sustain said shaft, means to turn said needle-carrying shaft that the needle may penetrate the goods, a presser-foot having a throat and a guiding edge and a lip extending beyond said edge and adapted to be interposed between the two pieces of material to be stitched together, said lip lifting the edge of the upper layer of material that the point of the curved needle may readily enter under said edge.

23. In a machine of the class described, a loop-taker, having a bobbin-case and bobbin, means to sustain said loop-taker that it may be turned in a diagonal direction, a vertical shaft having a bearing at its lower end, a

needle-carrier in said bearing, and a screw to detachably connect said bearing to said shaft, the removal of the screw enabling the removal of the bearing to thus uncover the chamber of the loop-taker and enable access to be had thereto to effect the change of bobbin-case and bobbin.

24. In a machine for blind stitching, a needle and complementary device for making blindstitches, a work-support, a feeding device sustained by said work-support, a stationary presser-foot, a lever connected with said work-support and an adjustable spring connected with said lever to sustain the work-support in a yielding manner, and a device coacting with said lever to lower and hold the work-support locked in its lowered position.

25. In a machine of the class described, a work-support, stitch-forming mechanism, a presser-foot having a guiding edge combined with means to vary the throat-space in the presser-foot to accomodate differences in the thickness of goods, said means presenting a lip extended from the inner guiding edge of the presser-foot to separate, in advance of the stitching, the materials about to be stitched.

26. In a machine of the class described, a work-support, a rock-shaft, a needle-carrier pivotally mounted on said shaft and provided with a needle, means to vibrate said needle-carrier on said rock-shaft, an arm connected with said rock-shaft, a cam, means to move the same that said cam may act on said arm and turn said rock-shaft, a device acting normally to retain said arm in the path of movement of said cam, a cross-bar connected with said rock-shaft, a spring acting normally to depress said rock-shaft, and a controlling device coacting with said cross-bar to raise the rock-shaft in its bearing.

27. In a machine of the class described, a work-support, a rock-shaft, a needle-carrier pivotally mounted on said shaft and provided with a needle, means to vibrate said needle-carrier on said rock-shaft, an arm connected with said rock-shaft, a cam, means to move the same that said cam may act on said arm and turn said rock-shaft, a device acting normally to retain said arm in the path of movement of said cam, a cross-bar connected with said rock-shaft, a spring acting normally to depress said rock-shaft, and an adjustable controlling device coacting with said cross-bar to enable said rock-shaft to be rotated to a greater or less extent.

28. In a machine of the class described, a work-support, a rock-shaft, a needle-carrier pivotally mounted on said shaft and provided with a needle, means to vibrate said needle-carrier on said rock-shaft, an arm connected with said rock-shaft, a cam, means to move the same that said cam may act on said arm and turn said rock-shaft, a device acting normally to retain said arm in the path of

movement of said cam, a cross-bar connected with said rock-shaft, a stud, a coacting adjusting device to control the axial position of said rock-shaft when the needle is entering the material diagonally with relation to the line of feed.

29. In a machine of the class described, a presser-foot, a work-support, a rod having at one end a bearing, means to turn said rod about its longitudinal axis, a rock-shaft sustained in said bearing, a needle-carrying arm secured to one end of said rock-shaft, a second arm loosely pivoted to the opposite end of said rock-shaft and provided with a ball-shaped end, a rotatable shaft having a crank, a link connected at one end with said crank and having provision at its opposite end to embrace the ball of said second arm.

30. In a machine of the class described, a block or bearing curved at its under side, a loop-taker containing a second thread, the shaft of said loop-taker being sustained in said block, means to drive said loop-taker, a shaft having a bearing at one end, a needle-carrying rock-shaft located in said bearing and provided with an eye-pointed needle carrying a thread and coacting with said loop-taker, combined with a carriage, means to move said carriage vertically, a work-support mounted at the upper end of said carriage, a work-feeding device mounted on said carriage, and means to actuate said feeding device that the feed-dogs at the upper end thereof may engage the under side of the material and move the upper side thereof over the under side of said block.

31. In a machine of the class described, a spring-sustained slotted work-support to sustain the material to be stitched, a block located above said work-support and bearing at its under side on the material, a loop-taker sustained in said block; means to actuate said loop-taker, an eye-pointed thread-carrying needle, means to move the same to present a loop for the entrance of the loop-taker, a presser-foot located in front of said block, a feeding device located below said work-support, and means to actuate the feeding device to engage the material and move the

same over the under side of said presser-foot and block.

32. In a machine of the class described, stitch-forming mechanism comprising a thread-carrying needle and rotatable loop-taker carrying a second thread, a work-support having a bender-passage, a bender located below said work-support, means to move said bender up through said bender-passage, a presser-foot having a space above the bender-passage in said work-support and having a guiding edge to guide the edge of the material being blindstitched onto the material underlying the same and sustained on the work-support, said guiding edge occupying a position which, if prolonged, would cross the upper edge of the bender between its ends.

33. In a machine of the class described, stitch-forming means located above the material and comprising a needle and complementary loop-taker carrying a second thread and adapted to make a series of blindstitches, a work-support presenting a flat surface at right angles to the direction in which the work is fed over the work-support to thus sustain the work at both sides of the line of stitching, said work-support having in its flat surface slots for the passage of a feeding device, and having a bender-passage between said slots, combined with a presser-foot having an opening in line with the bender-passage in the work-support, a feeding device and means to actuate the same to engage the material intermittently and move the same over the work-support, and a bender, and means to move the same from a position below the work-support up through said work-support, bending the work upwardly into the space of the presser-foot to be entered by the needle in making a blindstitch therein.

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

WOLF ARBETTER.

Witnesses:

GEO. W. GREGORY,
MARGARET A. DUNN.