No. 730,947. PATENTED JUNE 16, 1903.

J. M. MERROW.

TRIMMING MECHANISM FOR SEWING MACHINES.

APPLICATION FILED JULY 3, 1902.

NO MODEL. 3 SHEETS—SHEET 1.

Fig. 1.

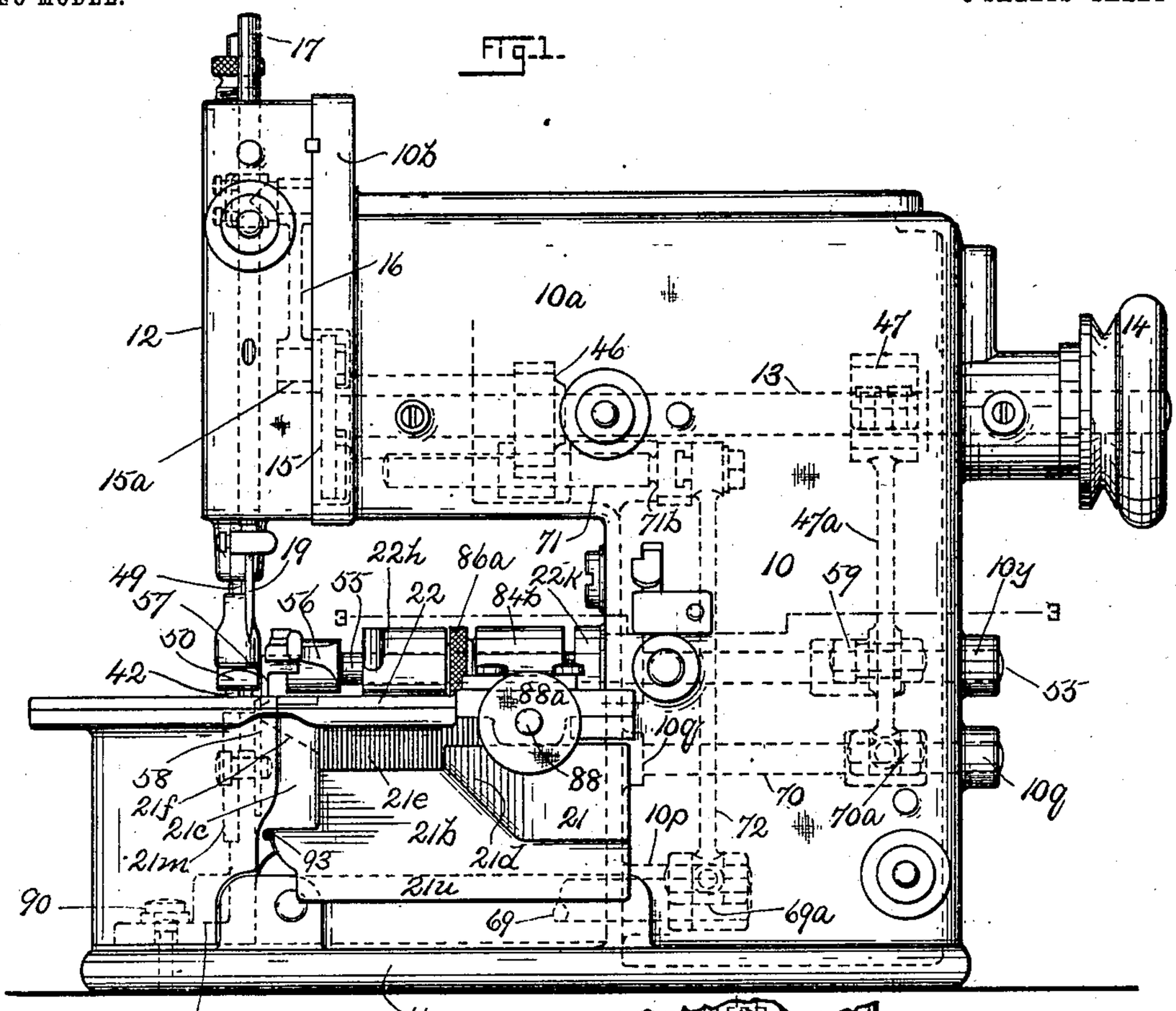
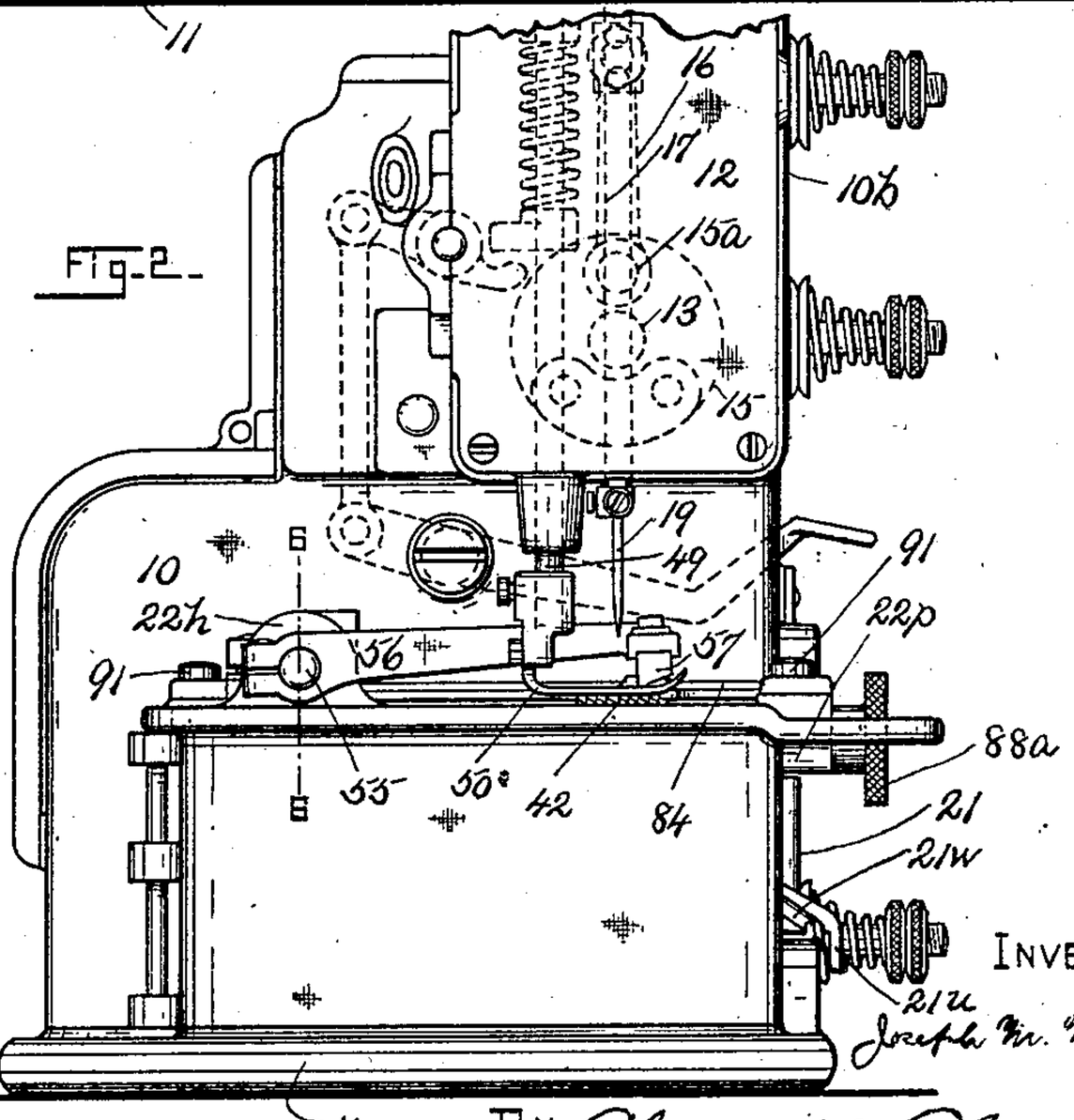


Fig. 2.



WITNESSES.

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NO MODEL. 3 SHEETS—SHEET 2.

Fig. 3.

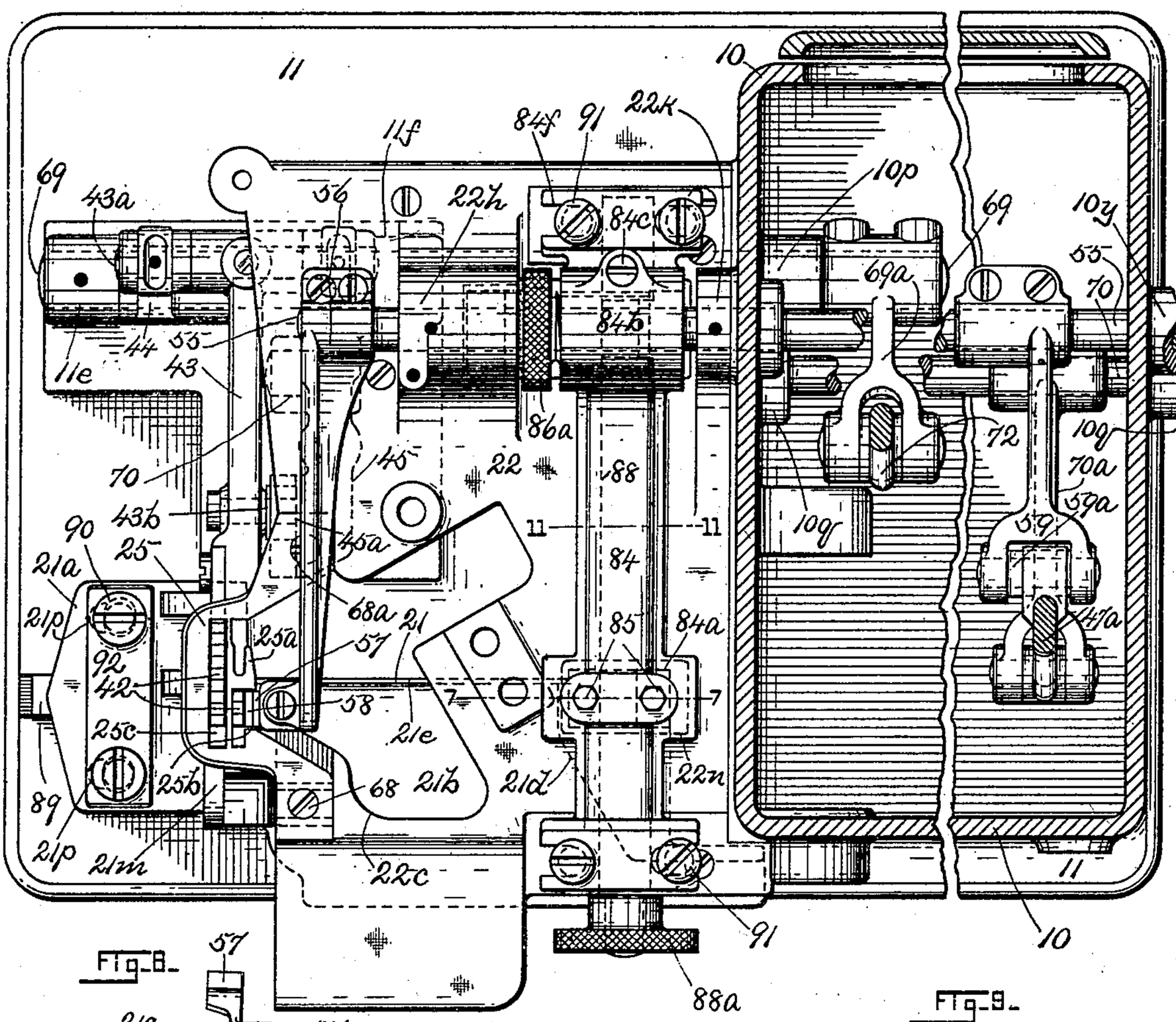


Fig. 8.

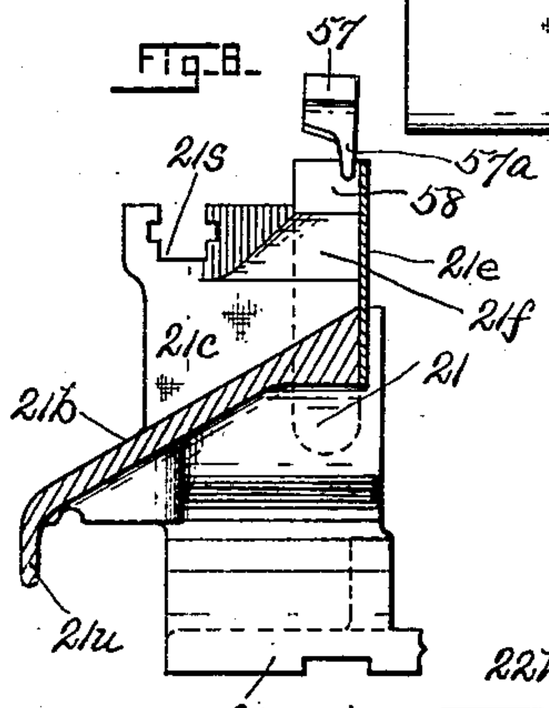


Fig. 7.

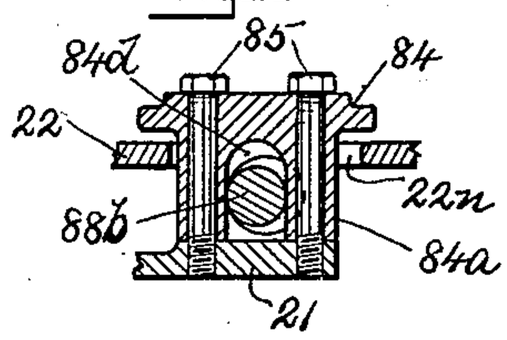


Fig. 9.

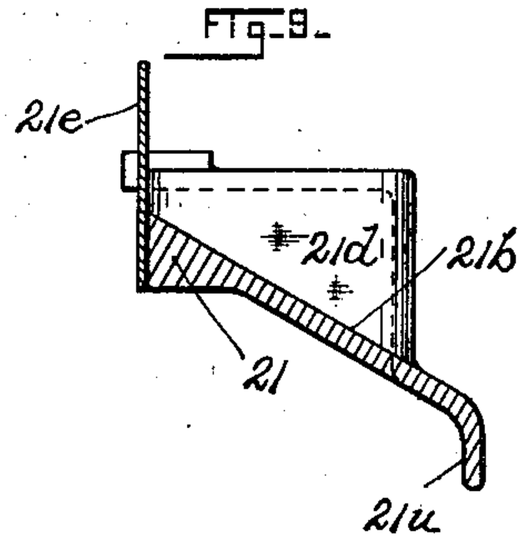
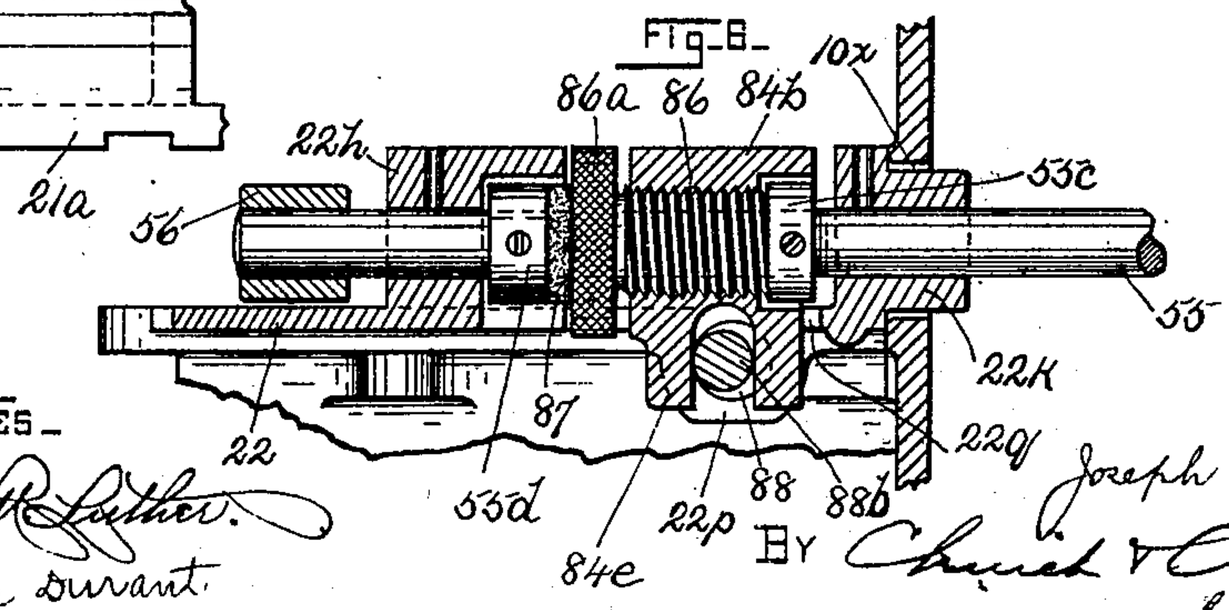


Fig. 6.



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No. 730,947. PATENTED JUNE 16, 1903.

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NO MODEL. 3 SHEETS—SHEET 3

Fig. 4.

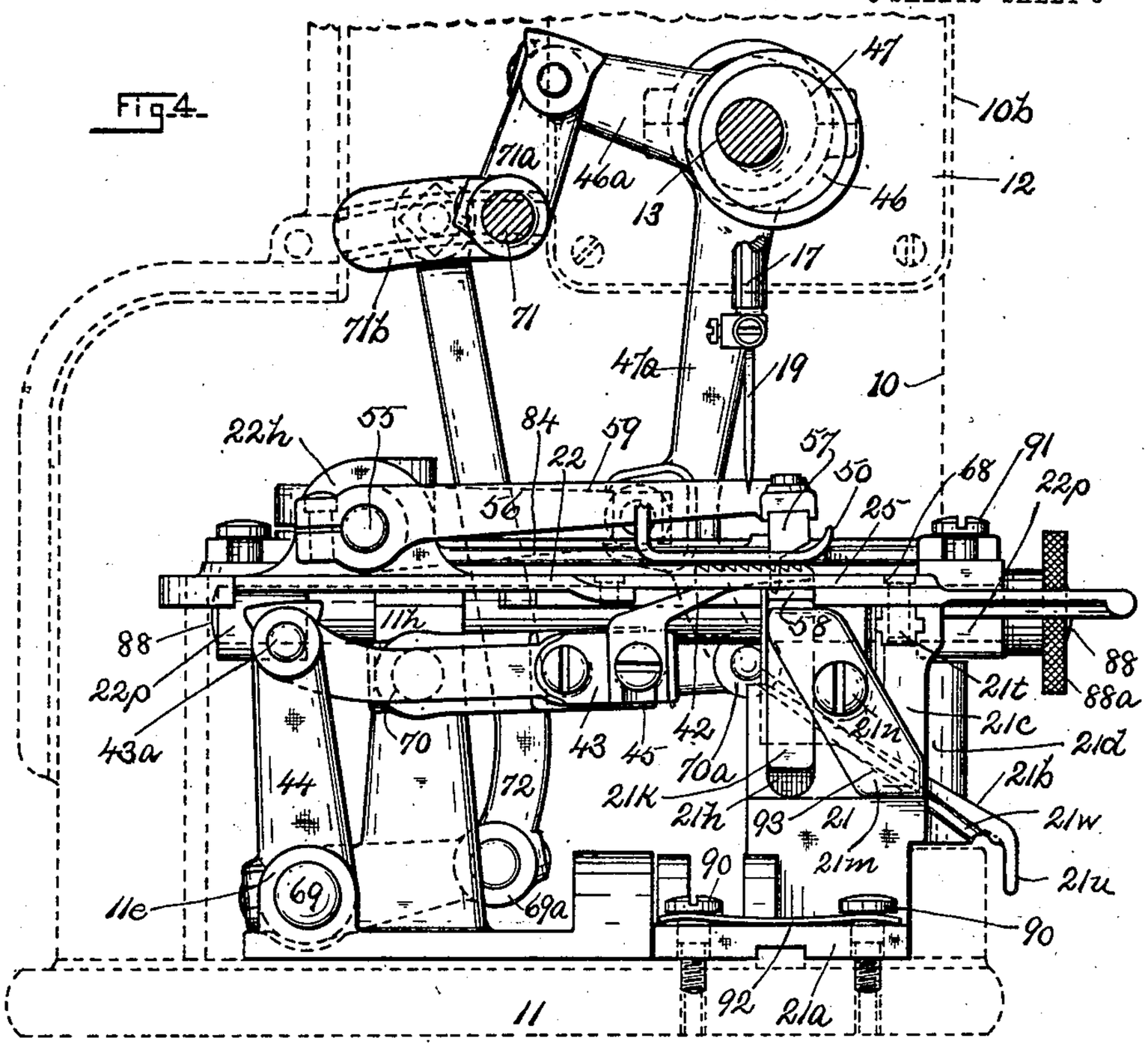


Fig. 10.

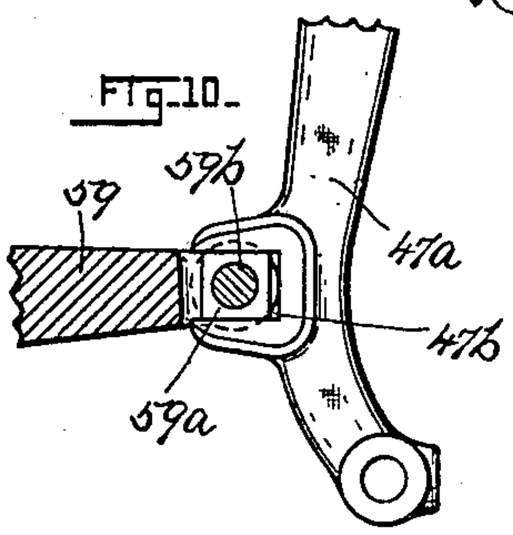


Fig. 5.

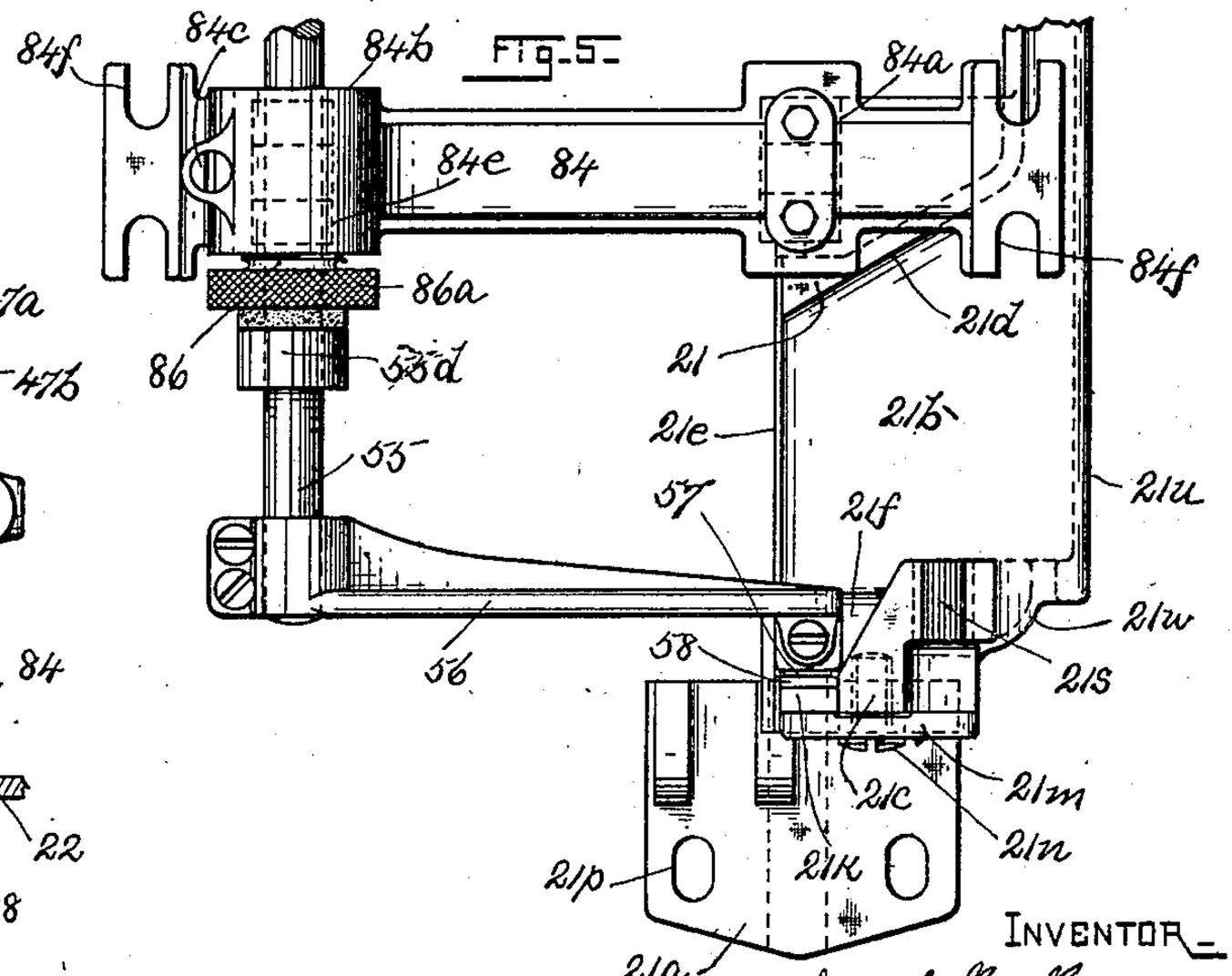
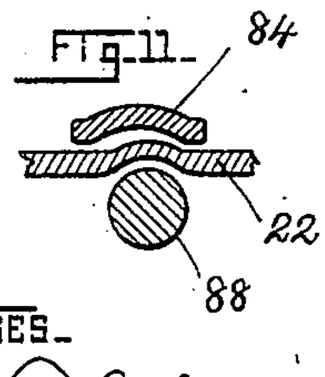


Fig. 11.



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No. 730,947. Patented June 16, 1903.

UNITED STATES PATENT OFFICE.

JOSEPH M. MERROW, OF MERROW, CONNECTICUT, ASSIGNOR TO THE MERROW MACHINE COMPANY, OF HARTFORD, CONNECTICUT, A CORPORATION OF CONNECTICUT.

TRIMMING MECHANISM FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 730,947, dated June 16, 1903.

Application filed July 3, 1902. Serial No. 114,264. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH M. MERROW, of Merrow, Tolland county, State of Connecticut, have invented certain new and useful Improvements in Trimming Mechanism for Sewing-Machines; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the figures of reference marked thereon.

The object of this invention is to improve the trimming mechanism proper of sewing-machines, also the means whereby the clippings or waste caused by the trimming operation are conducted from the machine and, further, to improve certain details of construction and arrangement, all as fully set forth and described hereinafter.

The invention embraces a trimming mechanism adapted for adjustment toward and from the needle while the operation of sewing is being performed in order that the distance between the line of stitching and the trimmed edge of the fabric may be easily and quickly varied and also a chute or conductor for receiving the waste or clippings from the trimming-knives and simultaneously adjustable with the latter.

The trimming mechanism and the chute described herein and illustrated in the annexed drawings are designed to operate with overseam sewing mechanism. The trimming and sewing operations are performed simultaneously, the former operation just in advance of the latter, in order that the overseam-stitches may be received upon the trimmed edge of the fabric.

The said improvements constituting this invention are also shown and described as applied to a peculiar form of sewing-machine with which they are especially adapted for use, the principal features of such machine having a direct bearing on this invention being fully pointed out and described hereinafter. It will be obvious, however, after an understanding of the invention that the improvements constituting the same are well adapted for use with other kinds of sewing-machines and that the trimming operation may be performed at different points relatively to the needle than the particular point indicated.

Briefly describing this invention, a pair of trimming-knives is located in advance and somewhat to the right of the needle as the machine is viewed from its front. One of the knives is secured to an arm carried on a longitudinally-adjustable rock-shaft, to which motion is imparted, preferably, from the feed-actuating mechanism of the machine. The companion (stationary) knife with which the just-described vibrating knife coöperates is preferably secured to a chute adjustably located beneath the work-plate. The vibrating knife so engages the stationary knife that the clippings or waste occasioned by the trimming operation pass downward through an opening in the work-plate and are conducted out of the machine by the chute. Means of adjustment common to the chute and the rock-shaft are provided, and connection is made between the said chute and rock-shaft in order that upon the manipulation of the said adjusting means the chute, rock-shaft, and knives are moved in unison toward or away from the needle. Frictional means are provided for the retention of the trimming mechanism in an adjusted position. In addition to its adjustment with the chute the rock-shaft carrying the knife and hereinafter designated as the "knife-shaft" is also provided with means to enable its adjustment independently of the chute, and the vibrating knife-carrier is made independently adjustable on the said knife-shaft in order that the knives may properly engage each other.

In the drawings, Figure 1 is a front elevation of a sewing-machine fitted up with these improvements, sufficient of the stitch-forming mechanism being illustrated to show the relation of the present improvements thereto. Fig. 2 is an end elevation of the machine, partly broken away and illustrating the machine and improvements in a manner corresponding to Fig. 1. Fig. 3 is a sectional plan, on an enlarged scale, illustrating the work-plate, parts located thereon, and also parts below the plane thereof and with the adjacent upright portion of the machine-frame in

cross-section on the line 3 3 of Fig. 1. Fig. 4 is an end elevation showing the present improvements together with portions of the stitch-forming and feeding mechanism related thereto, the outline of the machine-frame being indicated in dotted lines. Fig. 5 is a detail plan view of portions of the mechanism shown in Figs. 3 and 4. Fig. 6 is a detail sectional elevation of the knife-shaft, showing its supporting and adjusting mechanism, the section being taken on the line 6 6, Fig. 2. Fig. 7 is a detail section taken on the line 7 7, Fig. 3. Fig. 8 is a vertical section through the chute looking toward the trimming-knives from the right. Fig. 9 is a similar view through the chute, but looking in the opposite direction. Fig. 10 illustrates, partly in elevation and partly in section, a certain detail of construction. Fig. 11 is a section taken on the line 11 11 of Fig. 3.

Like numerals in the several figures indicate the same parts.

Referring to the accompanying drawings, the number 10 denotes the frame of the machine; 11, the base-plate, supporting and preferably formed integrally with the frame; 10^a, the overhanging arm of the frame; 10^b, the machine-head, and 12 a cap forming a separable portion of the head. The main shaft (denoted by the number 13) bears a driving-pulley 14 and a disk 15, having a wrist-pin 15^a. A link 16 connects the wrist-pin with the needle-bar 17, guided in the cap 12 and carrying at its lower end the needle 19. Upon the rotation of the shaft 13 the said needle-bar and needle are reciprocated vertically. Other stitch-forming implements, which may be of well-known construction, coöperate with the needle in the operation of sewing; but as the needle only need be considered in connection with this invention it is not deemed necessary to illustrate or describe such other implements.

The reference-number 22 denotes the work-plate, suitably supported intermediate the base-plate 11 and the overhanging arm 10^a, and the number 25 denotes the needle-plate, supported on the work-plate and secured thereto by the screws 68 68^a, said needle-plate having the usual finger 25^a and feed-dog openings 25^b 25^c.

The mechanism for feeding the fabric, including the presser-foot coacting therewith, is so closely associated with the trimming mechanism that a brief description of the said feeding mechanism is deemed desirable. The feeding mechanism shown is of the "four-motion" type, and the feed-dog 42 is adapted to engage the fabric through the needle-plate openings 25^b 25^c and to feed the same in the usual manner. The said feed-dog is supported at the forward end of a carrier 43, pivoted at 43^a between the upper ends of the arms of a rocking frame 44. The frame 44 is mounted upon a rock-shaft 69, having bearings 11^e 11^f beneath the work-plate and a bearing 10^p in the machine-frame. Secured to the rock-shaft within the said frame is an arm 69^a, connected by a link 72 with a slotted arc-shaped arm 71^b, carried upon a rock-shaft 71, supported in bearings in the upper part of the machine-frame. The shaft 71 is provided with an arm 71^a, connected through an eccentric-rod 46^a with an eccentric 46 on the main shaft 13. Upon the rotation of the main shaft the eccentric 46 through its rod 46^a and the arm 71^a actuates the shaft 71, and from the latter through the arm 71^b, the link 72, the arm 69^a, and the shaft 69 rocking motion is imparted to the frame 44, and the latter in turn moves the feed-carrier 43 and feed-dog 42 horizontally.

To support the forward end of the feed-carrier 43 and effect the raising and lowering of the feed-dogs, a rock-shaft 70 is provided extending parallel with the main shaft and having a bearing 11^h beneath the work-plate and bearings 10^q 10^q in the machine-frame. The shaft 70 carries (preferably outside of its bearing 11^h) an arm 45, Figs. 3 and 4, adjacent to and substantially parallel with the feed-carrier 43 and extending with the latter toward the path of the needle. The arm 45 is grooved at 45^a to receive a block 43^b, Fig. 3, mounted on a pin on the carrier 43, whereby the arm 45 supports the said carrier and when oscillated will impart the up-and-down movements to the feed-dogs. For oscillating the arm 45 its shaft 70 is provided with an arm 70^a, connected by an eccentric-rod 47^a with an eccentric 47 on the main shaft 13. Upon the rotation of the main shaft the eccentric 47, through the connection 47^a and the arm 70^a, effects the rocking of the shaft 70, and the latter, through its arm 45 and block 43^b, effects the raising and lowering of the feed.

The presser-foot 50 is carried at the end of a presser-bar 49, as usual.

Describing now in detail the trimming mechanism and other features forming the subject-matter of this invention as embodied in the machine illustrated, the work-plate 22 is provided with bearings 22^h 22^k for a longitudinally-adjustable knife-shaft 55, said shaft projecting through its bearing 22^h and having adjustably secured thereto an arm 56, carrying the vibrating knife 57, which latter coöperates with a companion relatively fixed knife 58, supported in a manner to be presently explained. The bearing 22^k preferably projects into the machine-frame through an opening 10^x, Fig. 6, and the shaft 55, projecting through the said bearing, crosses the frame and finds a third bearing 10^y, Figs. 1 and 3, in the wall of the said frame. Within the frame 10 the shaft 55 carries an arm 59, bifurcated at the end, Fig. 3, to receive a block 59^a, secured in position by a pin 59^b, Fig. 10. The eccentric connection 47^a, already described, is provided with slot-bearing or recess 47^b for the reception of the block 59^a, carried by the said arm 59. Thus upon the rotation of the main shaft 13 the eccentric 47,

through the connection 47ª, actuates both the arm 70ª and the arm 59 and through the described mechanism simultaneously effects the raising and lowering of the feed and the driving of the vibrating knife 57.

It has already been stated that the knife-shaft 55 is longitudinally adjustable, and to permit of such adjustment the block 59ª is of sufficient length and is adapted to move endwise in the recess 47ᵇ of the eccentric connection 47ª, as best shown in Fig. 3.

To impart a greater oscillation to the knife-shaft 55 than is required for the feed-raising shaft 70, the eccentric connection 47ª is preferably deflected or extended rearwardly at the point of attachment of the arm 59, whereby the latter may be made much shorter than the arm 70ª, carried by the shaft 70, and consequently as the connection 47ª has a uniform movement the greater oscillation will be imparted to the knife-shaft.

The number 21 indicates a chute-frame located at the front side of the machine and below the plane of the work-plate 22. This chute-frame extends substantially parallel with the length of the machine and is supported at one end by a foot 21ª, resting on the base-plate 11, and at the opposite end in a manner to be explained. An inclined surface 21ᵇ is formed on the chute-frame 21 and constitutes the chute proper, one side of the inclined surface being bounded by a vertical wall 21ᶜ and the opposite side by a vertical wall 21ᵈ. At the rear it is bounded by the wall 21ᵉ, preferably of sheet metal and suitably secured to the said chute-frame. Said wall 21ᵉ is illustrated as extending upward substantially to the plane of the top of the work-plate; but it may be carried farther upward in certain cases, as demanded, to properly deflect the waste or clippings.

The stationary knife 58 is supported on the wall 21ᵉ, and the latter is provided with a second inclined surface 21ᶠ, down which the waste or clippings from the knives pass to the chute proper, 21ᵇ. An opening 22ᶜ in the work-plate 22 permits of the engagement of the knives in the trimming operation and permits the clippings from the said knives to pass downward onto the chute by which they are conducted from the machine.

The stationary knife 58 is preferably made of thin steel and is supported in a groove 21ʰ in the wall 21ᶜ of the chute-frame, as is also a block 21ᵏ, Figs. 4 and 5, to prevent deflection of the said knife. A clamp 21ᵐ, secured to the wall 21ᵉ by a screw 21ⁿ coöperates with the block 21ᵏ to clamp and hold the knife 58 against the bottom of the groove 21ʰ. The cutting edge of the knife 58 is approximately in the same plane with or slightly above the plane of the upper surface of the needle-plate 25 and coöperates with the vibrating knife 57, the latter being provided with the usual finger 57ª to guard against the complete separation of the knives when the vibrating knife is in its elevated position. To permit the trimming-knives to operate very closely to the line of stitching, the stationary knife 58 is located in the feed-dog opening 25ᵇ, as shown in Fig. 3.

A means of connection between the chute-frame and the knife-shaft has already been referred to, and this connection, which may be termed a "yoke", is denoted by the number 84, Figs. 3 and 5. It is adjustably supported, preferably, on the upper face of the work-plate 22 and extends at right angles to but is adapted to be moved in a line parallel with the length of the machine. Near its forward end the yoke 84 is formed with a depending portion 84ª, Fig. 7, which extends through an opening 22ⁿ, in the work-plate 22 and is secured to the chute-frame 21 by bolts 85 or other suitable means, and thus serves to support that end of the said chute-frame. Near its rear end the yoke 84 is provided with a tapped clamp-bearing 84ᵇ, having a clamp-screw 84ᶜ and adapted to receive a screw-bushing 86, provided with a knurled head 86ª. The knife-shaft 55 passes centrally through the screw-bushing 86 and has mounted thereon collars 55ᶜ 55ᵈ, the former of which is located within the clamp-bearing 84ᵇ and the latter within the shaft-bearing 22ʰ, Fig. 6. The collars 55ᶜ 55ᵈ are designed to prevent endwise play of the knife-shaft 55 in the bushing 84ᵇ, but permit of the rocking motion of the said shaft, and, if desired, fiber washers 87 may be inserted between the collars and bushing ends, as shown in connection with the collar 55ᵈ. It is obvious that this construction, while preventing endwise movement of the shaft 55 in the bushing 86, will impart endwise motion or adjustment to the said shaft in its bearings 22ʰ 22ᵏ upon the adjustment of the clamp-bearing 84ᵇ, carrying the said bushing, and that like movement, through the yoke 84, will be imparted to the chute 21, and thus the knives 57 58, the positions of which are controlled by the said shaft and chute, respectively, may be varied with respect to the needle, while their positions relatively to each other will remain unchanged. It will also be obvious that the knife 57 can be adjusted relatively to the knife 58 by the rotation of the screw-bushing 86 to effect endwise adjustment of the knife-shaft 55. In connection with the adjustment of the knife-shaft 55, either with or independently of the chute-frame, it should be borne in mind that the block 59ª, carried by the actuating-arm 59 of the said shaft, slides in the recess 47ᵇ of the eccentric connection 47ª to permit of such adjustment, as already explained.

It will now be seen that the knife-shaft and the chute-frame through the yoke connection and elements carried by these parts are adapted to be moved or adjusted either toward or from the needle. To accomplish and accurately control such adjustment, means are provided, including an adjusting-shaft 88,

supported, preferably, beneath the work-plate 22 in suitable bearings 22^p, Fig. 4. The adjusting-shaft 88 extends at right angles to the length of the machine and preferably at its front end and within convenient reach of the operator is provided with a knurled wheel 88^a. The shaft 88 is also provided with eccentric portions 88^b, which upon the rotation of the shaft 88 operate to move the knife-shaft, the chute, the cutters, &c., collectively either toward or from the needle. A convenient construction of the mechanism just referred to is the utilization of the depending portion 84^a of the yoke 84 for the reception of one of the eccentrics 88^b of the shaft 88, the said depending portion being cut out, as at 84^d, Fig. 7, to receive the said eccentric. The second eccentric 88^b is received between legs 84^e, depending from the clamp-bearing 84^b, Fig. 6, the work-plate 22 being provided with an opening 22^q between the knife-shaft bearings 22^h 22^k for the passage of the legs 84^e. The simultaneous adjustment of the chute-frame and knife-shaft in lines parallel with each other without cramping is insured by the employment of the two eccentrics 88^b; but it will be apparent that were the chute-frame and knife-shaft located near each other only one eccentric on the shaft 88 would be needed.

It will be obvious that the connection between the ends of the yoke or the making of them integral is not essential when the adjusting-shaft is provided with two eccentrics; but the construction shown is the preferred form of the invention.

To steady the chute-frame 21 and insure its travel in a straight line, a key or feather 89, Fig. 3, is preferably located in confronting grooves in the foot 21^a and the base-plate 11, and to hold the chute-frame against accidental displacement the foot 21^a is slotted, as at 21^p, to receive screws 90, threaded into the base-plate 11. The yoke connection may also be similarly slotted near its ends, as at 84^f, Figs. 3 and 5, to receive screws 91, located in the work-plate. The screws 90 91 are turned inwardly sufficiently to prevent displacement of the chute-frame and yoke, but not so as to interfere with the adjustment of these elements, it being obvious, however, that one or more of the screws 90 91 could be tightened sufficiently to prevent such adjustment.

That the adjusting-shaft 88 may operate as nearly as may be in the same horizontal plane as the knife-shaft 55 the work-plate 22 is raised (see Fig. 11) to permit the shaft 88 to occupy the elevated position shown, and the yoke is properly shaped to cover the said raised portion of the work-plate.

Frictionally-acting means are provided to retain the trimming mechanism in an adjusted position and prevent accidental displacement thereof, a simple and effective form of such frictional device being a somewhat bowed flat spring 92 on the foot 21^a, with enlarged openings therein to receive the screws 90. The heads of the screws bear near the opposite raised ends of the spring, while the central portion engages the foot 21^a.

The chute-frame 21 in addition to performing the various offices already described serves, further, as a support for the work-plate 22, and to permit of the adjustment of the chute, as already described, and at the same time permit it to serve as a support for the said plate the end wall 21^c of the chute-frame is provided in its upper portion with an undercut groove 21^s for a block 21^t, Fig. 4, and the latter in turn receives the screw 68, by which the needle-plate 25 is secured to the work-plate 22. Upon the adjustment of the chute-frame 21 the block 21^t rides in the groove 21^s without affecting in any way the efficiency of the chute-frame as a work-plate support.

In a machine of the type illustrated stitch-forming implements beneath the work-plate are generally employed to coöperate with the needle. To provide means for leading a thread to an implement in this position, the chute-frame wall 21^c has a passage 93 located therein, through which a thread may render from the exterior to the interior of the machine. To protect the thread rendering into the passage 93, the lower end 21^u of the inclined wall 21^b of the chute-frame extends downwardly, as shown, the said thread being led beneath and in the rear of the inclined and downwardly-extending chute portions 21^b 21^u, just mentioned, thence through a well-rounded groove 21^w to the thread-passage 93.

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

1. In a sewing-machine, the combination with stitch-forming mechanism including a needle, trimming mechanism including a vibrating knife and a coöperating relatively fixed knife, and a carrier for the vibrating knife, of a rock-shaft supporting the said carrier, means for oscillating the rock-shaft, means for adjusting the rock-shaft and vibrating knife relatively to the fixed knife, an adjustable support for the fixed knife and an eccentric for adjusting the rock-shaft and the fixed knife-support, whereby the knives may be moved in unison with reference to the needle; substantially as described.

2. In a sewing-machine, the combination with stitch-forming mechanism including a needle, trimming mechanism including a vibrating knife and a coöperating relatively fixed knife, and means for actuating the vibrating knife, an adjustable support for the vibrating knife, an adjustable support for the fixed knife, a connection between said supports and means for adjusting the knives consisting of a shaft mounted in fixed bearings relatively to the knives and having eccentric portions coöperating with the adjustable

parts to move the knives, supports and connection in unison, toward and from the needle, substantially as described.

3. In a sewing-machine, the combination with stitch-forming mechanism including a needle, trimming mechanism including a vibrating knife and a coöperating relatively fixed knife, a carrier for the vibrating knife, a rock-shaft supporting the carrier, means for actuating the rock-shaft, an adjustable bearing for the rock-shaft and means to prevent endwise movement of the shaft therein, and an adjustable support for the fixed knife, of means for adjustment, consisting of a shaft mounted in bearings fixed relatively to the knives and having eccentric portions engaging the adjustable bearing and fixed-knife support to move the knives in unison toward and from the needle, substantially as described.

4. In a sewing mechanism, the combination with stitch-forming mechanism including a needle, trimming mechanism including a vibrating knife and a coöperating relatively fixed knife, means for actuating the vibrating knife, an adjustable support for the vibrating knife, an adjustable support for the fixed knife and means whereby the knives and their supports are moved in unison toward and from the needle, of means whereby the knives are retained in an adjusted position, consisting of a spring engaging the fixed-knife support at a point thereof intermediate the said knife and a fixed portion of the machine to form a friction-clamp, substantially as described.

5. In a sewing-machine, the combination with trimming mechanism including a vibrating knife and a coöperating relatively fixed knife, of a carrier for the vibrating knife, a longitudinally-movable rock-shaft, supporting the carrier, bearings for the rock-shaft, a screw-bushing surrounding the rock-shaft and held against relative movement endwise of the shaft, a threaded element to receive the bushing whereby rotation of the bushing will effect endwise adjustment of the shaft and the adjustment of the vibrating knife relatively to the fixed knife, and means for oscillating the shaft, substantially as described.

6. In a sewing-machine, the combination with trimming mechanism including a vibrating knife and a coöperating relatively fixed knife, an adjustable support for the fixed knife, a carrier for the vibrating knife and a shaft supporting the carrier, of bearings for the shaft, a screw-bushing surrounding the shaft and held against endwise movement relative to the shaft, a threaded element adjustable in unison with the fixed-knife support and adapted to receive the screw-bushing, whereby by the rotation of the bushing endwise adjustment of the shaft and the adjustment of the vibrating knife relatively to the fixed knife is effected, means for rocking the shaft, and means for adjusting the threaded element and the fixed-knife support, substantially as described.

7. In a sewing-machine, the combination with a main shaft, feeding mechanism including a rock-shaft adapted to effect the raising and lowering of the feed, an arm on the feed-actuating rock-shaft, trimming mechanism including a vibrating and a coöperating relatively fixed knife, a carrier for the vibrating knife, a rock-shaft supporting the said carrier and an arm on the knife-actuating rock-shaft, of an eccentric on the main shaft and an eccentric-rod actuated thereby and engaging both the arm on the feed-shaft and the arm on the knife-actuating rock-shaft, substantially as described.

8. In a sewing-machine, the combination with a main shaft, feeding mechanism including a rock-shaft adapted to effect the raising and lowering of the feed, an arm on the feed-actuating rock-shaft, trimming mechanism including a vibrating and a coöperating relatively fixed knife, a carrier for the vibrating knife, a rock-shaft supporting the carrier, an eccentric on the main shaft, an eccentric-rod connecting the eccentric and the arm on the feed-actuating rock-shaft, of means for adjusting the knife-actuating rock-shaft longitudinally relatively to the fixed knife, and an arm intermediate the knife-actuating rock-shaft and eccentric-rod, movable laterally relatively thereto, whereby the shaft is actuated by the rod and is free for lateral adjustment relatively to the said eccentric-rod, substantially as described.

9. In a sewing-machine, the combination with a main shaft, feeding mechanism including a rock-shaft adapted to effect the raising and lowering of the feed, an arm on the feed-actuating rock-shaft, trimming mechanism including a vibrating knife and a coöperating relatively fixed knife, a carrier for the vibrating knife, a rock-shaft supporting the carrier, an eccentric on the main shaft, an eccentric-rod between the eccentric and the arm on the feed-actuating rock-shaft, of means for adjusting the knife-actuating rock-shaft longitudinally, an arm supported on the knife-actuating rock-shaft, a block carried by the said arm, a bearing in the eccentric-rod to receive the block and allow endwise adjustment thereof in unison with the knife-shaft; substantially as described.

10. In a sewing-machine, the combination with a work-plate, of trimming mechanism including a chute-frame coöperating with and serving as a support for the work-plate, means for adjusting the chute-frame and a movable connection between the work-plate and chute-frame whereby the adjustment of the said chute-frame is permitted, substantially as described.

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