No. 815,428. PATENTED MAR. 20, 1906.

J. HIGGINS.

TRIMMER AND BINDER FOR SEWING MACHINES.

APPLICATION FILED JUNE 3, 1904.

4 SHEETS—SHEET 1.

Fig. 1.

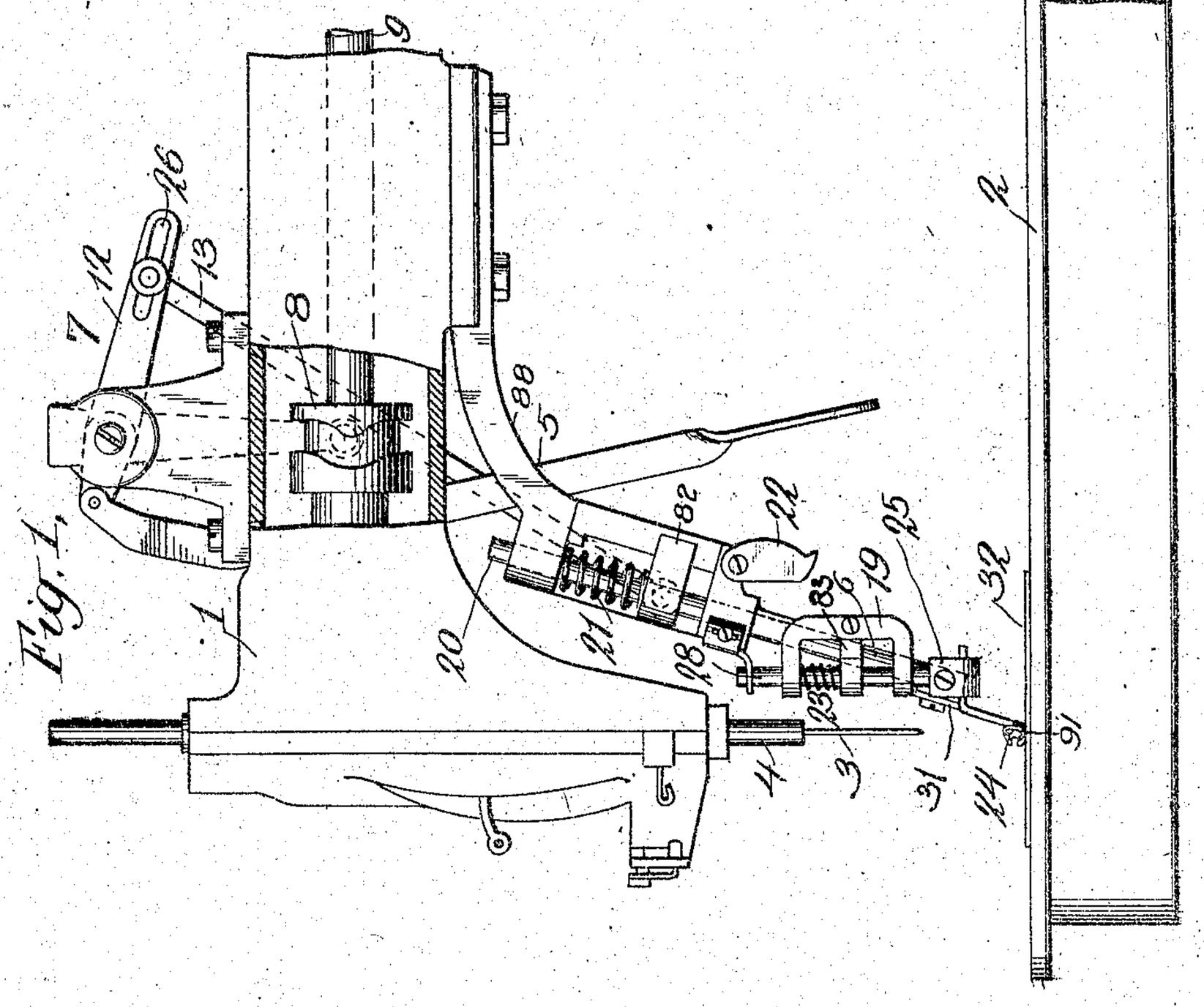
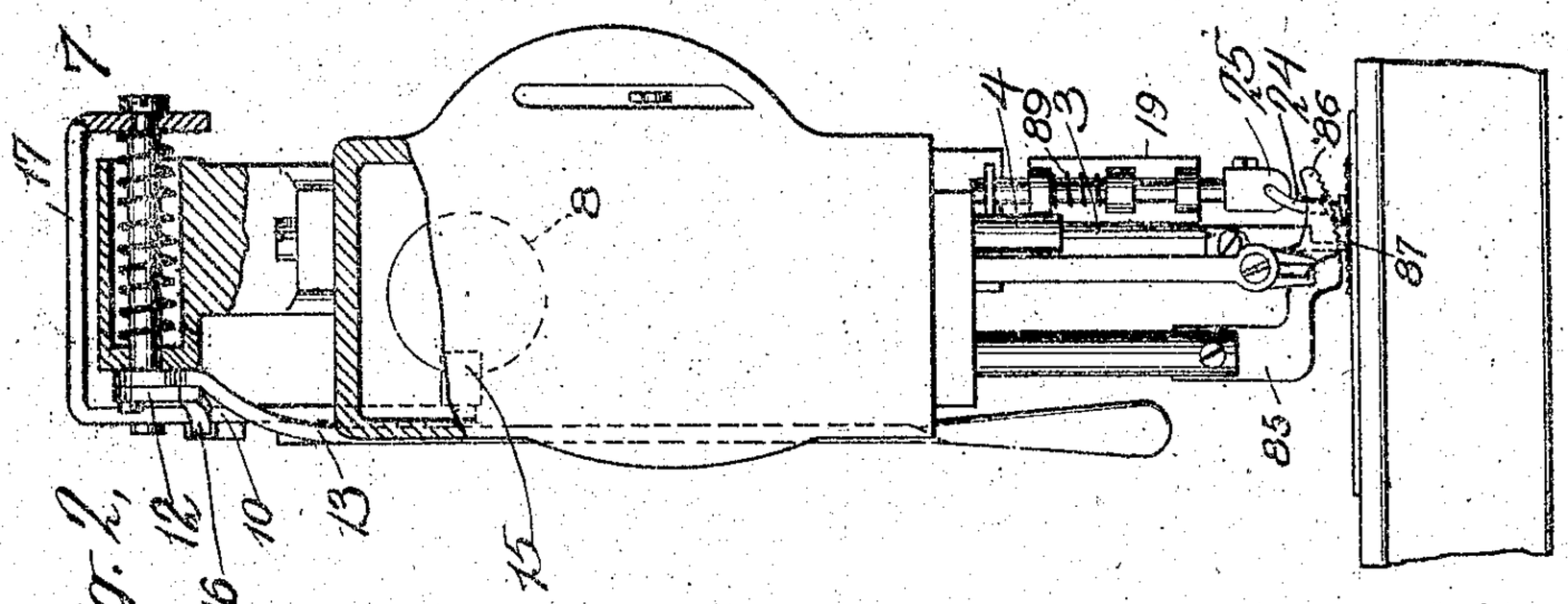


Fig. 2.



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4 SHEETS—SHEET 2.

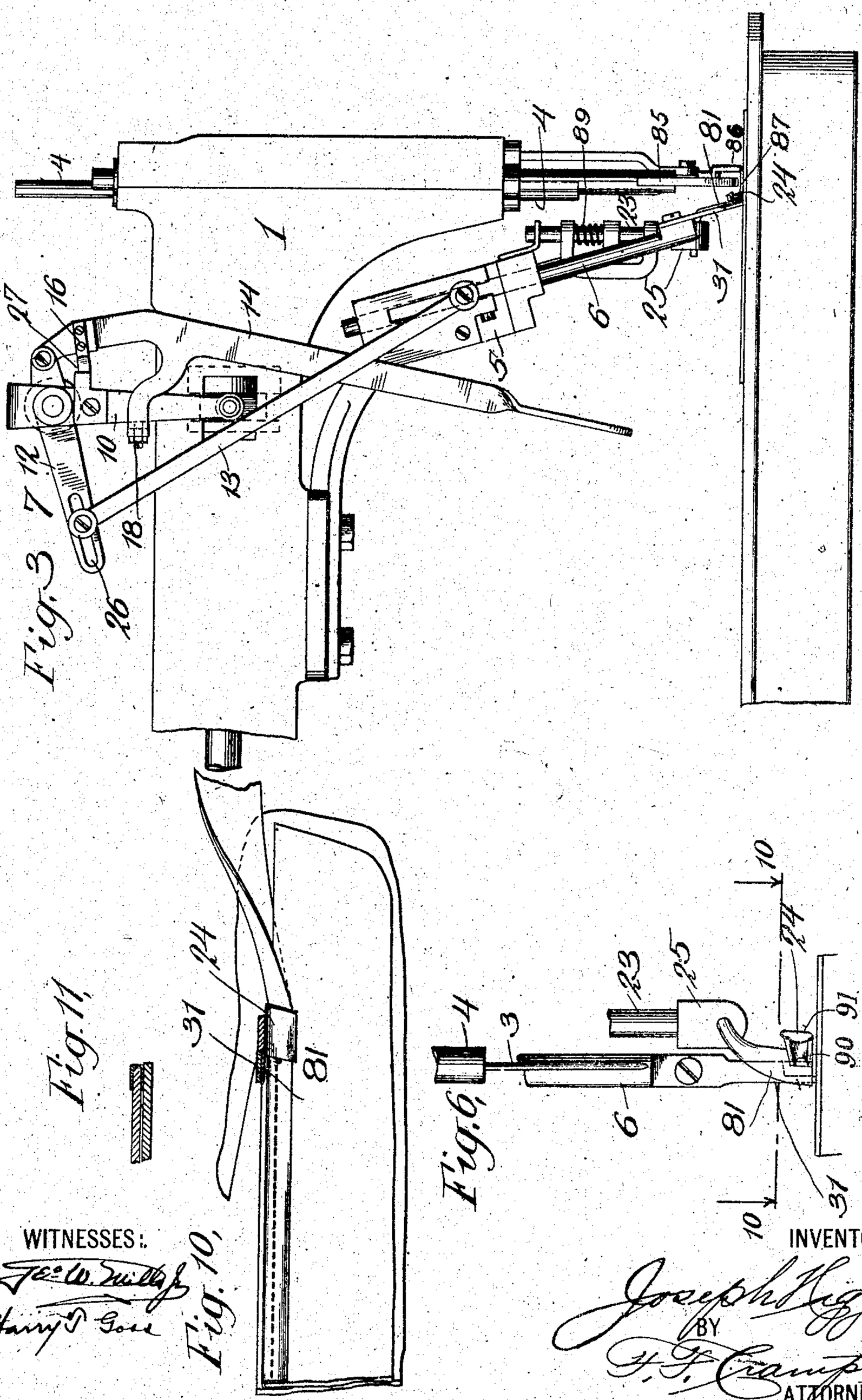

Fig. 3.

Fig. 11.

Fig. 6.

Fig. 10, [illegible]

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4 SHEETS—SHEET 3.

Fig. 7.

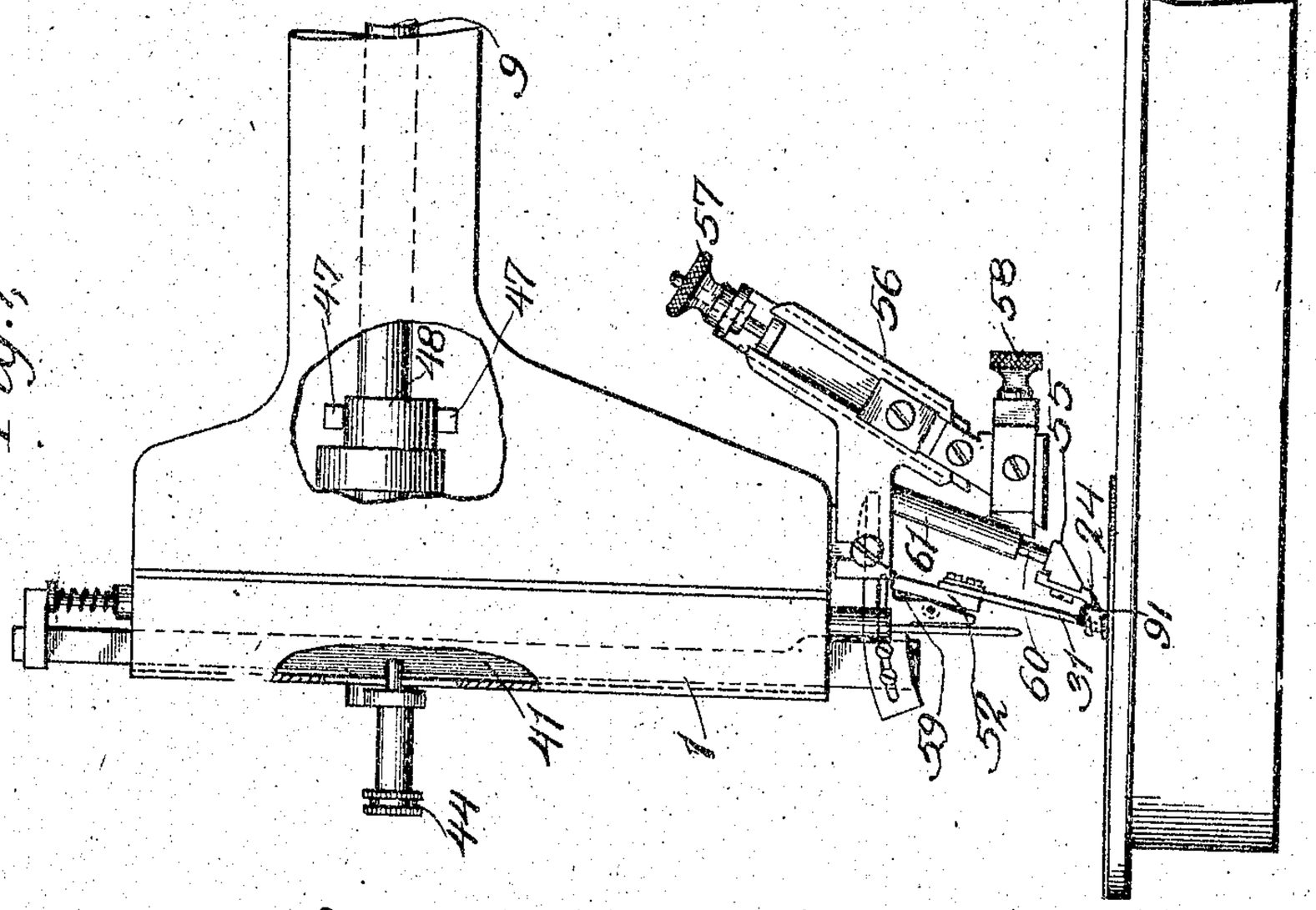

Fig. 8.

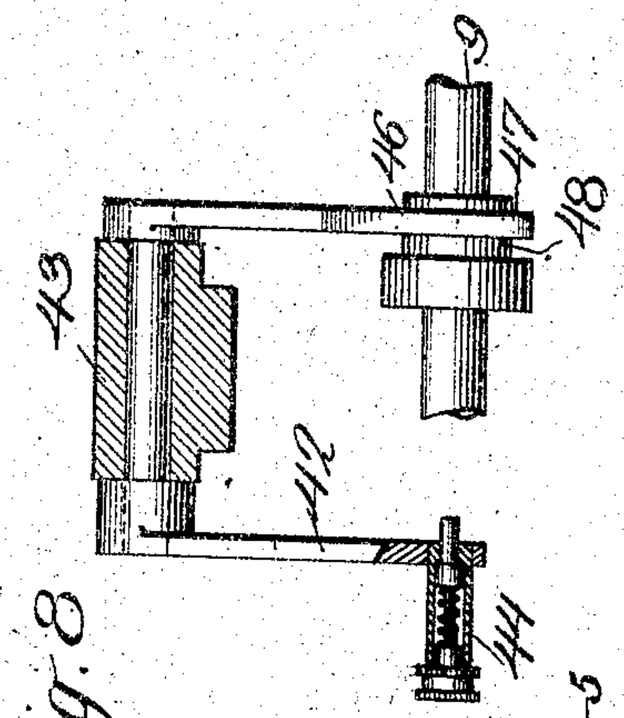

Fig. 9.

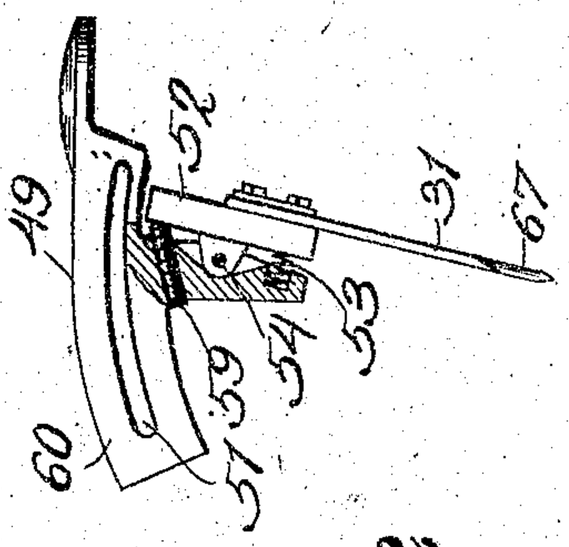

Fig. 12.

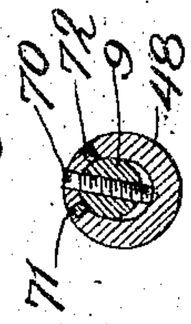

Fig. 4.

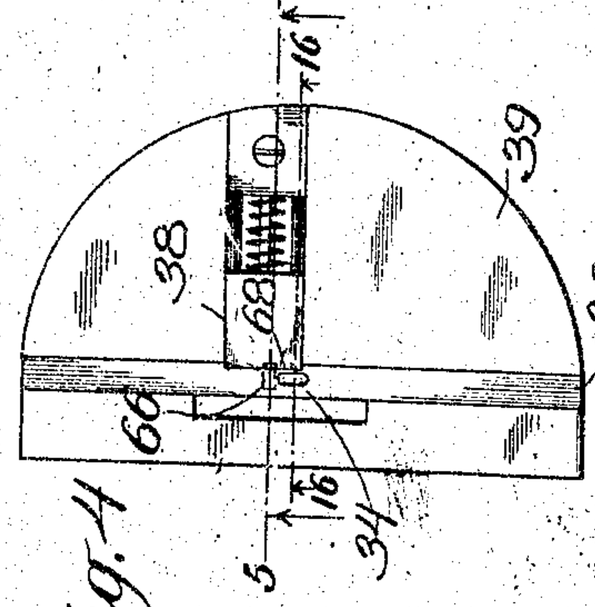

Fig. 5.

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UNITED STATES PATENT OFFICE.

JOSEPH HIGGINS, OF NEW YORK, N. Y.

TRIMMER AND BINDER FOR SEWING-MACHINES.

No. 815,428. Specification of Letters Patent. Patented March 20, 1906.

Application filed June 3, 1904. Serial No. 210,927.

To all whom it may concern:

Be it known that I, JOSEPH HIGGINS, a citizen of the United States, and a resident of the borough of Brooklyn, city and State of New York, have invented certain new and useful Improvements in Trimmers and Binders for Sewing-Machines, of which the following is a specification.

My invention relates to improvements in sewing-machines; and it particularly relates to improvements in the mechanism for cutting, trimming, and binding the materials while they are being sewed.

The invention consists of features which appear in the following description, illustrated in the drawings, and which are claimed in the claims.

The invention is illustrated in the accompanying drawings, wherein—

Figure 1 illustrates a front view of the head-stock and mechanism of the trimmer and binder. Fig. 2 illustrates an end view of the same. Fig. 3 illustrates a rear view of the same. Fig. 4 illustrates the throat-plate, which also operates as the cutter-plate. Figs. 5 and 16 are sectional views of the same, taken on the lines 5 5 and 16 16 indicated in Fig. 4. Figs. 6 and 14 illustrate the binder, the guide, and knife, showing the relative position of the same. Fig. 7 shows the invention applied to another form of a machine wherein the cutter is operated by a vertical reciprocating bar. Figs. 8 and 13 illustrate a crank for causing the said bar to reciprocate. Fig. 9 illustrates an adjustable knife-block. Fig. 10 illustrates the goods partially cut and bound and a sectional view taken on line 10, Fig. 6. Figs. 11 illustrates a sectional view of the goods when trimmed and bound by the machine when operated as a vertical trimmer. Fig. 12 illustrates a form of an adjustable cam for operating the cutter. Fig. 15 is a side view of the mechanism for connecting the knife-bar with the cam. Fig. 17 illustrates a sectional view of the goods when trimmed and bound by the machine when used as an under trimmer.

Referring to Fig. 1, 1 is a head suitably mounted on the bed 2. 3 is a needle carried by the needle-bar 4 in the manner well known in the art. 85, 86, and 87 are the parts of the alternating presser-foot mechanism well known in the art. 85 is the presser-foot, 86 is the walking-foot, and 87 is the feeding mechanism. By means of the alternating feed mechanism the goods are fed under the needle. 5 is a cutter-supporting frame mounted on the head 1.

6, Fig. 3, is a knife-bar supported in the said frame 5. 7 is a reciprocating mechanism which is adapted to cause the knife to reciprocate. It consists of a cam 8, located on the shaft 9. A spring-pressed crank-arm 10 has a roller 15. The roller 15 is moved back and forth by the operation of the cam 8. The other arm 12 of the crank is connected to a rod 13, which is in turn connected to the knife-bar 6. The arms 10 and 12 form a bell-crank. The arm 12 is provided with a slot 26, and the rod 13 is fastened by a pivot-pin to the arm 12 at any point along the slot, whereby the amount of movement of the rod 13 may be varied and the movement of the knife attached thereto may also be varied. 14 is a lever for throwing the roller into and out of contact of the cam-surface of the cam 8. The lever 14 has a projecting piece 16, which has an inclined surface. The crank-arm 10 has a projecting portion 27, which is adapted to be operated on by the inclined surface of the piece 16. The crank 10 is drawn inward by a spring 17, so that the roller 15 will enter and normally be retained in the groove of the cam. When the lever is thrown in one direction, the crank 10 is moved out by the inclined surface 16, operating on the crank, and the roller 15 is lifted out of the groove, and when the roller is removed from the groove the crank 10 is turned by the operation of the spiral spring 17, so that the bearing rests on the cylindrical portion of the cam at the side of the groove. When the mechanism is to be operated by the shaft 9 the lever 14 is thrown in the opposite direction. The arm 18 then presses upon the arm 10 of the crank, and the crank is drawn over until the spring 17 pulls the bearing 15 into the groove of the cam.

When the cam-roller is drawn out of the groove of the cam by the operation of the lever 14, the spring 17 throws the cam-roller to one side, turning with it the arm 12, which pulls on the link 13 and raises the knife-bar 6.

A knife-bar 6, which is slidably mounted in the frame 5, is connected to the rod 13. The knife 31 is connected to the knife-bar 6. The knife has a finger 67. The throat-bar 33 operates in conjunction with the knife to cut the goods. The throat-bar, having the throat 34, is located in the throat-plate 39.

The plate has a spring-actuated slide 38. A small hole 66 is formed at one point along the line of contact between the said slide and the said throat-bar. The finger 67 enters the hole 66 and passes diagonally downward through the hole 66, so as to cross just behind the needle. The edge of the knife strikes the cutting edge of the throat-bar beside the needle. The cutting edge of the throat-bar is within one sixty-fourth of an inch, or even less, from the hole of the needle in the throat-bar 33.

The cutting side 68 of the throat-bar is vertical and extends downward in a plane parallel to the needle. The vertical central line of the vertical cutting side and the needle lies in a vertical plane at right angles to the direction of the throat-bar. The body of the knife moves diagonally downward, and its edge strikes the throat-bar at its cutting edge and continues to move downward along the vertical cutting-surface of the bar. The body of the knife in the form of the invention illustrated in Figs. 1 and 3 continues to move diagonally downward; but the spring of the knife permits the edge of the blade to move down the vertical cutting side. This brings the mechanism for sewing goods and the trimmer in exceedingly close proximity to each other and prevents what is known as "chewing" of the edge of the goods when the goods is turned more or less sharply during the operation of the machine.

The needle moves in a vertical direction in the manner common in this art, and the throat is necessarily vertical. The knife being located at the side of the said throat and in exceedingly close proximity thereto for the purpose above stated, the cutting wall or surface of the throat-plate is vertical.

To the supporting-frame 5 is attached the frame 19 for the binder. The binder-frame 19, carried by a rod 20, is pressed downward by a spring 21. A lug 82 is attached to the bar 20. The spring 21 presses between the guiding-frame 88 and the lug 82. The frame 19 and the bar 20 is lifted by the cam 22, which may be turned so as to engage with the lug 82. This raises the binder away from the work. A binder-rod 28 is located in and guided by the frame 19. The lug 83 is attached to the rod 28. The rod is pressed downward by a light spring 23, which is located between the lug 83 and the frame 19. The binder 24 is fastened in the binder-block 25, located on the end of the binder-rod 28. The binder has a substantially semi-annular opening 91, through which the binding material is drawn by the feeder of the machine. The opening 90 is located just in front of the needle. The binder is provided with a fin 81, which extends over the knife and a little ahead of the opening 90 of the binder. The fin 81 forms a guide to the knife and a guard to the goods to prevent the knife from cutting the binding material. It is necessary for this work to cause the knife to pass exceedingly close to the binder in order to trim the goods.

In Figs. 11 and 17 are illustrated samples of goods which were cut by a vertical cutter and an under cutter, respectively. In each case it will be noticed that the knife passes exceedingly close to the binder. This could only be done by the assistance of the fin, which operates as a guide to the knife, as well as a guard to the goods. The fin is exceedingly thin and permits the knife to operate exceedingly close to the needle. A magnified sectional view of the fin is illustrated in Fig. 10.

In the form of the machine shown in Fig. 7 the knife is located on a vertically-reciprocating bar 41, which is located in the head 1. The bar 41 is operated by a crank 42, which is pivotally supported on the head 1 and in the bracket 43. The crank 42 has a spring-pressed pin 44, which is adapted to enter a recess located in the bar 41. When the pin is in the recess of the bar, the crank is mechanically connected to the bar. When the pin is drawn out, the bar is disconnected from the crank. The arm 46 of the crank 42 has a yoke 47, which embraces the cam 48, located on the shaft 9. As the shaft turns the crank is oscillated and the knife-bar 41, connected to the crank, is reciprocated. The cam 48 is illustrated in detail in Fig. 12. In the said figure, 9 indicates the shaft on which the cam 48 is located. The cam 48 is provided with an oblong hole passing through the cam in the direction of the axis, and it is so positioned that when the shaft is located at one end of the oblong opening the axis of the cam will coincide with the axis of the shaft, and when the shaft is located at the opposite end of the opening the cam will be eccentric with the shaft. In order to provide for varying degrees of eccentricity, set-screws 70 and locking-screws 71 and 72 are provided. The set-screw 70 passes through an opening in the cam and through female thread located in the shaft. The inner end of the screw bears against the inner surface of the cam and is located in the oblong opening. The locking-screws 71 and 72 screw into the cam 48 and press against the surface of the shaft. By this means the screw 70 is adapted to set the cam so that its axis will be more or less removed from the axis of the shaft, while the lock-screws 71 and 72 lock the cam in this set position. By thus adjusting the cam 48 the knife 31 may be varied in the extent of its motion for heavy work—that is, for work upon materials having considerable thickness the cam may be set so that there will be a considerable up-and-down motion of the bar carrying the knife, or if the work is light—that is, if the material is thin—the cam can be varied so as to cause only a slight vertical movement of the bar. A knife-block 49 is

supported on the lower end of the knife-bar. The knife-block has a segmental portion 60, having a segmental slot 51. The block is attached to the knife-bar by screws passing through the segmental slot 51. The angle of the block, and consequently of the knife, with respect to the knife-bar may be varied by shifting the block along the screws. The knife by this means of adjustment can be readily changed from an under cutter to a vertical cutter, and wice versa. The knife 31 is attached to an auxiliary block 52, which is pivoted to the knife-block 49 on the pin 54. Spring 53, located below the pin 54, tends to press the block 52 against the screw 59, located above the pin. By means of the adjustable knife-block the knife may set so that from a vertical trimmer the goods may be trimmed at different angles. As the knife moves downward in a vertical direction and the edge of the knife strikes the goods the knife turns about the pivot-pin 54, and as it begins to cut the goods it moves about the pivot-pin 54 until it strikes the cutting edge of the throat-bar. When goods of different thicknesses are to to be cut, the knife has to be adjusted at different angles in order to obtain best results, which cannot be obtained by the mere adjustment of the limiting-pin 59. When the binding material is placed on the upper of two pieces of goods which are being sewed together, the lower piece may be cut away more or less from beneath the binder. This amount varies according to the results desired as to appearances and the use to which the goods are to be put when sewed together.

In the form of the invention illustrated in Fig. 7 the knife cuts the goods at the sides of the needle and in close proximity thereto, as in the machine shown in Fig. 1.

In the form of the machine shown in Fig. 7 the binder 24 is supported on the frame 56, which is attached to the head 1 of the machine.

Fig. 10 illustrates two pieces of goods partly sewed together, trimmed, and bound. The binding material is fed to the upper of two pieces of fabric which are being sewed together, and the binding material and the two pieces of fabric are sewed together at the same time that the knife operates to trim the lower of the said two pieces of fabric. This produces what is called "imitation" of French binding. In the machines now known in the art it is impossible to combine these operations into a single operation. In the making of French binding by the machines now known in the art it is necessary that the binding first be placed on what is called the "upper," and then the two pieces are sewed together and the trimming is done by hand. If goods are to be sewed together and trimmed by machines now known in the art, it is necessary that the ragged edge be subsequently trimmed up by hand, because of the chewing of the edge due to the remoteness between the position of the knife and the needle. By my invention I am enabled to bring the knife in close proximity to the needle and cut the goods exactly as the needle penetrates the goods and at a point at the side of the needle. When the goods are turned, they are always turned about the needle. The knife thus cuts the goods substantially at the turning-point, and it does not chew the goods, as in any machine where the knife is located ahead of the needle.

What I claim as new, and desire to secure by Letters Patent, is as follows:

1. In a sewing-machine the combination of a knife, means for operating the said knife, a binder for directing a binding material and having a guard for the said knife located between the said binder, and the said knife, whereby a binding material may be directed to the goods while they are being sewed and trimmed.

2. In a sewing-machine the combination of a knife, means for operating the said knife, an overhanging arm, a binder for directing a binding material supported by the said overhanging arm and having a fin-guard for the said knife to prevent it from cutting the material.

3. In a sewing-machine the combination of a knife a means for causing the said knife to operate, and an adjustable means for changing the said knife from an under trimmer to a straight trimmer.

4. In a sewing-machine the combination of a knife, a means for causing the said knife to operate an adjustable means for changing the said knife from an under trimmer to a straight trimmer, a guard for the said knife.

5. In a sewing-machine the combination of a knife, a means for causing the said knife to operate and an adjustable means for changing the said knife from an under trimmer to a straight trimmer, an adjustable guard for the said knife.

6. In a sewing-machine the combination of a vertically-moving rod a knife attached to the said rod, a means for causing the said rod to operate and an adjustable means for changing the said knife from an under trimmer to a straight trimmer.

7. In a sewing-machine the combination of a knife-block, means for moving the said knife-block, a knife pivotally connected to the said block and means for adjusting the said knife from an under cutter to a straight cutter.

8. In a sewing-machine the combination of a knife-block means for moving the said knife-block, a knife pivotally connected to the said block and means for adjusting the said knife from an under cutter to a straight cutter, a guard for the said knife.

9. In a sewing-machine the combination

of a knife, a means for causing the said knife to operate an adjustable means for changing the said knife from an under trimmer to a straight trimmer, an overhanging arm, a binder supported on the said overhanging arm, and having a fin for guiding the said knife.

10. In a sewing-machine the combination of a knife, a means for causing the said knife to operate an adjustable means for changing the said knife from an under trimmer to a straight trimmer, a binder having a fin for guiding the said knife.

11. In a sewing-machine the combination of a knife-bar, a knife, means for operating the said knife, a knife-block for carrying the said knife and having a curved slot for adjusting the said knife, and a means for coöperating with the said slot for securing the said knife to the said block in its adjusted position so as to change it from an under trimmer to a straight trimmer.

12. In a sewing-machine the combination of a throat-bar having an opening adapted to receive a needle, an under-cutting knife whose edge is adapted to strike the said bar at the side of the said needle, means for operating the said knife.

13. In a sewing-machine the combination of a throat-plate, an under-cutting knife whose edge is adapted to strike the edge of the said plate, the said throat-plate having a throat located substantially opposite the center of the said knife, means for operating the said knife.

14. In a sewing-machine the combination of a throat-bar having a throat for the needle and a vertical cutting side located along the side of the said throat, an under-cutting knife adapted to act along the side of the said throat.

15. In a sewing-machine the combination of a knife-bar, a crank for operating the said bar, a cam for moving the said crank and having an adjusting and locking pins, a shaft through which the said adjusting-pin is passed and against which the locking-pins press.

16. In a sewing-machine the combination of a throat-plate having a throat, a knife adapted to cut at an acute angle to the surface of said plate, a vertical cutting-surface located at the edge and side of the said throat.

17. In a sewing-machine the combination of an under-cutting knife, a throat-bar having a throat, and cutting-surface, the said cutting-surface being located in close proximity to, and the center of the said cutting-surface being located substantially opposite the said throat.

18. In a sewing-machine the combination of a needle and a knife, means for operating the said needle and knife, an overhanging arm, a binder supported on the said overhanging arm and having one end located at the side of the said knife and in close proximity to the said needle, a fin located between the said needle and the said knife.

19. In a sewing-machine the combination of a needle and a knife, means for operating the said needle and the said knife, an overhanging arm, a binder supported on the said overhanging arm and located at the side of the said knife and having one end located in close proximity to the said needle, a fin located between the said knife and the said needle, a throat-plate having a throat and vertical cutting-surface located side by side.

20. In a sewing-machine the combination of an overhanging arm, a knife, a needle and a binder supported by the said overhanging arm, means for operating the said knife and the said needle, the said needle being located in close proximity to the side of the said knife, the said binder being located at the side of the said knife and one end of the said binder being located in close proximity to the said needle, a fin, the said binder and the needle being located on one side of the said fin and the knife located on the other side of the said fin.

21. In a sewing-machine the combination of an overhanging arm, a knife, a needle and a binder supported by the said overhanging arm, a spring-pressed fin located between the binder and the said knife, means for operating the said needle and the said knife.

22. In a sewing-machine the combination of an overhanging arm, a knife and a needle supported by the said overhanging arm, a spring-controlled binder supported by the said arm and in proximity to the said knife and the said needle, means for operating the said needle and the said knife.

23. In a sewing-machine the combination of a needle and a knife, means for operating the said needle and the knife, an overhanging arm, a binder supported by the said overhanging arm, a fin located between the said binder and the said knife.

24. In a sewing-machine the combination of a throat-bar having a throat and a cutting edge located at the side of the said throat, a needle, a knife located at an acute angle to the surface of the throat-bar, a fin located between the said knife and the said needle, means for operating the said needle and the said knife.

25. In a sewing-machine the combination of a throat-bar having a throat and a vertical cutting-surface located at the side of the said throat, a needle, a knife located at an acute angle to the surface of the throat-bar, a fin located between the said knife and the said needle, means for operating the said needle and the said knife.

26. In a sewing-machine the combination of an overhanging arm, a binder supported

by the said overhanging arm, a needle and a throat-plate, a knife located at an acute angle to the said throat-plate, a fin located between the said binder and the said knife, means for operating the said needle and the said knife.

27. In a sewing-machine the combination of an overhanging arm, a binder supported on the overhanging arm, a needle and a throat-plate, a knife located at an acute angle to the surface of the said throat-plate and adapted to cut underneath the said binder and at the side of and in close proximity to the said needle, means for operating the said needle and the said knife.

28. In a sewing-machine the combination of a throat-bar having a vertical throat, a needle, an under-cutting knife whose edge is adapted to strike the said bar in the direction of and at the side and in close proximity to the said needle, means for operating the said knife and the said needle.

29. In a sewing-machine the combination of a throat-bar having a throat, an under-cutting knife having elasticity whose edge is adapted to strike the said bar at the side and to move vertically along the side of the said throat, means for operating the said knife.

30. In a sewing-machine the combination of a knife, a needle located at the side of the said knife, means for operating the said knife and the said needle, a binder, the delivering end of the said binder located at the side of the said knife and in close proximity to the said needle.

31. In a sewing-machine the combination of a knife and a needle, means for operating the said knife and the said needle, a spring-pressed binder having one end located in close proximity to the needle and at one side of the said knife whereby a binding material may be directed to one of two pieces of fabric, while the said piece of fabric and the binding material are being sewed together and the other piece of fabric is being trimmed.

32. In a sewing-machine the combination of an overhanging arm, a knife and a needle, a spring-pressed binder supported on the said overhanging arm and having one end located in close proximity to the needle and on one side of the said knife whereby a binding material may be directed to one of two pieces of fabric, while the said piece of fabric and the binding material are being sewed together and the other piece of fabric is being trimmed.

33. In a sewing-machine the combination of a throat-bar having a throat and a cutting edge located at the side of the said throat, an under-cutting knife having elasticity whose edge is adapted to strike the said bar at the side and in the direction of the throat, means for operating the said knife.

34. In a sewing-machine the combination of a throat-bar having a vertical throat and a surface located at the side of the said throat and in close proximity thereto, an under-cutting knife having elasticity whose edge is adapted to strike the said surface at the side of and in the direction of the throat, means for operating the said knife.

35. In a sewing-machine the combination of a throat-bar having a throat, a vertical cutting-surface located at the side of and in close proximity to the said throat, an under-cutting knife having elasticity whose edge is adapted to strike the said surface at the side of and in the direction of the throat, a means for operating the said knife.

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

JOSEPH HIGGINS.

Witnesses:
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ALFRED E. OWENS.