H. UNGER.

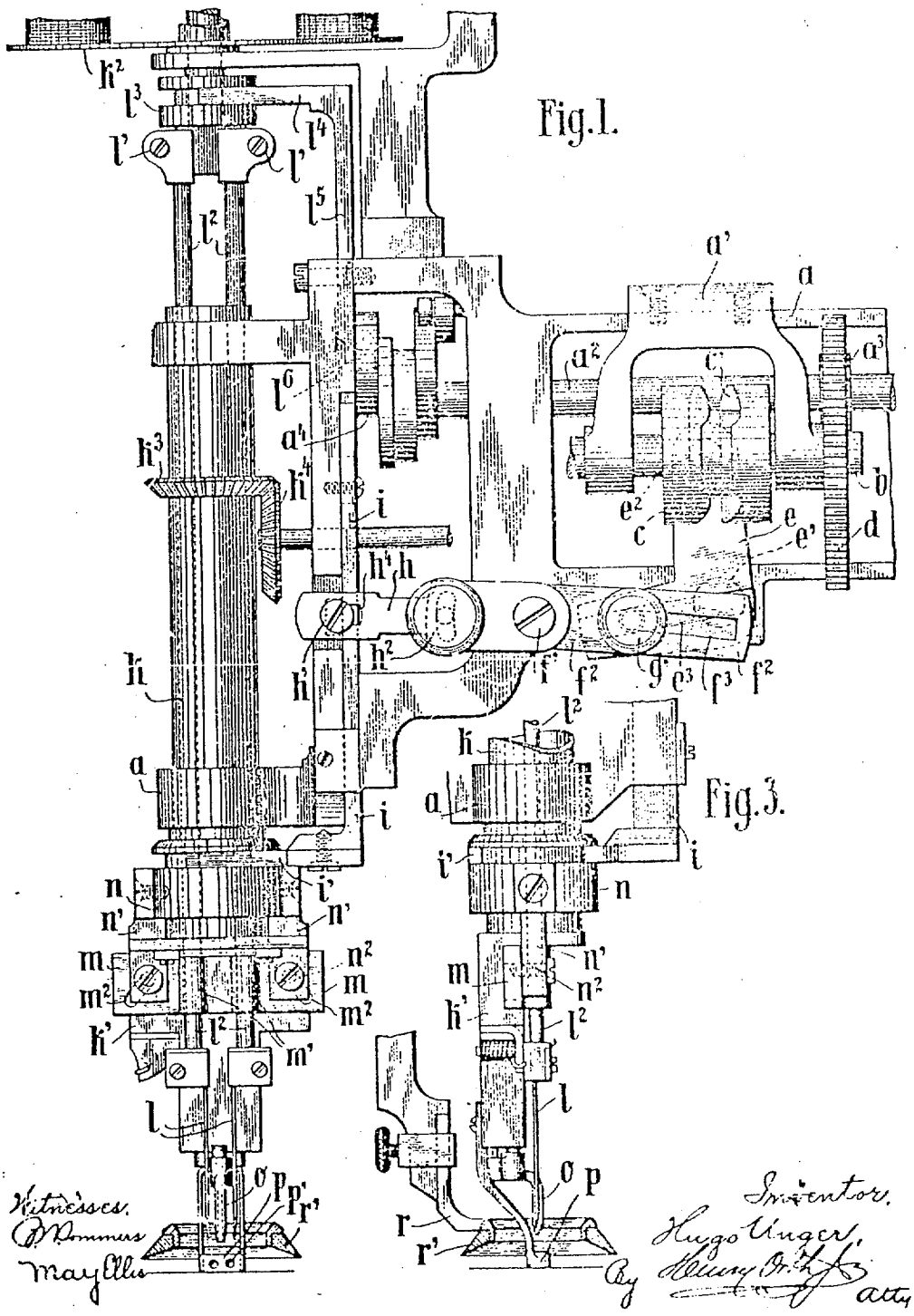
HEMSTITCHING MACHINE.

APPLICATION FILED OCT. 30, 1909.

988,050.

Patented Mar. 28, 1911.

2 SHEETS-SHEET 1.



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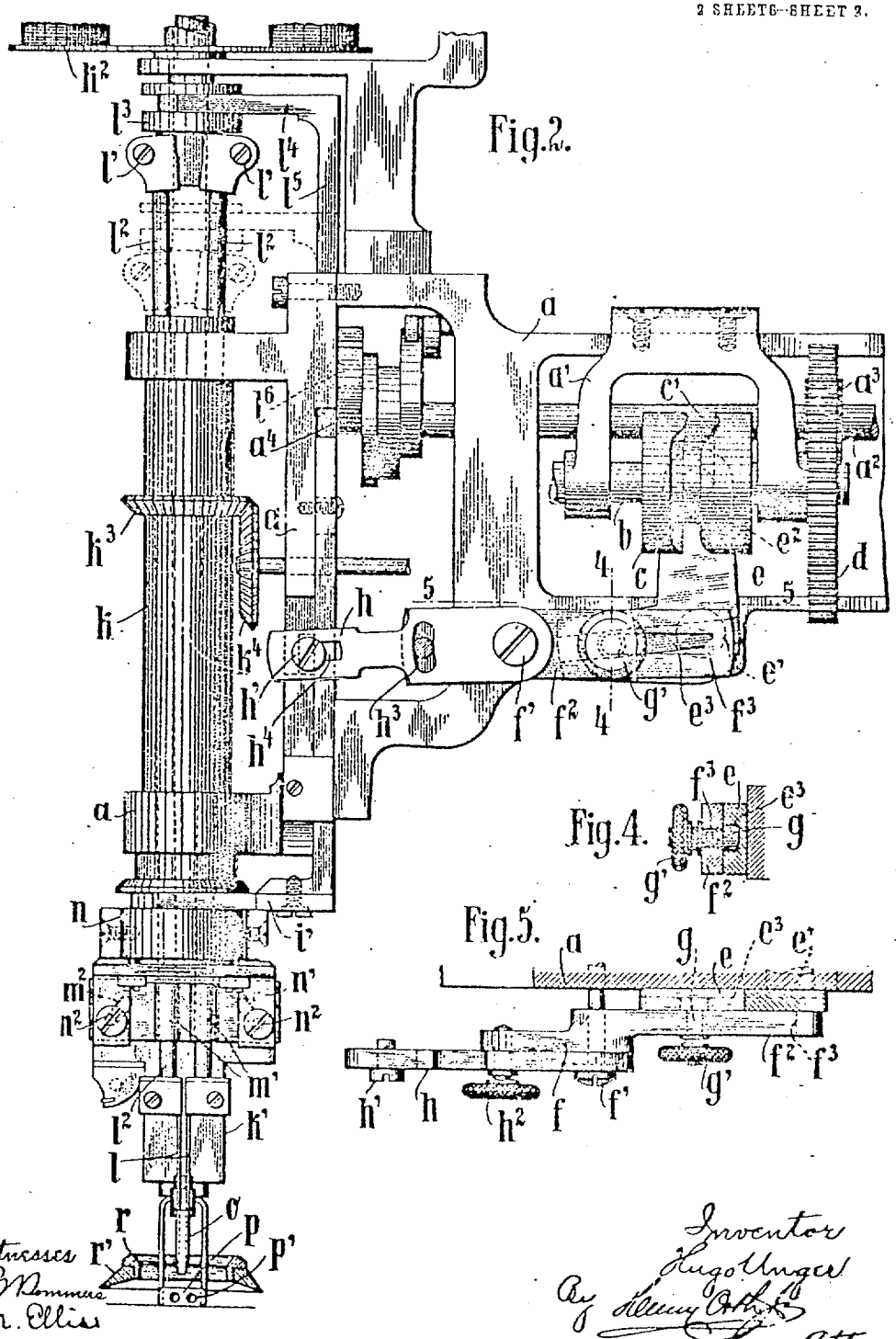

Fig. 2.

Fig. 4.

Fig. 5.

UNITED STATES PATENT OFFICE.

HUGO UNGER, OF BERLIN, GERMANY, ASSIGNOR TO LINTZ & ECKHARDT, OF BERLIN, GERMANY.

HEMSTITCHING-MACHINE.

988,050. Specification of Letters Patent. Patented Mar. 28, 1911.

Application filed October 30, 1909. Serial No. 525,473.

To all whom it may concern:

Be it known that I, HUGO UNGER, a subject of the King of Saxony, residing at Berlin, Germany, have invented certain new and useful Improvements in Hemstitching-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable other skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

My invention relates to hemstitch sewing machines and more particularly to the needle bar mounting mechanism and means for spreading the needles during the hemstitching operation, as will be hereinafter fully described and claimed.

Referring to the drawings, in which like parts are similarly designated, Figure 1 is an elevation of so much of the hemstitch sewing machine as is necessary for an understanding of my invention and shows the needles spread. Fig. 2 is a similar view showing needles in closed position. Fig. 3 is a side view partly in section. Fig. 4 is a section on the line 4—4 of Fig. 2 and Fig. 5 is a section on the line 5—5 of Fig. 2.

Mounted on the frame a of the machine is a bracket a' in which is mounted a short counter shaft b carrying a cam wheel c and a gear wheel d gearing with a similar gear a^3 on the driving shaft a^2 of the machine. The relation of the diameters of wheel d to wheel a^3 in the accompanying drawing is 3 to 1, however any other proportion may be used to produce a correspondingly altered stitch. The cam wheel c is provided with a cam groove c' which is so formed that the needles take up their innermost position during two stitches and move a part for each third stitch. In a known manner the cam may be so formed that the needles slightly move apart during the two inner stitches for the purpose of enlarging the stitch hole in the material. Pivoted on the frame of the machine at e' is a bell crank lever e, whose upright arm has a pin e^2 engaging the groove c' in the cam wheel c. The other arm of the said lever is connected to the arm f^2 of a double armed lever f, f^2 pivoted at f', this connection being effected by a bolt g which, guided in a slot f^3 in the lever arm f^2, moves in a groove e^3 in the horizontal arm of the lever e and may be fixed to the arm f^2 by means of a nut g'. By adjusting the bolt g from the point e' toward the point f' the throw of the lever f f^2 can be varied from zero to a maximum. A vertically reciprocable operating slide i on the machine frame may be actuated directly by the lever f f^2. It is however, more advantageous to connect the lever f f^2 with the slide i by means of an adjustable member, such as the lever h which is also pivoted at f' and by means of a screw h' passing through a slot h^4 pivotally connected with said slide. The lever h is provided with a slot h^3 through which passes an adjustable screw h^2 capable of clamping the lever h in angular relation to the lever f, f^2. The arcuate slot h^3 and the adjusting screw h^2 permit the adjustment of the lever h with respect to the lever f f^2 to adjust the end positions of the slide i without affecting the extent of movement of the slide i. On the head of the machine is revolubly mounted a tube k, which is actuated from the crank by means of the beveled wheels k^3 k^4 and within which the needle bars l^2 are freely suspended at l' from a collar l^3, said collar being engaged by a fork l^4 of a reciprocable slide l^5 operated from a shaft a^2 of the machine by means of an eccentric a^4 which is connected to a pivot l^6 fixed on the slide l^5.

k^2 is a spool holder.

It will be noted that the needle bars l^2 are suspended at their upper ends so that they are free to swing under the influence of a needle spreading mechanism. The lower end of each needle bar passes through a sleeve m', and each sleeve is on a slide m that is mounted on a supporting block k' secured to the end of the tube k. Each slide has a slot m^2, said slots being inclined to each other as shown. On the lower end of the tube k is a collar n engaged by the fork i' of the slide i and depending from this collar on each side of the tube k are brackets n' in which are screws or actuating pins n^2 taking into the slots m^2. The collar n is slidable but not rotatable on the tube k and consequently when it is depressed relatively to this tube the pins n^2 taking into the slots m^2 by reason of the inclination of the latter

forces the slides m together. The piercer o fixed in a known manner between the needles l has two lateral grooves in its sides into which the needles l, secured at the end of the needle bars l^2, may rest when in their inward position, Fig. 2. The presser foot p is also provided with two holes p', Figs. 1 and 2, through which the decorating thread is passed, and which, during the movement of the fabric by reason of the piercer o passing through the goods, is held elevated during the piercing operation in the customary manner.

r is a fabric stretcher containing as usual a rubber ring r' having beveled edges so as to uniformly stretch the fabric in all directions and at the same time prevent the fabric from wrinkling during the hemstitching operation.

The operation of the device is as follows: The spreading of the needles takes place by reason of the cam wheel c operating during two stitches of the needles l so as to actuate the slides m so far inward *i. e.* toward the piercer o, Fig. 2, that they only have a small spreading movement for the purpose of opening the hole made in the fabric. Before the third stitch the collar n is raised by the fork and slide $i\,i'$ and the lever mechanism $h\,f\,f^2\,e$ so that the pins n^2 carried in the depending lugs n' of the collar n will be moved upward and in so doing move the slide m outward to the required extent, (Fig. 1). The extent of spreading of the needles l is controlled by the adjustment of the bolt g to and from the pivot e' as above described. By adjusting the lever h with respect to the lever arm f, the collar n and the slide i are varied in height whereupon the slides m are either spread or brought together and the needle bars correspondingly moved. By this means the distances between the inner and the outer row of stitches is altered. By altering the relative proportion of the gearing $a^3\,d$ the number of the inner and the outer stitches can be altered, so that for example for each two inner stitches two or more outer stitches will be made.

Claims.

1. In a hemstitching machine, the combination with the frame and the driving shaft, of a gear wheel on the shaft, a bracket mounted on the frame, a counter shaft mounted in the bracket, a cam and a gear wheel that meshes with the aforesaid gear wheel on the counter shaft, a bell crank lever pivoted to the frame one arm of which is actuated by the cam and the other arm of which has a slot, a composite lever comprising a slotted section, an adjusting screw in the slots of said section and bell crank lever, a second section and a third section having two slots, the second and third sections secured to the first section, an adjusting screw passing through one of the slots in the third section into the second section, a reciprocable slide having a fork, and a screw passing through the second slot into the slide, a tube mounted rotatably in the frame, a collar slidable, but not rotatable on the tube and engaged by the fork of said slide, slides mounted to move transversely on the tube, each having an inclined slot and a sleeve, two lugs depending from the collar, a pin in each lug taking into a slot in a slide, a needle bar suspending collar, an actuating slide therefor, two needle bars independently and pivotally connected to the needle bar collar, the lower end of each needle bar passing through a sleeve on a slide.

2. In a hemstitching machine, the combination with the frame and the driving shaft, of a gear wheel on the shaft, a bracket mounted on the frame, a counter shaft mounted in the bracket, a cam and a gear wheel that meshes with the aforesaid gear wheel on the counter shaft, a bell crank lever pivoted to the frame one arm of which is actuated by the cam and the other arm of which has a slot, a composite lever comprising a slotted section, an adjusting screw in the slots of said section and bell crank lever, a second section and a third section having two slots, the second and third sections secured to the first section, an adjusting screw passing through one of the slots in the third section into the second section, a reciprocable slide having a fork, and a screw passing through the second slot into the slide, a tube mounted rotatably in the frame, a needle bar collar, means to reciprocate the collar, needle bars pivoted to the collar, needle bar spreading devices mounted at the end of the tube and actuated by the slide.

3. In a hemstitching machine, a rotatable tube, a collar, needle bars pivoted thereto and passing through the tube, a second collar slidable, but not rotatable on the tube, slides mounted to move substantially transversely of the tube, each having an inclined slot and a guide sleeve, the lower end of each needle bar passing through a sleeve, pins carried by the second collar to engage the slots to actuate the slides and a lever to actuate the slide.

4. In a hemstitching sewing machine having a driving shaft the combination with a collar, and rigid reciprocable needle bars pivoted thereto at their upper ends, of slides through which the bars pass, mechanism to actuate the slides from the shaft, including means to adjust the spread of the needle bars and means to adjust the inner and outer limits of the bars.

5. In a hemstitch sewing machine having a driving shaft the combination with reciprocable needle bars pivoted at their upper ends, slides through which said needle

bars pass each having a cam slot, means to engage the slots and mechanism to operate said means from the shaft including a composite lever having means to adjust the spread of the bars and means to adjust their inner and outer limits.

6. In a hemstitching machine the combination with a main shaft and laterally vibratable needle bars; of a cam actuated from the main shaft, a bell-crank lever operated by the cam, a two-part lever adjustably connected to the bell-crank to vary the lateral vibration of the needle bars, means to adjust one of the parts of the lever with respect to the other to vary the distance between the rows of stitches and means to operatively connect said lever to the needle bars.

7. In a hemstitching machine, the combination with pivoted needle bars; of guides for the lower ends of said bars, a collar reciprocable but non-rotatable with respect to the needle bars, means carried by the collar to coöperate with and operate the guides, a slide to actuate the collar and a two-part adjustable lever to actuate the slide and means to vary the angular relation of the two parts of the lever.

8. In a hemstitching machine, the combination with a needle bar support and means to reciprocate it; of needle bars pivoted at their upper ends to the support, needle bar spreading devices including a lever to adjust the distance between the needle bars to regulate the distance between the rows of stitches and a secondary lever to which the former lever is adjustably secured to vary the extent of lateral vibration of the needle bars.

9. In a hemstitching machine, a needle bar supporting collar, means to reciprocate the collar and in which said collar is rotatably mounted, needle bars pivoted to the collar at their upper ends, guides for the lower ends of the bars, means to adjust the distance apart of the guides, means to spread the needle bars, and means to rotate the needle bars about an axis common to them.

10. In a hemstitching machine, a needle bar supporting collar, means to vertically reciprocate the collar and in which the collar is rotatably mounted, a tube, means to rotate it, a collar on the tube, guides on the lower ends of the tube in which the needle bars are guided and having inclined slots, means to actuate the second collar, pins carried thereby to enter the slots in the guides, a slide to actuate the second collar, and means to actuate the slide for actuating the collar and guides, including means to adjust the distance apart of the needle bar guides to vary the distance apart of the rows of stitches and means to adjust the spread of the guides from zero to a maximum to vary the extent of lateral vibration.

In testimony that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

HUGO UNGER.

Witnesses:
JOHANNES HEIN,
HENRY HASPER.