(No Model.)

5 Sheets—Sheet 1.

F. O. JERRAM.

SEWING MACHINE.

No. 602,988. Patented Apr. 26, 1898.

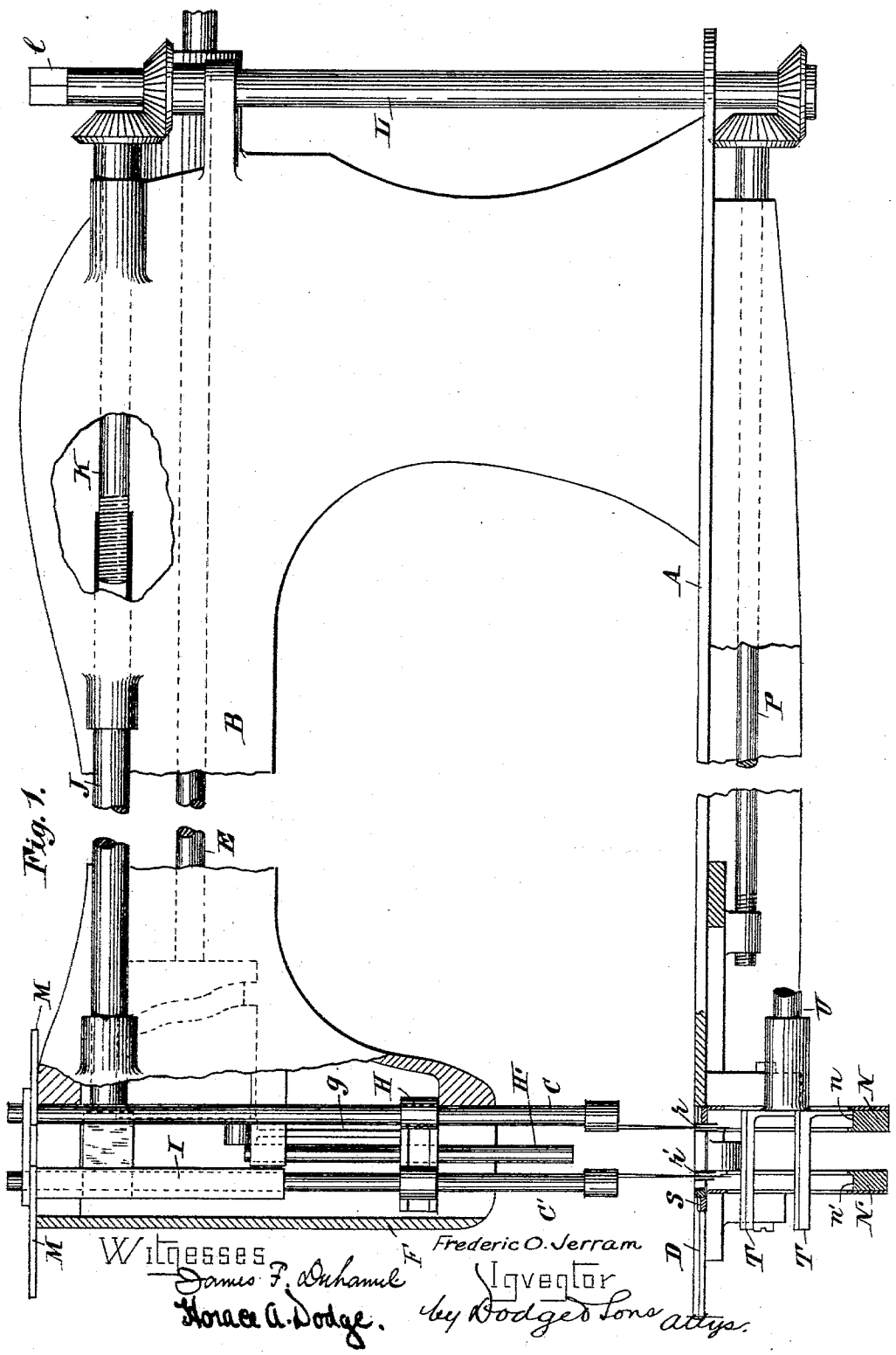

Fig. 1.

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(No Model.)

5 Sheets—Sheet 2.

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Fig. 2.

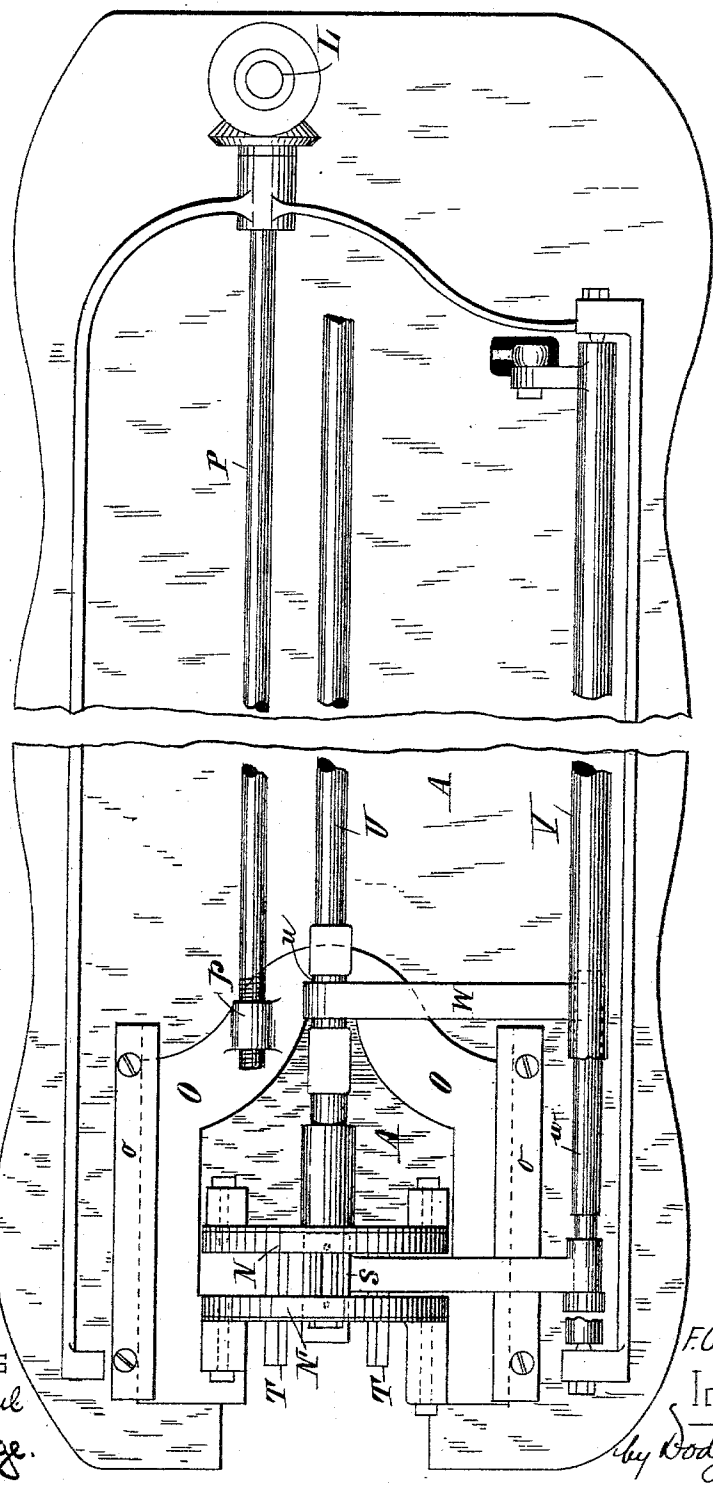

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Fig. 2a.

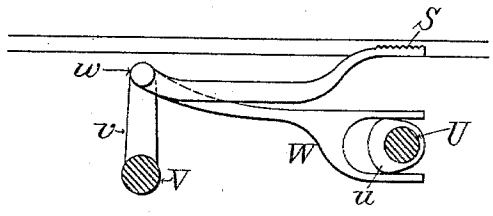


Fig. 7. Fig. 7a.

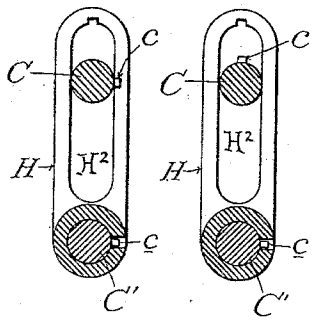


Fig. 7b.

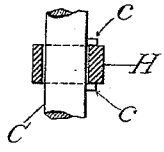
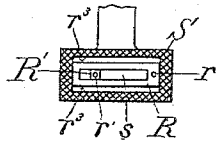


Fig. 11.



Witnesses

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(No Model.) 5 Sheets—Sheet 4.

F. O. JERRAM.

SEWING MACHINE.

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Fig. 3.

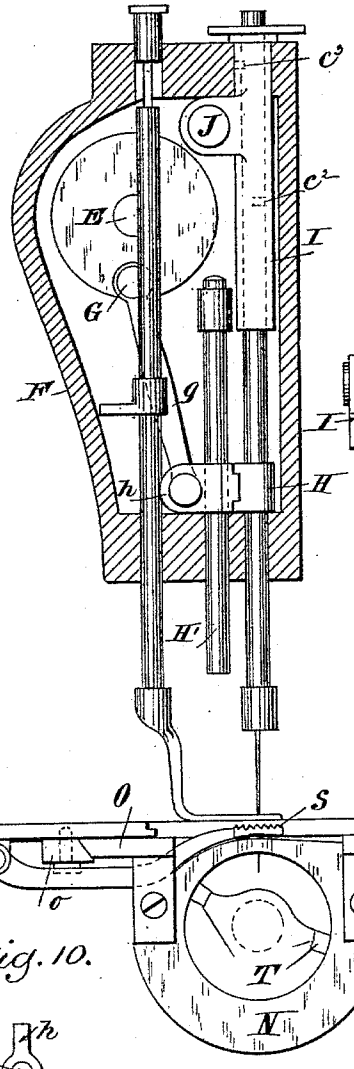


Fig. 5.

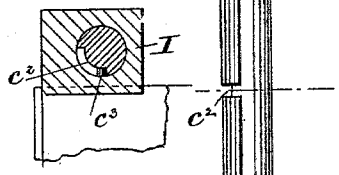


Fig. 9.

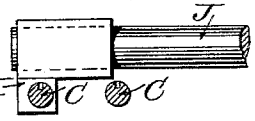


Fig. 4.

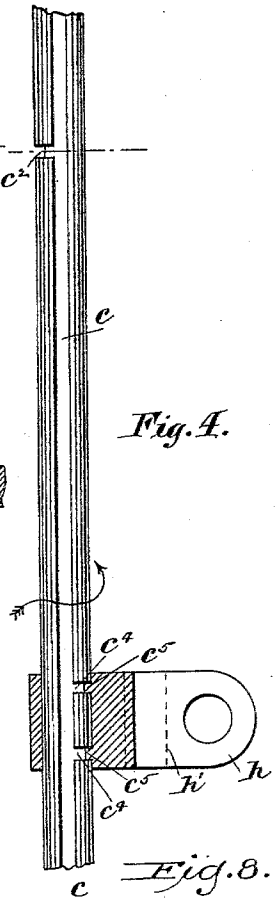


Fig. 8.

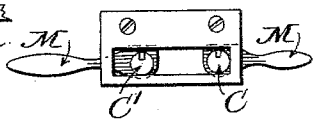


Fig. 10.

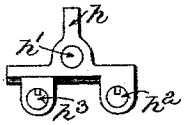
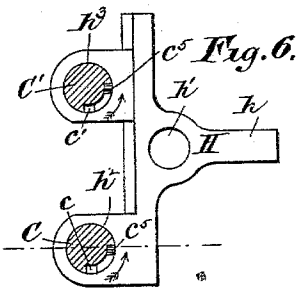


Fig. 6.



Witnesses
James F. Duhamel
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(No Model.) 5 Sheets—Sheet 5.

F. O. JERRAM.

SEWING MACHINE.

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Fig. 13.

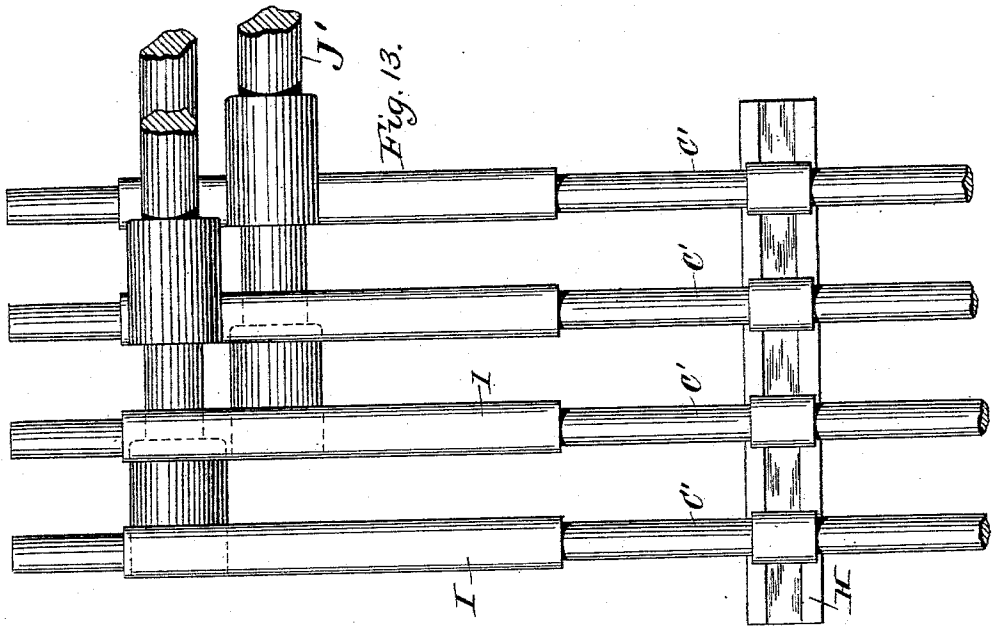
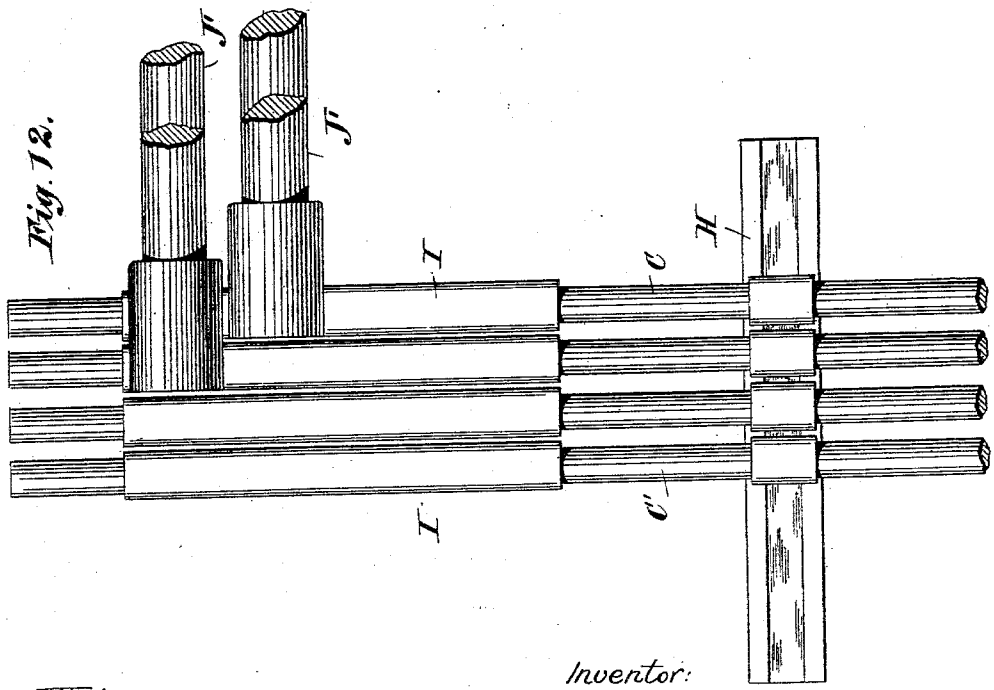


Fig. 12.



Witnesses:
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Inventor:
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

FREDERIC O. JERRAM, OF LIVERPOOL, ENGLAND.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 602,988, dated April 26, 1898.

Application filed April 7, 1893. Serial No. 469,490. (No model.) Patented in England February 24, 1893, No. 4,149.

To all whom it may concern:

Be it known that I, FREDERIC OLDERSHAW JERRAM, a subject of the Queen of Great Britain, residing at Liverpool, in the county of Lancaster, England, have invented certain new and useful Improvements in Sewing-Machines, (for which I have received Letters Patent in Great Britain, No. 4,149, dated February 24, 1893,) of which the following is a specification.

This invention relates to improvements in sewing-machines, the object of these improvements being to provide a sewing-machine in which two or more parallel rows of stitches may be sewed at the same time and at any suitable distance apart; also, to enable the needle bar or bars to be thrown in or out of gear to facilitate turning corners or to enable the machine to be employed as a single-needle machine.

The invention will be best understood from the following description, reference being had to the accompanying drawings, in which—

Figure 1 is a front elevation, partly in section, of a sewing-machine constructed in accordance with my invention, parts being partially broken away to show the mechanism more clearly; Fig. 2, an inverted plan of the machine; Fig. 2^a, a side view illustrating the feed mechanism; Fig. 3, a cross-section through the head; Fig. 4, an enlarged view of part of one of the needle-bars; Figs. 5 to 11, inclusive, views of parts of the machine detached from the residue; and Figs. 12 and 13, side elevations showing how several needle-bars may be applied for sewing parallel rows of stitches.

In order that the invention may be fully understood, representations of the principal parts of a sewing-machine are shown on the drawings aforesaid.

The general form of the machine which I have depicted to enable me to describe my invention does not differ materially from that of many shuttle-machines in common use, and it will be readily understood that my improvements may be applied to various other types of machines working on the shuttle or rotating-hook principle.

Referring to Figs. 1 to 11, inclusive, of the drawings, A is the bed-plate; B, a strong arm to support the needle-bars C C′ above the cloth-plate D; E, a driving-shaft extending through the needle-arm B to drive the needle-bars, and F the head of the needle-arm. Motion is imparted to the needle-bars C C′ from the driving-shaft E through the intervention of a crank-pin G and connecting-rod *g*, also the cross-head or link H, to which one end of the connecting-rod is coupled. The needle-bar C is arranged to work up and down in one uniform position like a single-needle machine, but the other, C′, is arranged in such a manner as to be adjustable as regards its distance from the fixed needle-bar and to sew a line of stitches at any required distance within certain limits from the line of stitches sewed by the needle-bar C. This is accomplished by providing a suitably-shaped sleeve or guide I, Figs. 1, 3, and 9, in which the movable needle-bar C′ can move up and down vertically. The sleeve is so mounted within the head F that it can be moved transversely toward or away from the fixed needle-bar C in order to adjust the distance between the parallel rows of stitches, at the same time retaining the needle-bar truly vertical and parallel to the other needle-bar. The sleeve I is mounted on and secured at right angles to the end of a non-rotatable rod J, which is capable of sliding horizontally in suitable bearings in the arm B.

K is a (non-sliding) rotary spindle, the end of which is screwed into the end of the rod J, and L is a vertical rotary spindle gearing with the horizontal spindle K by means of bevel-wheels. By rotating L by means of a hand-wheel or keys placed on the square shank *l* a sliding motion is imparted to the rod J, and thus the sleeve I, with its needle-bar C′, is moved toward or away from the fixed needle-bar C, as may be required. The cross-head H aforesaid, which is shown in plan in Figs. 6 and 10 (and also in Fig. 7, hereinafter described) and in other positions in Figs. 1, 3, and 4, is adapted to slide up and down by the motion of the crank-pin G and connecting-rod *g* and is guided by the guide-bar H′.

h is the shank to which the connecting-rod is coupled; *h*′, the hole for receiving the guide-bar H′; h^2 and h^3, the holes for receiving the needle-bars C C′.

It will be noticed that the slide in which

the hole h^3 is formed is mounted on the cross-head H in such a manner as to be adjustable as regards its distance from the hole h^2 without interfering with the means for driving the cross-head and needle-bars up and down. The needle-bars are each made with slots c c', running perpendicularly their entire length, or nearly their entire length, these two slots being adapted to receive the projecting pins c^5 in the holes h^2 h^3. Near the top of each needle-bar I form a small slot c^2, intersecting (and at right angles to) the longitudinal slots. The cross-slot in the needle-bar C′ is so made as to engage, when required, the stationary pin c^3 in the sleeve I, and the cross-slot in the needle-bar C a stationary pin located in the head. Near the bottom ends of both needle-bars I form similar cross-slots c^4, but running in the opposite direction to those at the top. Now it will be seen that by slightly revolving the needle-bars C or C′ the pins c^5 in the cross-head engage the cross-slots in the needle-bars, and the needle-bars and cross-head are thus coupled together, so as to move simultaneously up and down, being operated by the connecting-rod to which the cross-head is connected. When it is desired, however, to take either of the needle-bars C C′ out of gear, all that is necessary is to disconnect them from the cross-head by slightly rotating the needle-bar, so as to disconnect the pins from the cross-slots c^4. For the purpose of facilitating this movement small levers M are employed at the top of the head, through which levers the needle-bars pass, and they are each provided with a pin, Fig. 8, which engages the slots in the needle-bars. By these levers M either needle-bar can be rotated in an arc of forty-five degrees, by which means the needle-bars can be released from the pins c^5 in the cross-head and simultaneously engaged by means of the stationary pins c^3 falling into the slots c^2. The result is that the cross-head slides up and down on the needle-bars without actuating the latter, the pins c^5 sliding idly in the groove c. Both needle-bars can be thus released, or one needle-bar only may be liberated, while the other one is operated by the cross-head H.

The two shuttles are carried in races in any suitable manner. In the example shown circular shuttle-races N N′ are constructed with internal peripheral grooves n n' to receive and guide the rims of the shuttles, and a segment of the front side of these shuttles is constructed to turn edgewise upon a hinge, so as to facilitate the insertion and removal of the spools. One of these races N is secured to the frame A and is immovable. The other, N′, is secured to a carrier O, adapted to slide in guides o in a direction at right angles to the rows of stitches. A convenient way of imparting the requisite motion to the sliding carrier is to provide a horizontal rod P, the end of which is screwed into a nut p, fixed in the carrier O. By rotating this rod P the requisite motion is imparted to the carrier.

The shuttle-race carrier O and the needle-bar sleeve I are so arranged that they can be simultaneously moved in the same direction, whereby the position of the movable shuttle-race N′ relatively to the movable needle-bar C′ can be adjusted to a nicety. This is accomplished by gearing the rotary rod P, operating the carrier O, with the rotary spindle K, operating the needle-bar sleeve I by means of the vertical spindle L, hereinbefore described. By rotating this vertical spindle L, therefore, the horizontal spindles are both simultaneously rotated, and the adjustable needle-bar C′ and shuttle-race N′ are thus adjusted to a nicety by means of the screw-threads in spindles K and P.

The needle-plate, Figs. 1 and 11, is made in two parts, one part R being conveniently fixed and the other part R′ being adjustable. The former has in it the usual throat r, through which the needle passes, and is fixed permanently below the needle. The other part R′ is movable longitudinally in the slot s of the needle-plate R in the same direction as that in which the movable needle-bar C′ is adjustable and is provided with a needle-throat r', through which the needle may pass. The portion R′ of the needle-plate forms a part of the movable shuttle-race N′, and it is adjustable with it and therefore always remains in the same position relatively to the adjustable needle-bar.

The feed-plate S, Figs. 1 and 11, is made to feed at the front, back, and sides, and for this purpose it is made open and the needle-plate R and R′ placed within it, a space r^3 being left on both sides of the plate R.

The shuttle-driver T, Figs. 1, 2, and 3, is made to extend the full width that the needle-bar C′ and shuttle-race N′ are capable of being adjusted. It is driven by the rock-shaft U, which receives its rocking motion in any suitable manner. The lifting motion for the feed S is given by this rocking shaft, which has for this purpose a cam u upon it. The cam operates the arm W on the shaft w, and so gives a rocking motion to the feed S. (See Fig. 2ª.) The means employed for giving the to-and-fro motion to the feed S consist in connecting the shaft w with rock-shaft V by arms or in other suitable manner, and the vibration of these arms caused by the rocking motion of the shaft U produces the longitudinal movement of the feed S. The two rock-shafts U and V support the shaft w and feed S between them.

I have described one way in which my invention may be carried into effect; but I wish it to be understood that it may be applied to almost any type of sewing-machine; also, that a feather c, Figs. 7, 7ª, and 7ᵇ, may be applied to the needle-carrying bars instead of the slot c, Fig. 6, this feather being merely a mechanical equivalent of the slot. In Figs.

7, 7^a, and 7^b, H is the cross-head, in which is formed a slot H^2 for the bar C to slide transversely, and C′ the other needle-bar. In the position shown in Figs. 7 and 7^b the cross-head H has engaged the feathers, the latter being cut away at one part to enable this to be done. The needle-carrying bars are therefore driven up and down by the motion of the cross-head. By rotating one or both of the needle-bars forty-five degrees the feathers *c* are released from engagement with the cross-head H, but are simultaneously engaged by the pin c^3 in the sleeve I and the corresponding pin in the head, hereinbefore described, whereby the needle-carrying bars are held stationary and the cross-head slides up and down by the motion of the crank-pin and connecting-rod.

It will be obvious that my invention is equally well adapted for sewing more than two rows of stitches, if desired, by merely adding one or more needle-carrying bars and shuttle-races and adding to or duplicating the various other parts of my invention. Figs. 12 and 13 show how this may be done, C′ being four needle-carrying bars, H the cross-head for driving the same, I′ the sleeves, and J′ sliding rods on which the said sleeves are mounted. Two of these sliding rods are in front of the arm B and two are behind, and the eyes on the sleeves for receiving the rods are arranged to correspond. Each rod is connected with its shuttle-race in a similar manner to that before described, so that as each needle-carrying bar is adjusted it simultaneously adjusts its shuttle-race. Fig. 12 shows the needle-bars arranged to sew rows of stitches near together. Fig. 13 shows the needle-bars adjusted to sew rows of stitches farther apart. The various other parts of this four-needle machine are substantially duplicates of the two-needle machine hereinbefore described and do not, therefore, need further detailed description.

I am aware that it is not new to provide a sewing-machine with two heads, to mount within each of said heads a needle-bar, and to move one of said heads and the contained needle relatively to the other or fixed head. I am also aware that it has been proposed to provide the main needle-bar with lateral supports upon which are mounted one or more auxiliary needle-bars. My invention differs from these prior plans in that all of the needle-bars are mounted within a single fixed head and also in that the needle-bars are independent of each other, capable of being connected with or disconnected from the operating mechanism at will.

I declare that what I claim is—

1. In combination with a fixed head; a main needle-bar C and the horizontally-adjustable needle-bar C′ mounted in said head; a slide-bar H′; a vertically-moving cross-head H mounted thereon with which needle-bar C is connected; a horizontally-sliding block h^3 for the lower end of the needle-bar C′; and means for moving said block laterally upon the cross-head.

2. The combination with the rotatable needle-bars C and C′ provided with longitudinal and cross slots as described; of the cross-head H and means for imparting a reciprocating motion to said bars, said cross-head being provided with pins to engage the slots in the bars; said means comprising a crank-pin and connecting-rod for imparting motion to the cross-head; and means for rotating the needle-bars about their axes, whereby one or more of the needle-bars may be positively locked to the cross-head, substantially as described.

3. The combination of the head and stationary pins thereon; of two needle-carrying bars C and C′, the cross-head H, and means for releasing the said bars from the cross-head, and engaging the same with the stationary pins in the head, substantially as described.

4. In a sewing-machine, in combination with the fixed head and its pins; the needle-bars C C′ having longitudinal slots *c c′* formed with cut-away portions as described, the cross-head H having feathers formed therein to enter the slots in the said bars, and means for rotating one or more of the needle-bars in an arc of forty-five degrees, whereby they can be released from or engaged by the fixed head and simultaneously engaged by or released from the cross-head, substantially as described.

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

F. O. JERRAM.

Witnesses:
A. E. JERRAM,
G. C. DYMOND.