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A. O. TOWNS.

SEWING MACHINE.

No. 565,816. Patented Aug. 11, 1896.

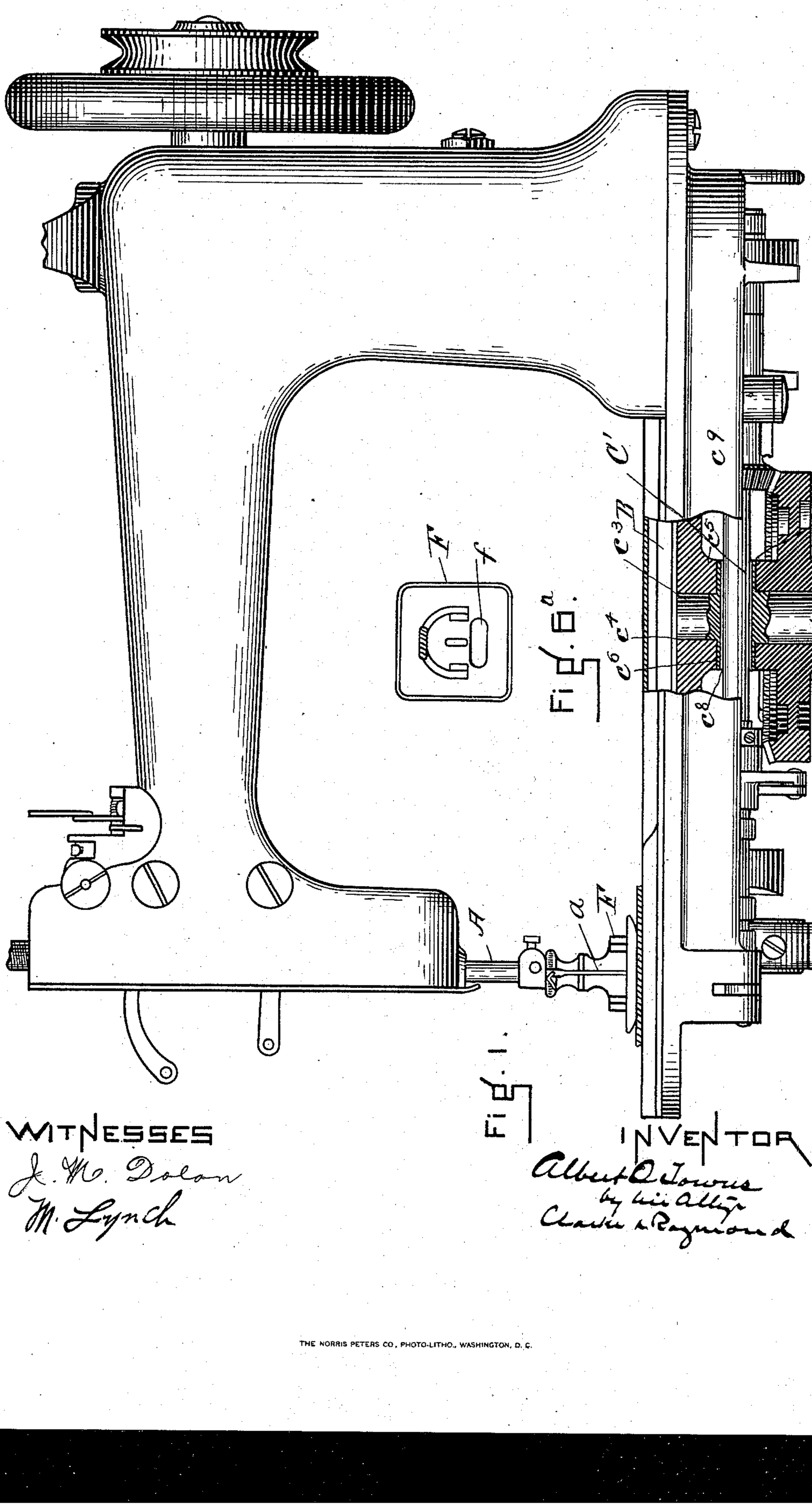

Fig. 6a.

Fig. 1.

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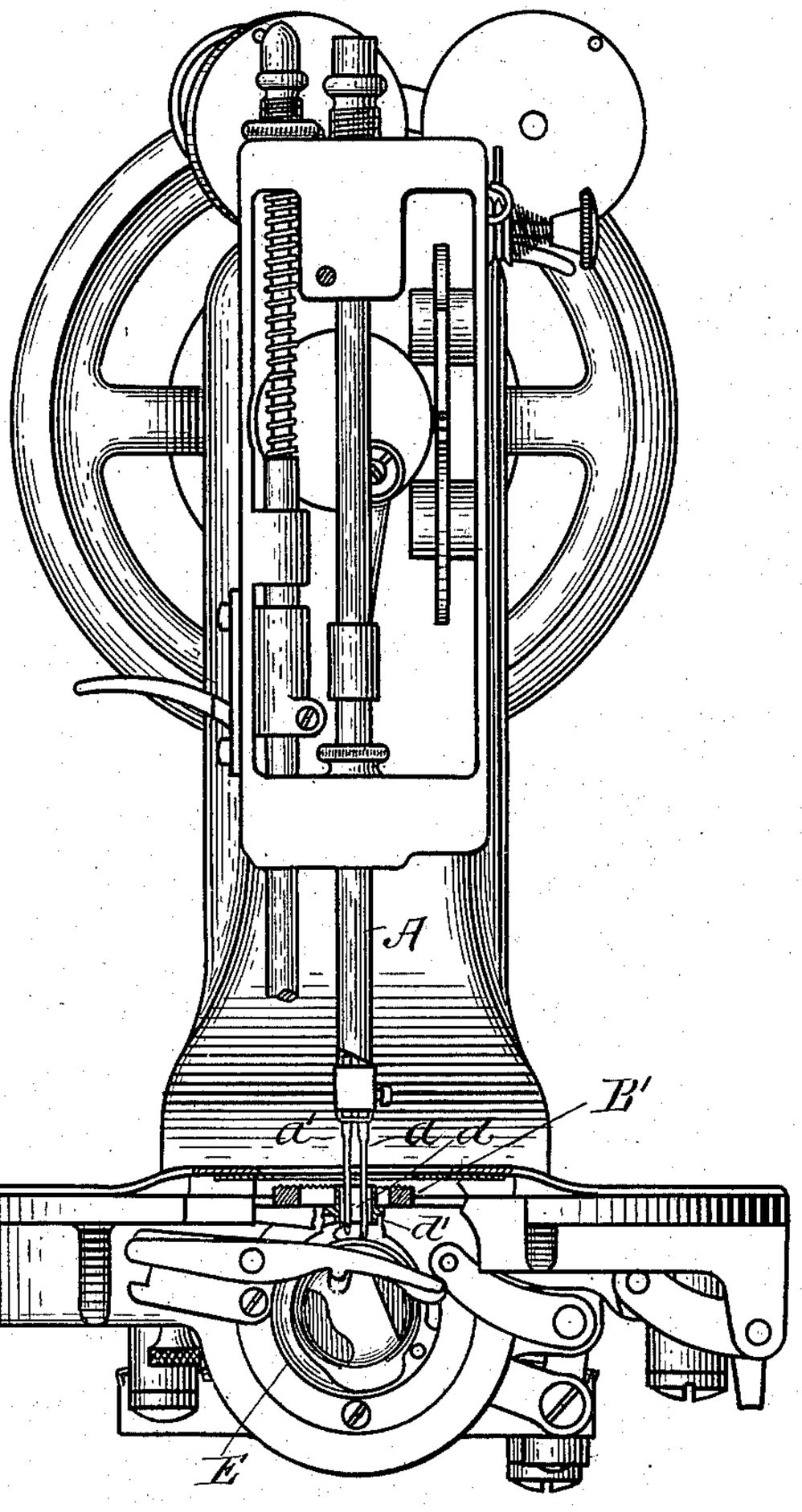

Fig. 2

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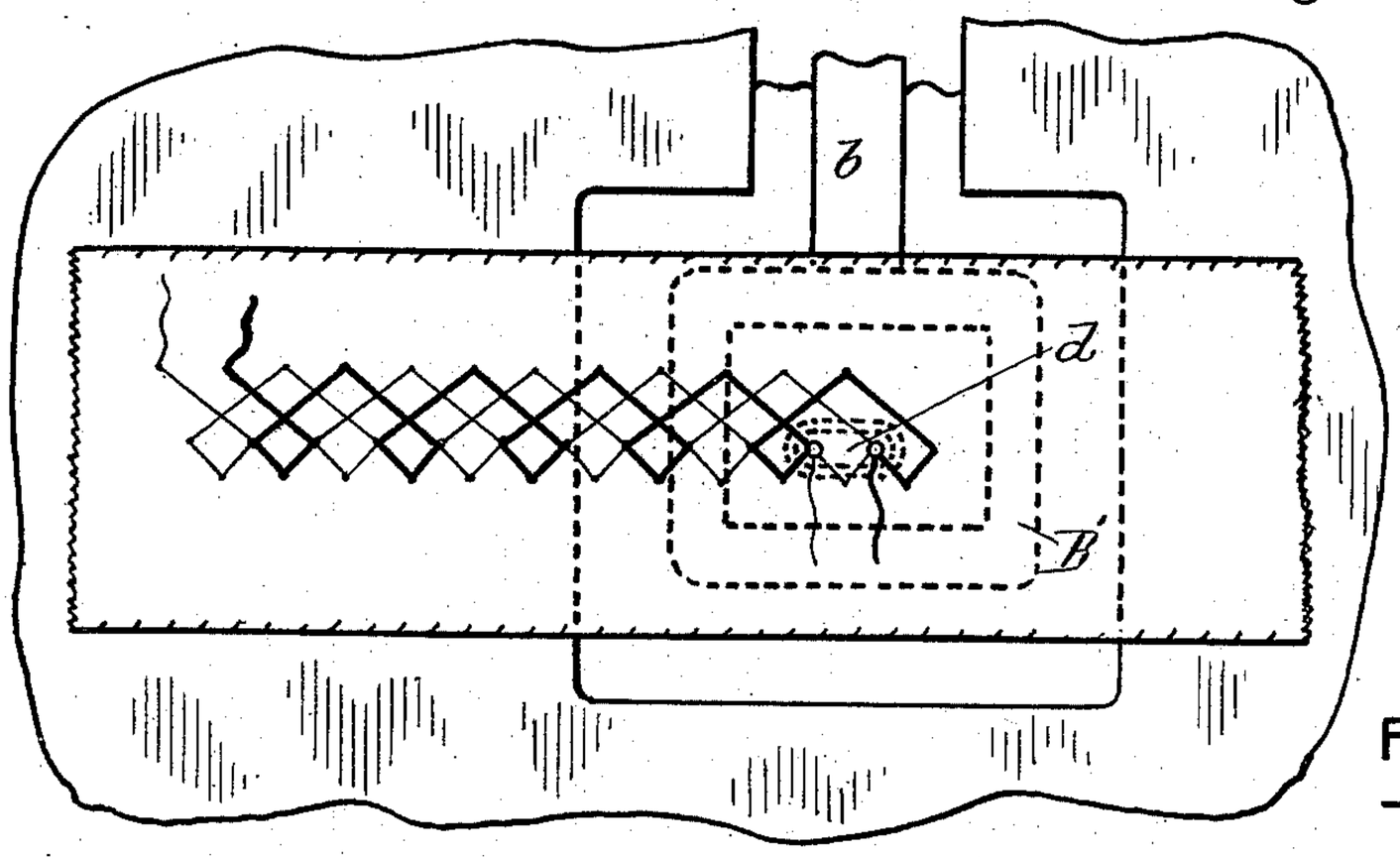

Fig. 4.

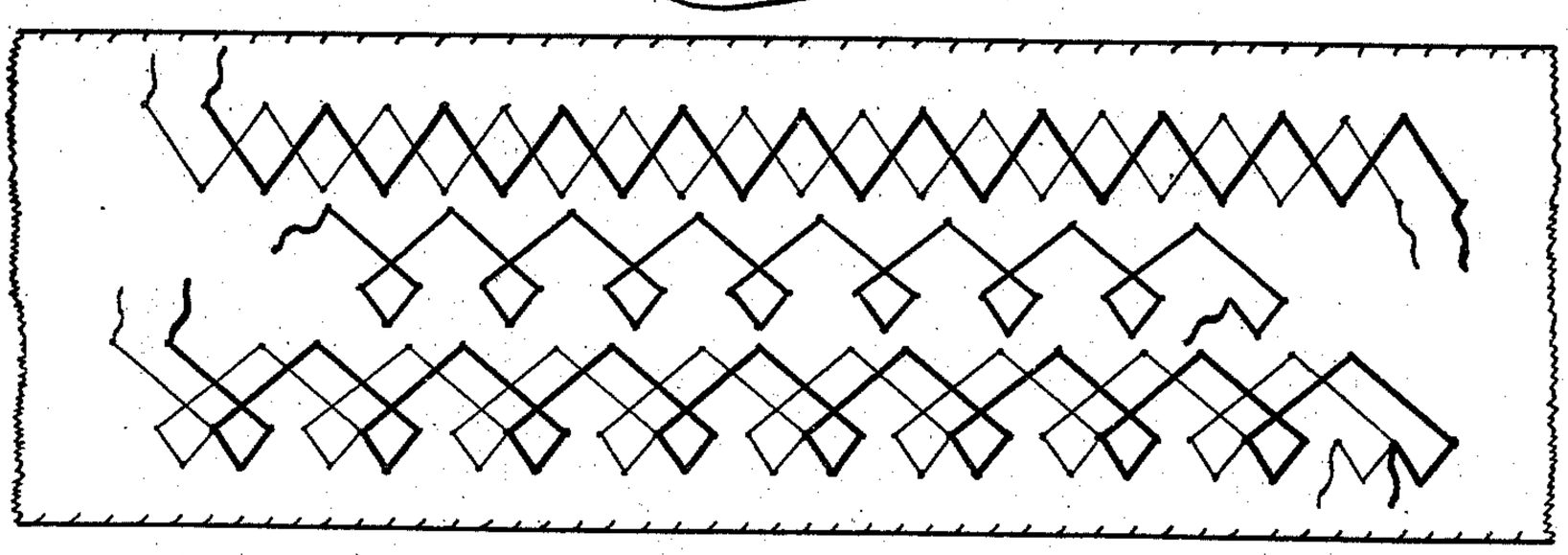

Fig. 5

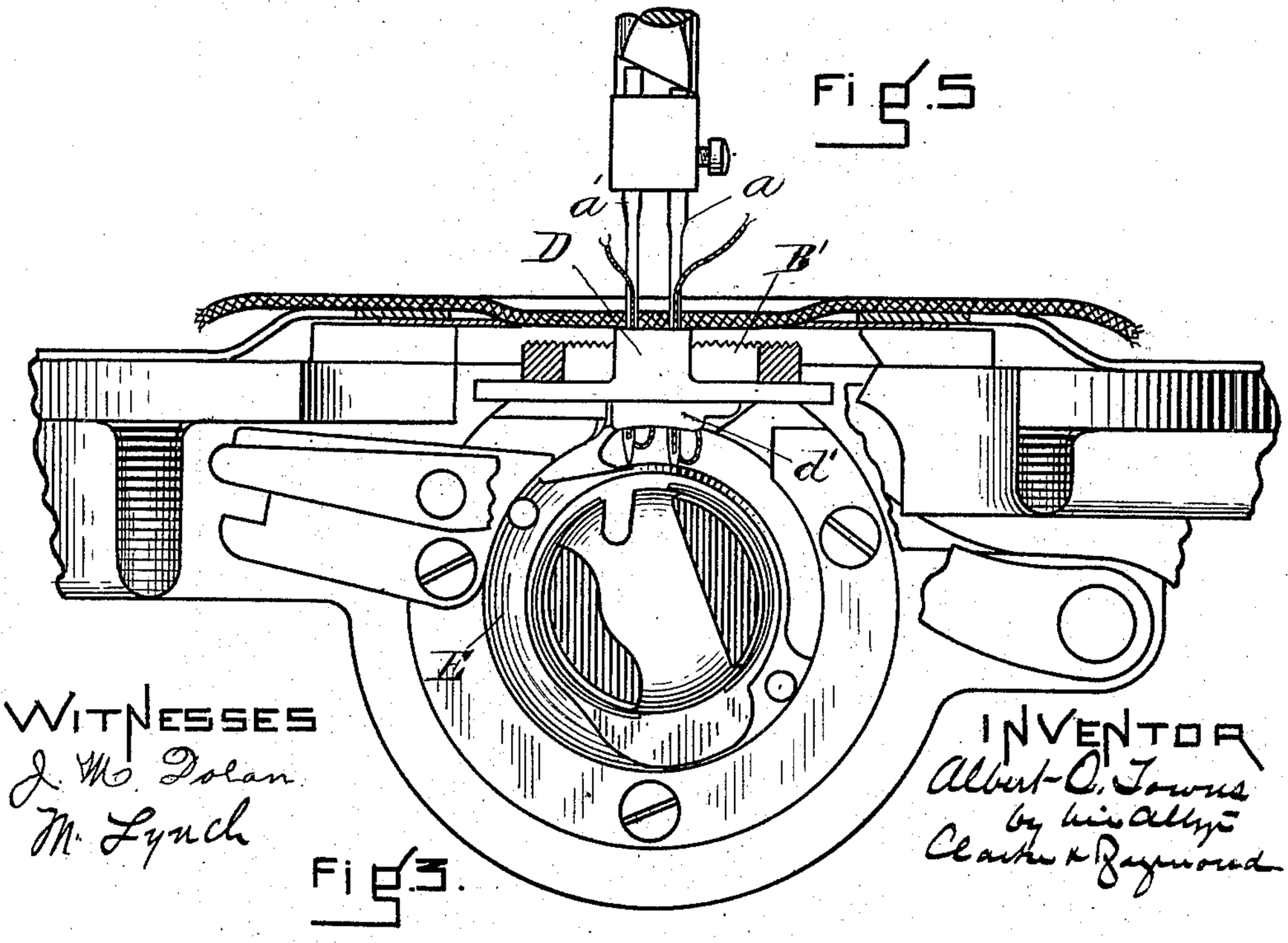

Fig. 3.

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SEWING MACHINE.

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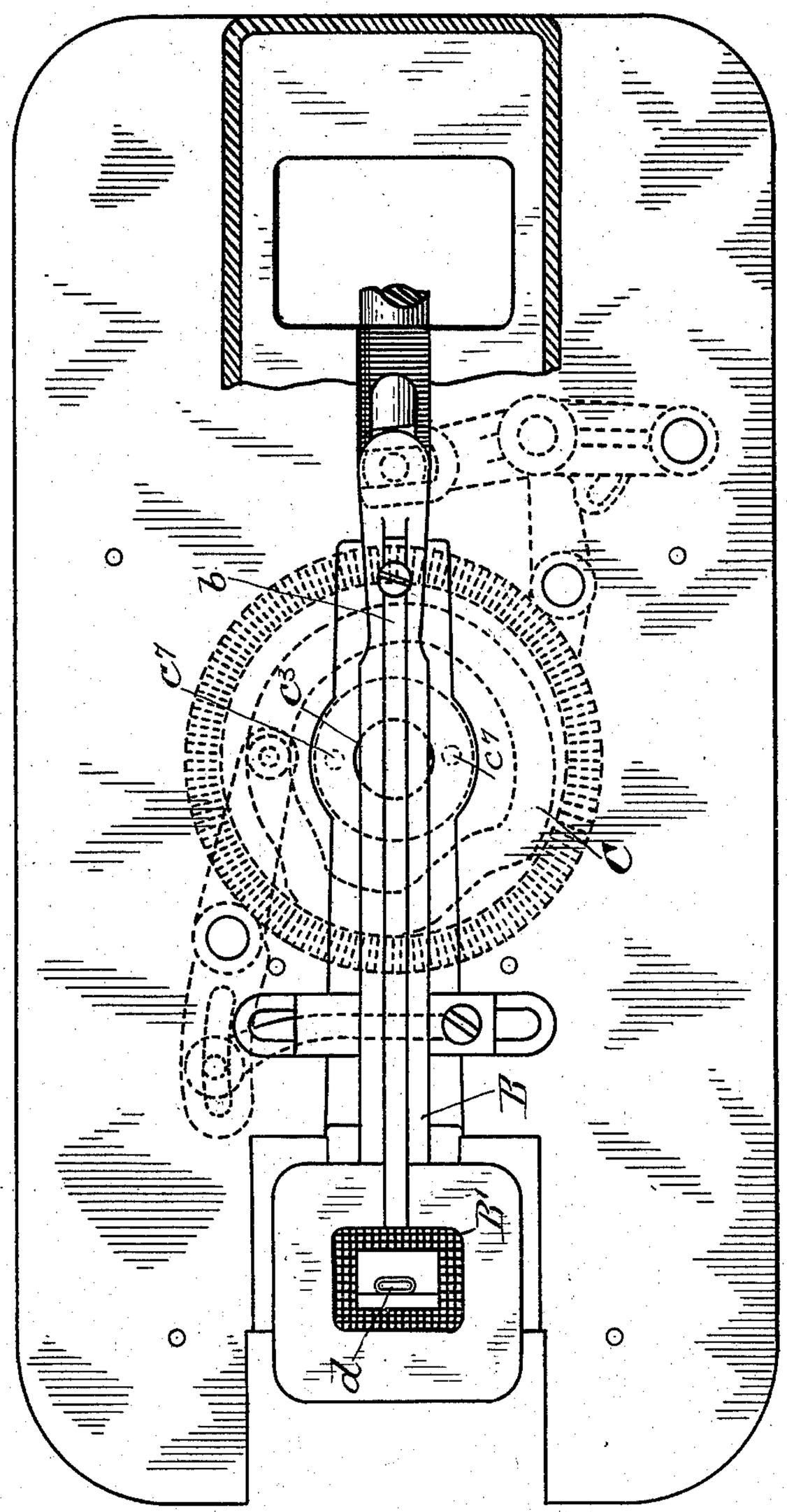

Fig. 6.

WITNESSES.

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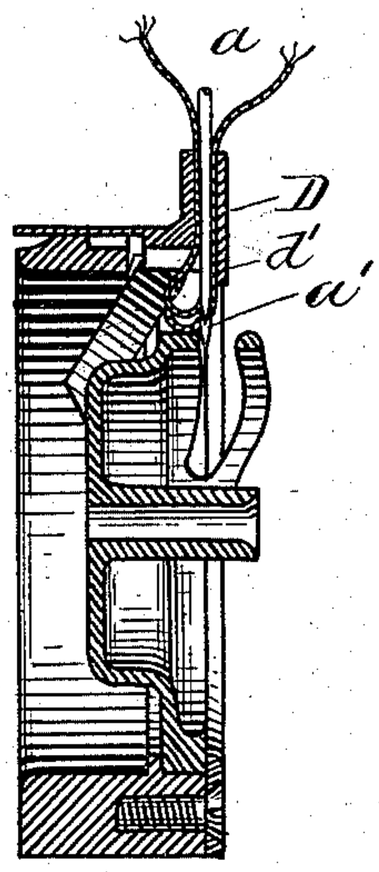

Fig. 7.

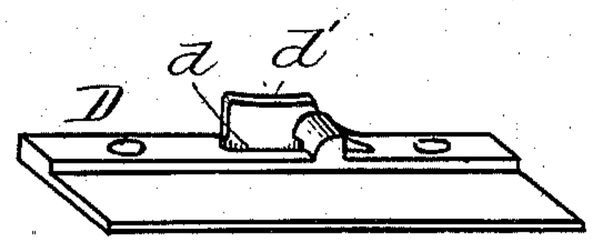

Fig. 9.

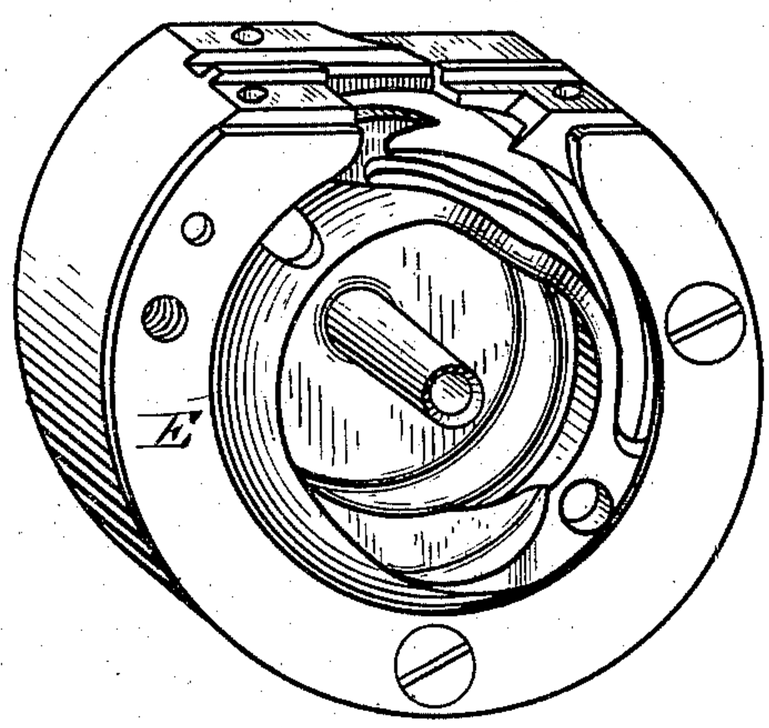

Fig. 8.

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UNITED STATES PATENT OFFICE.

ALBERT O. TOWNS, OF HUDSON, NEW HAMPSHIRE.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 565,816, dated August 11, 1896.

Application filed January 3, 1893. Serial No. 457,062. (No model.)

To all whom it may concern:

Be it known that I, ALBERT O. TOWNS, a citizen of the United States, residing at Hudson, in the county of Hillsborough and State of New Hampshire, have invented a new and useful Improvement in Sewing-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this application, in explaining its nature.

This invention relates, primarily, to means whereby the stitch-forming capacity of a fancy or ornamental stitch sewing-machine is multiplied or increased without increasing the number of reciprocations of the needle-bar or the speed of the shuttle.

I have represented this invention as carried into effect in a machine organized upon the plan of that described in Letters Patent to John T. Jones, No. 420,073, dated January 28, 1890, and No. 519,676, dated May 8, 1894. These two machines are in part built upon the foundation of the "Standard" sewing-machine, so called, and the improvements applied to the machine by the said Jones were for the purpose of permitting it to be used in stitching an elastic and ornamental stitch in knitted or elastic or other fabrics, by means of an irregular or fancy stitch feeding mechanism capable of moving the work sidewise or even backward, at times, as well as forward; but while I have shown my improvement as used with the form of irregular feed described in the said patents and necessary for forming diversified-stitch seams I wish it to be understood that I do not confine myself in the use of my present invention to the irregular or fancy stitch feeding mechanism of the said patents, as it may be used with other irregular or fancy stitch feeding mechanisms, as will be understood.

My invention is carried into effect by mounting upon a reciprocating needle-bar two eye-pointed needles which are arranged one behind the other transversely of the machine or in line with the path or line of movement or action of the rotary shuttle, and in such a manner that the loops of the needle-threads are successively engaged by the shuttle, and with this is used an irregular feed, which may not only move the work directly forward, but which may also move it sidewise or diagonally forward, so that the fabric is advanced or fed, in the main, transversely of the machine or upon the line of the needles and the line of movement of the shuttle. As there are, it may be said, two sets of stitch-forming devices in line with each other, doing full and complete work, it follows that the length of the feed can be increased, when desired, from that which would be employed if only one needle were used.

This invention, so far as it relates to ornamental stitching, is a marked improvement upon the Jones machine, in that it gives a far greater range for ornamental and diversified stitching, not only as to the style or character of the stitches, but also in the speed with which they may be made.

Referring to the drawings, Figure 1 is a view in side elevation of a machine embodying my invention, a portion of the frame being broken out to show the manner in which the feed-cam is made easily removable. Fig. 2 is a view principally in front elevation of my improved machine, the face-plate of the head being removed to show the mechanism behind it and the throat-plate being broken away upon the line of the needles to represent their relation to the cloth-feed and shuttle. Fig. 3 is a detail view, enlarged, partly in elevation, of the stitch-forming devices. Fig. 4 is a detail view in plan representing the relation which the needles bear to the throat-plate, feed-dog, and fabric. Fig. 5 is a diagrammatic view illustrating some of the ornamental stitching done upon the machine. Fig. 6 is a plan view of the bed of the machine, showing the feed-bar, feed-dog, throat-plate, and the feeding-cams, the latter and their connections with the feeding devices being shown in dotted lines. Fig. 6ª is a detail plan view of the presser-foot. Fig. 7 is a central vertical section of the throat-plate, shuttle-race, and the shuttle, to show the relation of the latter to the needles. Fig. 8 is a perspective view of the shuttle-race and shuttle, and Fig. 9 is a perspective bottom view of the throat-plate to show the loop-deflector.

The needle-bar A is reciprocated vertically in any desired manner, and I have represented it as reciprocated by mechanism similar to that of the standard machine. Its lower end

carries the straight eye-pointed needles *a a'*. These are preferably set so that the eye of one is a trifle below the eye of the other, the eye of the needle whose loop is first engaged by the shuttle being a little higher than the eye of the second needle. These needles are mounted upon the needle-bar, one behind the other, in the line of the work-advancing movement of the feed, or transversely of the machine.

B is the feed-bar, and B' the feed-dog. These feeding devices are actuated substantially as described in the said Jones patents. The pattern-cam C instead of being above the lower rotating shuttle-operating shaft C' in an inaccessible position is arranged below said shaft, and said cam has a bearing upon the post or stud *c*, attached to the work-plate centrally of the said shaft, said cam being held on said stud against the shoulder *c'* by a nut c^2, which screws on the threaded end of the said stud. This stud has an upward extension c^3, which enters a hole c^4 in the boss c^5 on the under side of the bed, and its enlargement c^6, which provides the shoulder *c'*, bears against the under surface of the boss and is secured thereto by screws c^7, said enlargement c^6 having the hole c^8 through which the shaft C' extends. It will thus be seen that the pattern-cam is held in place on the stud *c* by a nut only, and is therefore easily detachable from the machine and from the beveled gear c^9, which actuates it. This is an improved variation in the construction shown in the said Jones patents, for it is frequently necessary to remove the cam for the purpose of substituting another having cam-grooves of a different pattern, and this cannot readily be done by the Jones construction.

The throat-plate D of the machine has the elongated throat or slot *d* of sufficient length to receive both needles. The throat-plate also has the downwardly-extending loop-deflecting plate *d'*, the office of which is to cause the loops to be thrown or turned always in the same direction from the eyes of the needles. (See Figs. 3, 7, and 9.) The feed-dog B' has a feeding-surface entirely surrounding the needle opening or slot in the throat-plate, and is thus the better adapted to feed the work in any direction.

E is the rotary shuttle, operated as in the well-known "Standard" machine, and which engages in successive order the loops of the needle-threads, the needle *a* being set a trifle lower than the needle *a'*, so that the loops are caused, by the lifting of the needle-bar, to be engaged at about the same level or line of movement of the beak of the shuttle.

F is the presser-foot, provided with a slot or elongated opening *f* for the passage of the needles. The feeding mechanism is essentially the same as in the said Jones patent, No. 519,676, excepting that the feed-levers are of such relative proportion as to give somewhat longer feeding movements to the feed-dog B' at the forward end of the lever B than in the mechanism shown by said patent. The object of this increased feed will be apparent upon inspecting the diagrams in Figs. 4 and 5, where the heavy lines indicate the seam or stitches sewed by one needle and the shuttle, and the light lines show the stitches sewed by the other needle and the shuttle, and as the two needles are simultaneously sewing their respective lines it follows that the feed should be greater than the length of that employed when a single needle is used.

Another advantage obtained by locating the pattern-cam C as indicated arises from the fact that the feed-lever B may be made straight instead of curved, as shown in Fig. 28 of the said Jones patent, No. 519,575, and the arm *b* of the dog may be attached to it much farther back than in the said last-named construction. This arises from the fact that no boss upon the upper side of the bed is necessary for the support of the stud carrying the pattern-cam, the boss being in my construction upon the under side. This makes the upper part of the bed level and does away with the necessity for curving the feed-bar about the boss, and the boss being removed permits the bar to be extended much farther backward of the center of the stud carrying the pattern-cam. This improves the operation of the feed-bar and dog, and especially of the dog, and it also improves the operation of the parts actuating the feed-bar and dog.

It will be understood, of course, that the increased feed herein spoken of would be entirely inapplicable for use in connection with a single needle, as it would make stitches which would be too long; but where there are three threads and the stitch is formed by the overlapping of the two needle-threads a strong, serviceable, and durable seam is made, and one which is also very elastic and which therefore renders the line of stitching especially useful in sewing fabrics which require a flexible or elastic stitch.

I do not limit this invention to an organization which employs two needles, as three needles may in some instances be used, but where they are used the principle of the invention is not changed. The feeding movement of the feeding devices would then be correspondingly increased. The number of needles so employed is limited only by the ability of the shuttle to take successively the various loops.

It will be observed that the stitch which is thus sewed is made up of three threads, two of which are needle-threads, and the third the shuttle-thread; or, in other words, the single shuttle-thread concatenates at each rotation of the shuttle, or at each reciprocation of the needle-bar, with the two needle-thread loops, the shuttle-thread bearing the same relation to the needle-threads in the seam which is being made, whether said seam be a straight line or in a diversified or irregular line.

From the foregoing it will be understood that the term "irregular or fancy stitch feeding mechanism" as hereinafter employed in the claims is to be construed to cover only an automatic feeding mechanism capable of moving the work sidewise as well as forward to form irregular seams of fancy or embroidering stitches in contradistinction to seams of straight-ahead stitches, and which may also be capable of moving the work backward at times, as well as forward and sidewise, to still further vary the ornamental seams, as is the case with the feeding mechanism of the said Jones patents.

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

1. In a sewing-machine, the combination with an automatic irregular or fancy stitch feeding mechanism, such as described, of a plurality of needles arranged one behind the other transversely of the machine or in the line of the general work-advancing movement of the feed, a shuttle coöperating with said needles, and mechanism for operating said needles and shuttle, whereby a double seam of irregular or fancy stitches may be made.

2. In a sewing-machine, the combination with a reciprocating needle-bar, of a plurality of needles carried by said bar and arranged one behind the other transversely of the machine or in the direction of the general work-advancing movement of the feed, a shuttle coöperating with said needles the presser-foot F having the opening *f* for the passage of said needles, the throat-plate D having the slot *d* also for the passage of the said needles, the feed-dog B′ having a feeding-surface entirely surrounding the slot in the said throat-plate, and automatic mechanism for imparting irregular or fancy feeding movements to the said feed-dog.

3. In a fancy-stitch sewing-machine, the combination with a stitch-forming mechanism comprising a shuttle-operating shaft C′ arranged below the work-plate of the machine, of a stud or post *c* attached to said work-plate, and an irregular or fancy stitch feeding mechanism comprising the pattern-cam C removably mounted on the said stud or post below the said shaft so as to be conveniently detached from the machine when it is desired to change the said pattern-cam.

4. In a fancy-stitch sewing-machine, the combination with a stitch-forming mechanism comprising a shuttle-operating shaft C′ arranged below the work-plate of the machine, of a stud or post *c* attached to said work-plate centrally of said shaft and having an enlargement through which said shaft passes, and an irregular or fancy stitch feeding mechanism comprising the pattern-cam C removably mounted on the said stud or post below the said shaft, so as to be conveniently detached from the machine when it is desired to change the said pattern-cam.

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