(No Model.) 2 Sheets—Sheet 1.

D. H. COLES.

FEEDING MECHANISM FOR SEWING MACHINES.

No. 335,018. Patented Jan. 26, 1886.

Fig. 1.

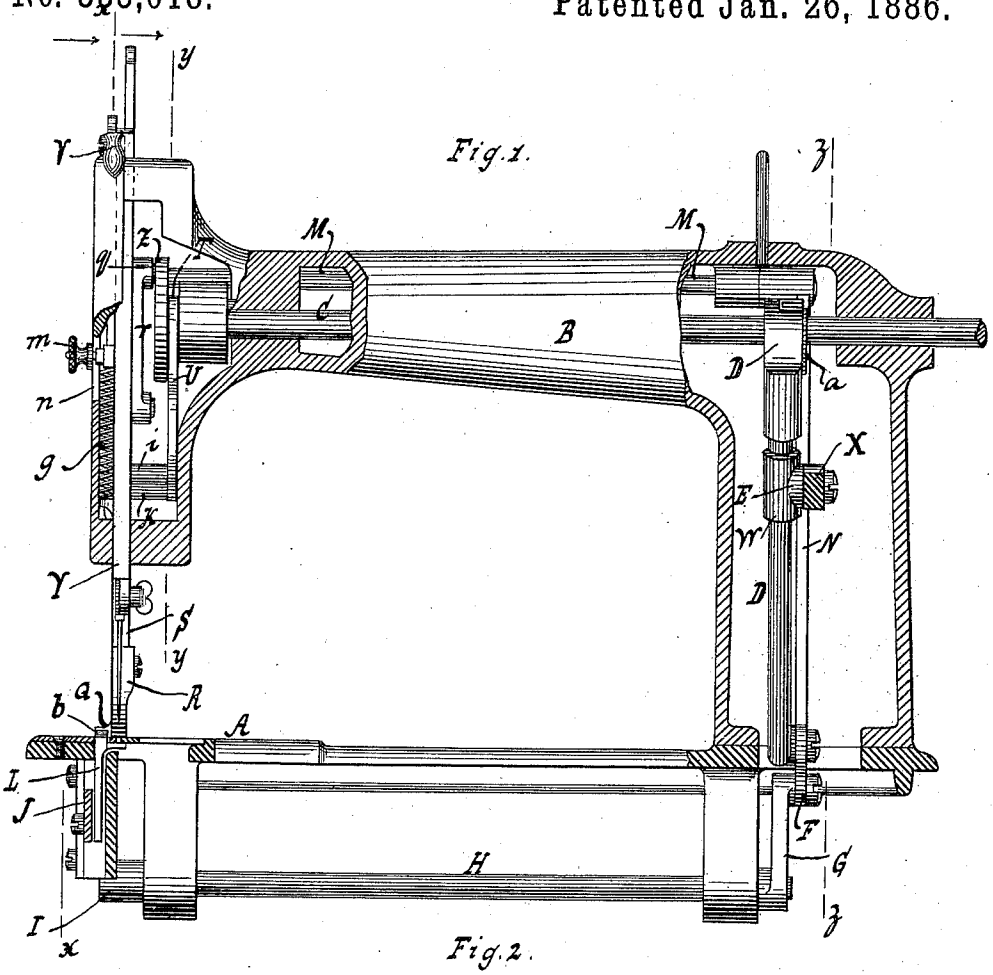
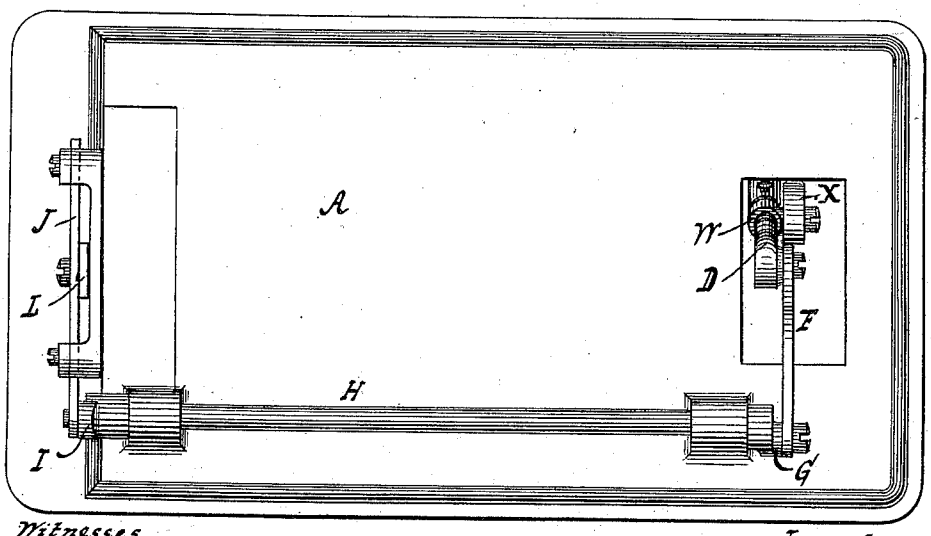


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 5.

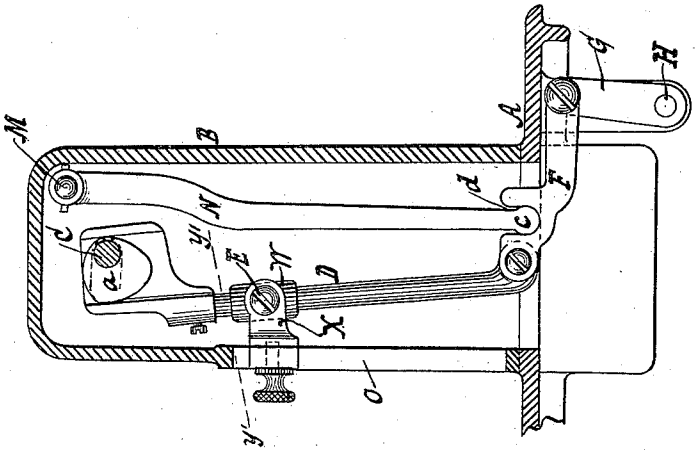

Fig. 4.

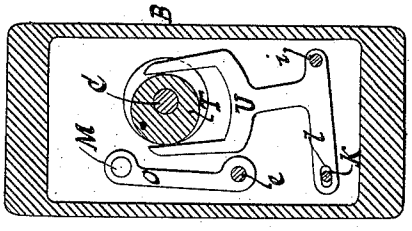

Fig. 8.

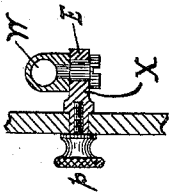

Fig. 3.

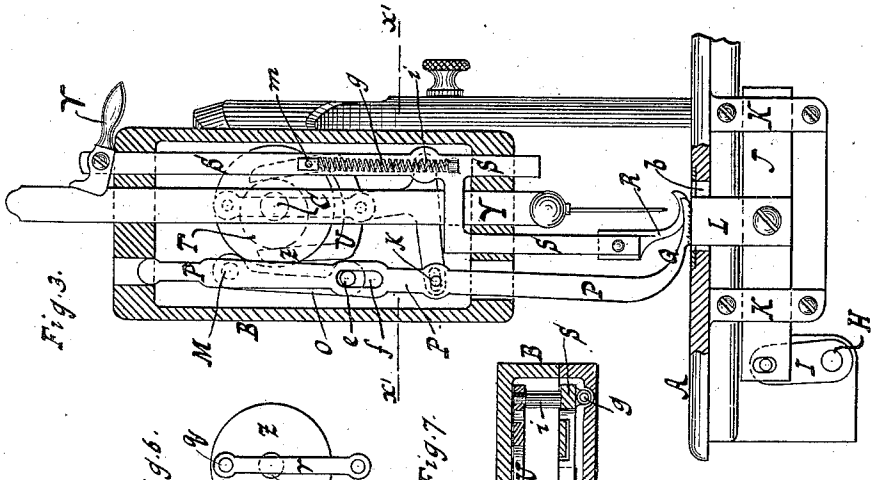

Fig. 6.

Fig. 7.

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UNITED STATES PATENT OFFICE.

DAVID H. COLES, OF NEW YORK, N. Y.

FEEDING MECHANISM FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 335,018, dated January 26, 1886.

Application filed September 3, 1885. Serial No. 176,036. (No model.)

To all whom it may concern:

Be it known that I, DAVID H. COLES, a citizen of the United States, residing at New York, in the county and State of New York, have invented new and useful Improvements in Feeding Mechanism for Sewing-Machines, of which the following is a specification.

This invention relates to improved feeding mechanism for sewing-machines, which are set forth in the following specification and claims, and shown in the accompanying drawings, in which—

Figure 1 is a side elevation, partly in section, of a sewing-machine containing my invention. Fig. 2 is an inverted plan view of the same. Fig. 3 is a section in the plane *x x*, Fig. 1. Fig. 4 is a section in the plane *y y*, Fig. 1. Fig. 5 is a section in the plane *z z*, Fig. 1. Fig. 6 is a detail of the disk and link for imparting motion to the needle-bar. Fig. 7 is a section on the line *x' x'*, Fig. 3. Fig. 8 is a section on the line *y' y'*, Fig. 5.

Similar letters indicate corresponding parts.

In the drawings, the letter A designates the cloth-plate, and B the arm, of a sewing-machine.

C is the main shaft, which has its bearings in the arm B, and to which a revolving motion is imparted in the usual manner. On this shaft is mounted a cam or eccentric, *a*, which engages with the upper end of an oscillating lever, D, which turns on the adjustable or sliding pivot E, and is connected by a link, F, to an arm, G, mounted on one end of the rock-shaft H. (See Fig. 5.) On the other end of this rock-shaft is mounted an arm, I, which is connected to the lower feed-carrier, J. This feed-carrier slides in bearings K, projecting from the under side of the cloth-plate A, and carries the lower feed-dog, L, which projects through a slot, *b*, in the cloth-plate and acts on the under side of the fabric to be fed.

As will be understood from the above, the lower feed shown in the drawings has only a horizontal motion; but a vertical motion may also be added, if desired, through any of the well-known mechanisms used for that purpose. The feed-dog L may be made adjustable on the feed-carrier J, or it may be rigidly secured to it.

In the arm B of the machine is also mounted a rock-shaft, M, which serves to actuate the upper feed, and which receives its motion from the cam *a*, mounted on the main shaft C.

By preference I transmit the rocking motion to the rock-shaft M in the following manner: On one end of the rock-shaft M is secured an arm, N, the lower rounded end, *c*, of which engages a notch, *d*, in the link F, Fig. 5, which receives its motion from the oscillating lever D, as above described, and as the lever D and the link F oscillate the desired motion is imparted to the rock-shaft M. On the opposite end of the rock-shaft M is mounted an arm, O, with a pin, *e*, engaging with a slot, *f*, in the upper feed-carrier, P, carrying the upper feed-dog, Q, Figs. 3 and 4, to which an oscillating motion is given by the movement of the rock-shaft M. The oscillation of the upper feed-dog, Q, must obviously correspond to that of the lower feed-dog, L, and for that reason it is preferred to transmit the motion to the upper feed from the link F, which also moves the lower feed; but it is obvious that a similar result might be obtained by directly connecting the rock-shaft M with the main shaft C or the oscillating lever D.

According to the nature of the work the feeding-surfaces of the feed-dogs may be either roughened or left smooth; but I prefer to have the lower one smooth and the upper one roughened.

In order to feed the work properly it is necessary that it should first be clamped between the two feed-surfaces as it is pushed forward, and then be released when said feed-surfaces return to take a fresh grip; but as the latter operation is apt to carry the work back with it I employ a presser-foot or stripper, R, secured to the lower end of the slide S, having its bearings in the arm B of the machine. This presser-foot or stripper is subject to the action of the spring *g*, and holds the work in position against the cloth-plate A as the feed-surfaces go back, but releases the same as soon as the said feed-surfaces have reached the end of their backward movement and have clamped the work for a new forward movement. From this it will be understood that the work is always held either between the feed-surfaces or between the presser-foot or stripper and the cloth-plate, each releasing the work as the

other takes hold, and as no unequal stretching takes place both surfaces of the work are fed evenly. To accomplish this operation it is necessary that either one or both of the feed-surfaces shall have a "four-way" or both a horizontal and a vertical motion, while the presser-foot or stripper needs a vertical motion only.

I will now proceed to describe the mechanism by which I produce these various movements. On the main shaft C is firmly secured an eccentric, T, which engages the forked lever U. This lever is connected by a pin, *i*, to the slide S, which carries the presser-foot or stripper, and by a slot, *l*, with the pin *k*, projecting from the upper feed-carrier, P, the action of the eccentric T on the lever U causing the latter to turn alternately on the pins *i* and *k*, as will be described, Figs. 3, 4, and 7.

Figs. 3 and 4 show the feeding-surfaces in their extreme backward position, and while the work is clamped between them and ready for a forward motion, the presser-foot or stripper being raised to permit the latter operation. To attain this position the pin *k* has acted as a pivot for the lever U, and as this lever has been turned on said pin by the action of the eccentric T the arm of the lever U, carrying the pin *i*, has been raised, carrying with it the presser-foot or stripper, thereby leaving the work free to be fed forward by the forward motion of the feed-surfaces. When the feed-surfaces have reached their extreme forward position, the rotation of the eccentric T will have caused the lever to be turned on the same pin *k* until it has depressed the presser-foot sufficiently toward the cloth-plate to hold the work. As the rotation of the eccentric continues it will again turn the lever U, but this time on the pin *i* in the slide S, which now rests firmly on the work on the cloth-plate, thereby raising the pin *k*, and with it the upper feed-carrier, P, releasing the work from the feed-surfaces and permitting them to move back, when the feed-carrier P will again descend, clamp the work, and be ready to again feed forward as soon as the operation of the machine has released the work from the presser-foot.

From this description it will be understood that the work is firmly held either by the feed-surfaces, by which both surfaces of the work are evenly and positively carried forward, or when these release it and go back to get a new grip by the presser-foot. It will further be understood that but one of the above—either the feed-surfaces or the presser-foot—can be in contact with the work at one time, for their connection, as described above, is such that as soon as one comes into contact with it the other releases its hold. It will also be evident that either this upper or the lower feed devices will feed successfully alone.

When not in use, the presser-foot may be lifted away from the cloth-plate by a cam-lever, V, which will raise the same against the action of the spring *g*. The tension of this spring may be adjusted by a set-screw, *m*, working in a slot, *n*, in the arm B.

To regulate the length of the stitch, or, in other words, to adjust the throw of the two feeds, I employ the following device: The adjustable or sliding pivot E, about which the lever D oscillates, carries a sleeve, W, through which the lever passes loosely. This sleeve is pivoted in a carriage, X, which is made to move in a slot, *o*, in the upright portion of the arm B, and may be adjusted therein by a set-screw, *p*. To lengthen the throw of the feed, this carriage, with its pivoted sleeve, is moved up toward the main shaft, thereby causing the lower end of the lever D, with the link F, which controls both feeds, to increase its stroke.

If the carriage is moved away from the main shaft, the throw of the feed will in the same manner be diminished.

In the machine shown the needle-bar Y has a continuous up-and-down motion imparted to it by a disk, Z, having an eccentric-pin, *q*, Fig. 6, which is connected to the needle-bar by the link *r*.

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

1. The combination, with the machine-arm, of the revolving main shaft C, the upper rock-shaft, M, operated at one end by the main shaft, the upper feed, Q, connected with said rock-shaft, the pivoted oscillating lever D, operated at its upper end by the main shaft, a link, F, connected with said oscillating lever, a rock-shaft, H, connected at one end with said link, and a feed-carrier, J, connected with the other end of the rock-shaft and operated thereby in a right line, substantially as described.

2. The combination, with the machine-arm, of the revolving main shaft C, the upper rock-shaft, M, operated at one end by the main shaft, the upper feed-carrying bar, P, connected with the rock-shaft, the pivoted oscillating lever D, operated at its upper end by the main shaft, the link F, connected at one end with the oscillating lever, the lower rock-shaft, H, having at one end an arm, G, connected with said link, an arm, I, attached to the other end of said lower rock-shaft, and a guided lower feed-carrying bar, J, pivoted to said latter arm and moved thereby in a right line, substantially as described.

3. The combination, with the machine-arm, of the revolving shaft C, the upper rock-shaft, M, the upper feed-carrying-bar, P, connected with one end of the rock-shaft, a pendent arm, N, secured to the latter, a pivoted oscillating lever, D, operated by the main shaft, a link, F, connected with the oscillating lever and with the pendent arm of the upper rock-shaft, a lower rock-shaft, H, connected at one end with said link, and a feed-carrier, J, connected with the other end of said lower rock-shaft, substantially as described.

4. The combination, with the sewing-machine arm, of the pivoted oscillating lever D, the link F, pivotally connected with the lower

end of said lever, the rocking shaft H, connected at one end with the link, the feed-carrier J, connected with the other end of the rock-shaft and reciprocated thereby in a right line, an upper feed-carrying bar, P, and connections between said upper feed-carrying bar and the oscillating lever, substantially as described.

5. The combination, with the sewing-machine arm, of the revolving main shaft C, provided with a cam, *a*, the pivoted oscillating lever D, operated by said cam, the link F, connected with the lower end of the oscillating lever, the rock-shaft H, connected at one end with the link, the lower feed-carrier, J, connected with the other end of the rock-shaft and moved thereby in a right line, and the upper feed, Q, connected with the said oscillating lever and receiving its motion therefrom to synchronously move both the upper and lower feeds by the said oscillating lever, substantially as described.

6. The combination, with the lower feed-carrier, J, the rock-shaft H, the link F, connected with the latter, the pivoted oscillating lever D, carrying the link, the revolving main shaft C, and the rock-shaft M, of the feed and presser bars P and S, and the lever U, operated by the main shaft and pivotally connected with the feed and presser bars, substantially as described.

7. The combination, with the upper and lower feed-carriers, the rock-shaft H, connected with the lower feed-carrier, the link F, the oscillating lever D, the main shaft C, and the rock-shaft M, connected with the oscillating lever, of the adjustable sliding pivot E, carrying the said oscillating lever and serving as a pivot therefor, substantially as described.

In testimony whereof I have hereunto set my hand and seal in the presence of two subscribing witnesses.

DAVID H. COLES. [L. S.]

Witnesses:

A. FABER DU FAUR, Jr.,

E. F. KASTENHUBER.