

(No Model.)

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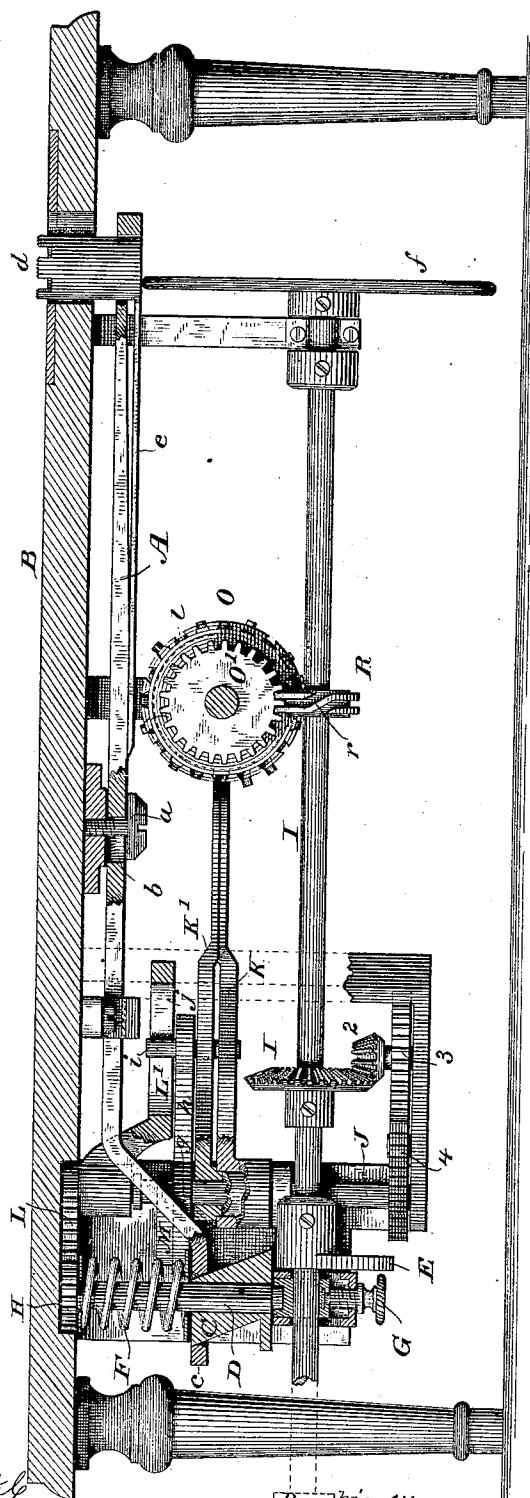
G. R. PEARE.

FEEDING MECHANISM FOR SEWING MACHINES.

No. 272,761.

Patented Feb. 20, 1883.

Fig. 1.



WITNESSES

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(No Model.)

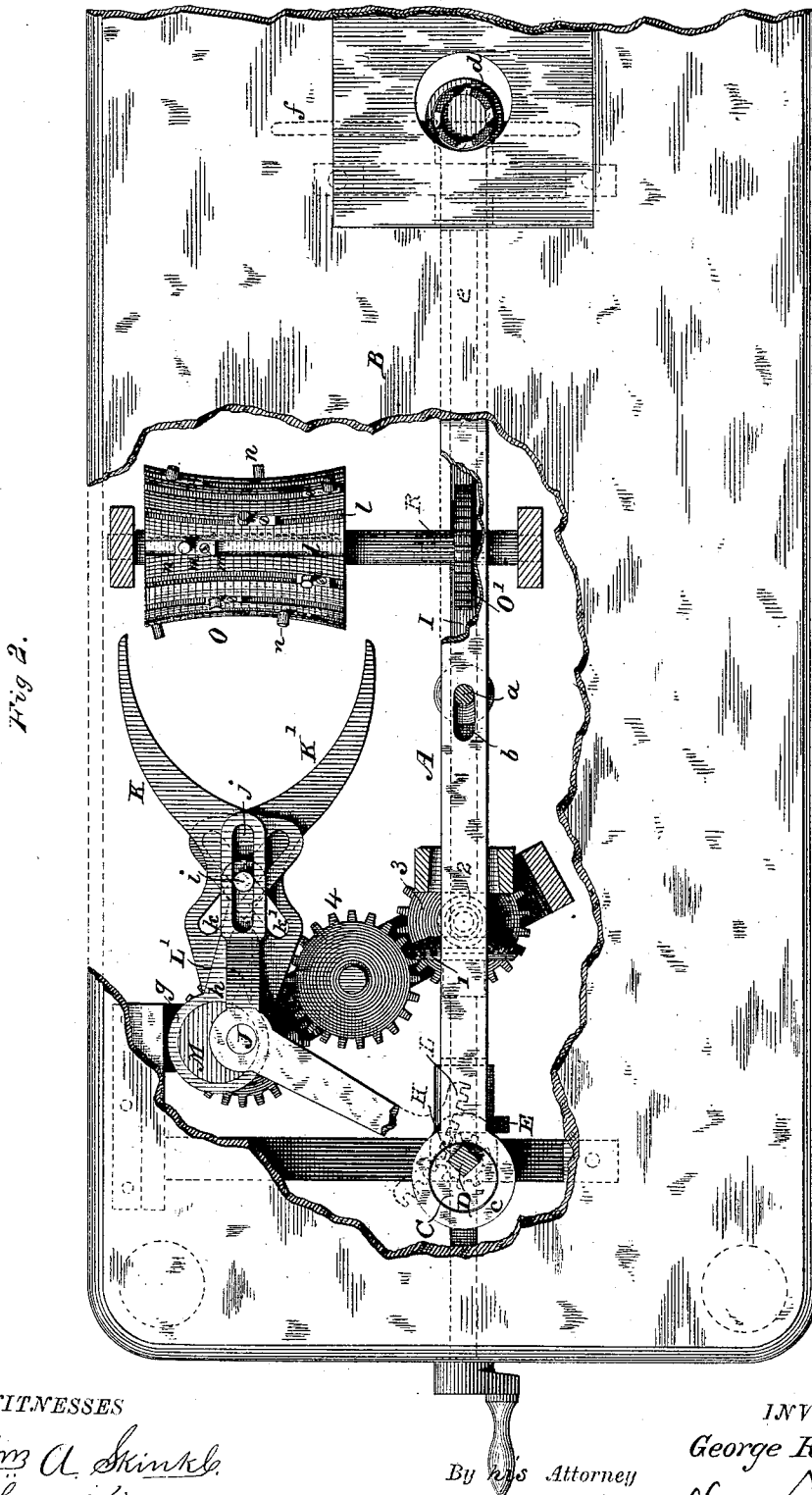
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Fig 3.

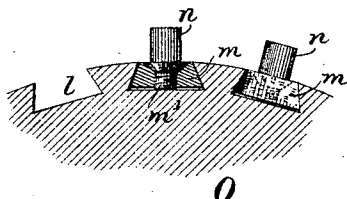


Fig 4.

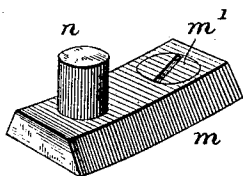


Fig 5.

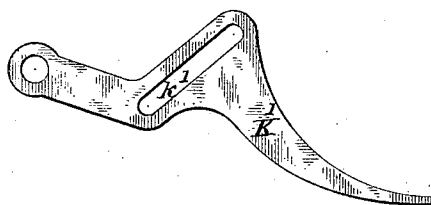
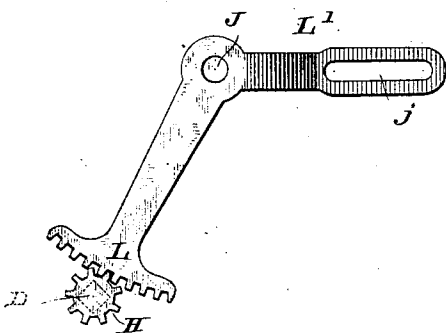


Fig 6.



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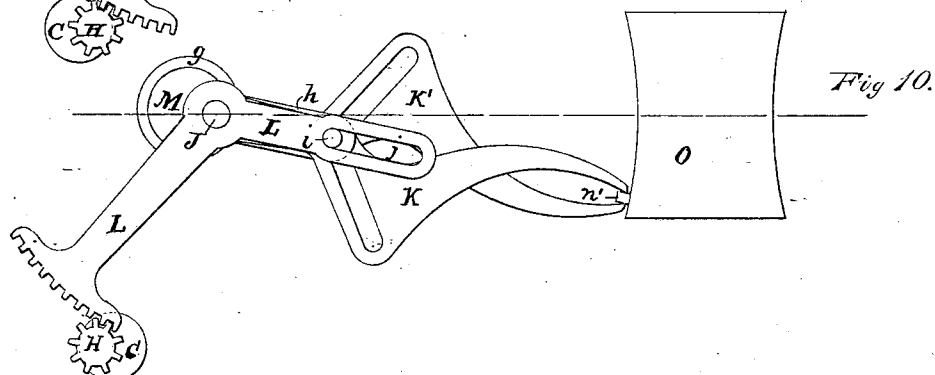
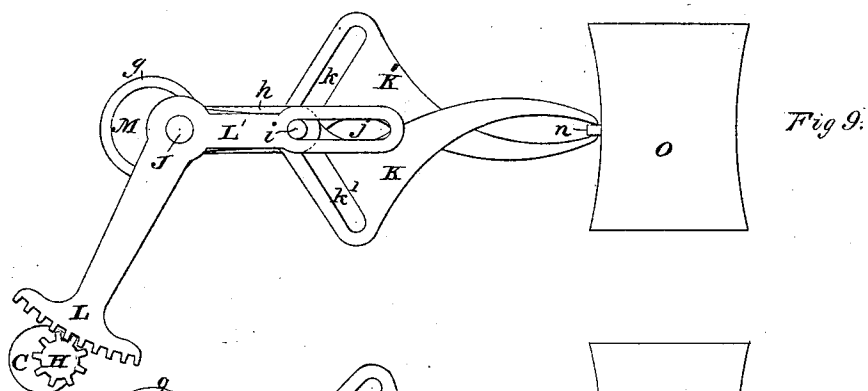
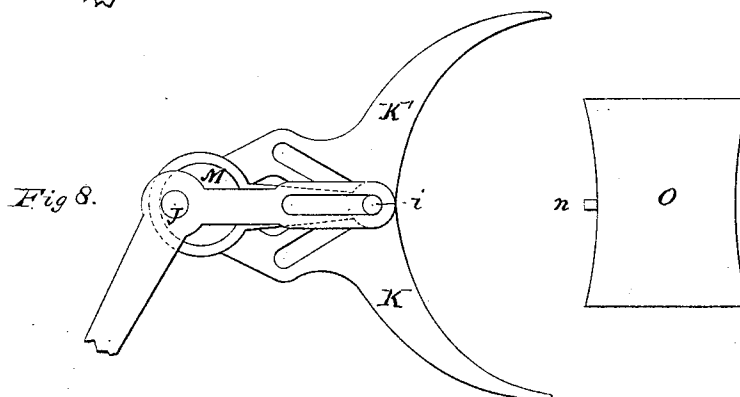
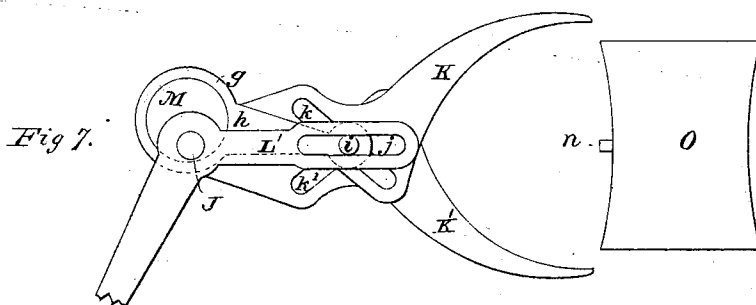
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UNITED STATES PATENT OFFICE.

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TO JOHN H. ALLEY, OF SAME PLACE.

FEEDING MECHANISM FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 272,761, dated February 20, 1883.

Application filed November 14, 1882. (No model.)

To all whom it may concern:

Be it known that I, GEORGE R. PEARE, of Lynn, in the State of Massachusetts, have invented certain new and useful Improvements in Feeding Mechanism for Sewing-Machines, of which the following is a specification.

My invention relates to that kind of feed mechanism known as "universal feed." It is my object to obtain a feed of this kind which shall automatically feed the goods in the direction required for any given pattern.

In the forms of universal-feed mechanism at present in use—as, for example, that known as the "Coles universal feed"—it is necessary to operate the pattern-controlling mechanism by hand, which requires the services of a skilled operator. By my invention the pattern-controlling mechanism is entirely automatic in its operation, so that when the feed mechanism is set to a given pattern the machine, when in operation, will produce that pattern with certainty, and without any manipulation of pattern-controlling devices on the part of the operator.

My invention is characterized by the combination, with the variable feed controlling or operating mechanism of a sewing-machine, of a pattern-drum armed peripherally with pattern-pins, and rotatable so as to bring each pattern-pin successively into the path of and between the interior opposite faces of two pattern-regulating arms which move to and from one another lengthwise of the pattern-drum. The sum of the distances traveled by the two arms is always the same, the differences between their respective lengths of movement, governed by the relative positions of the successive pattern-pins, which serve to arrest one or the other of the arms sooner or later in its movements, produce and determine the character or extent of the variations in the movement of the feed controlling or operating mechanism. The varying movement of the mechanism that controls or operates the universal feed is thus dependent upon and may not improperly be considered the differential of the movements of the two opposed reciprocating pattern-regulating arms. By "reciprocation" I intend back-and-forth movement, whether in a right line or in an arc of a circle.

In the accompanying drawings, which I

shall proceed to describe in further explanation of my invention, the pattern-regulating arms are hung so as to have vibratory or oscillating movement in the arc of a circle, and the universal-feed mechanism there illustrated is of the kind shown and described in Coles's Reissued Patent No. 7,287, of August 29, 1876.

In the drawings, Figure 1 represents in sectional side elevation so much of a sewing-machine as needed for the purpose of illustrating my invention. Fig. 2 is a plan of the same, with the cloth-plate and some of the subjacent parts partly broken away. Fig. 3 is an enlarged sectional end elevation of a portion of the pattern-drum. Fig. 4 is an enlarged perspective view of one of the pattern-pin slides detached. Fig. 5 is a plan of one of the pattern-regulating arms. Fig. 6 is a plan of the sector-arm, hereinafter referred to, together with the pinion engaged by the same. Figs. 7, 8, 9, and 10 are plan views of the pattern-regulating arms and their adjuncts, representing diagrammatically the changes in the positions of the parts during the back and forth movements of the arms.

A is the feed-bar, attached to the under side of the cloth-plate B by a fulcrum-pin and longitudinal slot-connection *a b*, whereby it is permitted both oscillating and lengthwise movement. The bar carries at one end the feed-dog *d*, mounted on the end of a spring, *e*, attached to the bar, said spring being operated on at stated intervals by the rotating eccentric or cam *f*, so as to produce the rising and falling motions of the feed. The rear end of the feed-bar forms a ring or eye, *c*, which encircles the oblique feed-controlling cam C, feathered on the upright arbor D, and caused to rise and fall by the conjoint action of the revolving cam-disk E and the spring F, which presses the cam C toward E. The extent of up-and-down movement of the feed-controlling cam is determined by the regulating-screw G, which can be caused to lift or raise the cam more or less against the stress of spring F, thus regulating the length of stitch. The feed-controlling cam is also rotatable with its arbor D, for which purpose the arbor D carries a toothed wheel, H, to engage suitable mechanism for imparting to it partial rotary movement.

Thus far the machine is the same as that de-

scribed by similar letters of reference in the reissued patent above referred to, and it therefore to this extent requires no further description. It is sufficient to say that by partly rotating the cam in one direction or the other the feed-bar receives a movement either reciprocating in a right line, or oscillating, or a compound of the two movements, according to the position assumed by the cam.

In the Coles patent the changes in position of the feed-controlling cam which cause a change of direction of feed are effected by an index or handle mounted above the cloth-plate upon an arbor which carries a gear-wheel engaging the gear-wheel H, and this index must be moved by hand each time a change in direction of the feed is desired. By my invention the change in direction of feed is effected automatically. The preferred means employed by me for this purpose are shown in the drawings, and may be described as follows:

A vertical shaft or arbor, J, is mounted in proper bearings in the machine-frame, below the cloth-plate, and has imparted to it a movement of continuous rotation, obtained in this instance from the horizontal shaft I (which carries cam-disks E and F) through the gearing 1, 2, 3, and 4.

Upon the arbor J is fixed an eccentric, M, surrounded by a strap, G, from which projects the horizontal pitman H, carrying at its outer extremity the vertical cross-pin, I, which extends above and below pitman H.

Upon arbor J, above the eccentric, is loosely mounted a toothed sector or gear, L, from the hub of which projects an arm, L', having a longitudinal slot, J, which is entered by the upper end of the cross-pin I. The sector and its arms are capable of oscillating on the arbor J as an axis, and the sector engages the wheel H on the arbor D.

On the arbor J, below the eccentric M, are loosely mounted two arms, K K', capable of oscillating on arbor J as an axis. These arms, which I have termed the "pattern-regulating" arms, are formed and arranged and move very much like the legs of calipers. Their shanks are formed so as to permit inclined slots k k' to be made in them, so placed that when the arms are put together the slots may cross one another. The lower end of the cross-pin I enters these two slots at their point of intersection, as indicated in Figs. 2, 7, 8, 9, and 10, so that the back-and-forth movement of the pin, derived from the rotating eccentric M, will cause the arms K K' to oscillate to and from one another.

Opposite to the outer ends or points of the pattern-regulating arms is a horizontal drum, O, (heretofore termed by me the "pattern-drum,") supported in bearings in which it can revolve, and having an intermittent movement of rotation imparted to it from shaft I by means of a worm-cam, R, on said shaft, which engages a toothed wheel, O', on the drum-shaft, and at each revolution turns the same a distance equal to one tooth. The cam-rise by which this

movement is effected is indicated at r, Fig. 1. The periphery of the drum is curved lengthwise in the arc of a circle of which the axis of oscillation of arms K K' is the center, and it is also formed in its periphery with longitudinal undercut or dovetail grooves l. Each groove contains a dovetail slide, m, from which projects a pin, n. The pins n are what I have heretofore termed "pattern-pins," and they are mounted on slides, so as to permit them to be adjusted to the various positions in the grooves required for the production of any given pattern. Each slide, when adjusted, can be held in place by a set or tightening screw, m', Fig. 4. The pins project from the periphery of the drum, and the latter is intermittently rotated by R and O', so as to bring each pin in succession into the path and between the outer ends or points of the oscillating pattern-regulating arms.

The operations of the parts will be readily understood by reference to the diagrammatic Figs. 7 to 10. Suppose the eccentric to be at that extreme of its throw represented in Fig. 8, in which the cross-pin is moved forward to the front ends of the slots k k', so as to open wide the arms K K', the axis J, pin I, and pattern-pin n on drum O being in line. Under these conditions the eccentric, as it continues to rotate, will cause the feed-regulating caliper-arms K K' to close, as indicated in Fig. 7, where they are half-closed, and in Fig. 9, where they are entirely closed, less the thickness of the pin n, which they clasp. Each feed-regulating arm has moved the same distance, the points J I n have remained in line in the same position, and consequently the sector L has remained unmoved and at rest. If the next succeeding pattern-pin, brought around by the intermittently-moving pattern-drum into the path of the arms K K', stands directly in rear of the pin n, (shown in the figures under consideration,) then a repetition of the operation will leave the sector L unaffected, as before; but suppose that the next succeeding pin stands obliquely in rear of the pin n, so that when brought around it will occupy the position indicated in Fig. 10 at n', the effect will be to arrest the arm K' before it has traveled its normal distance, and consequently the arm K will travel a correspondingly-increased distance, with the result of drawing or moving the pin I to a position indicated in the figure last above referred to, thus bringing the cross-pin, the pattern-pin, and the axis J in line, as they must always be at the conclusion of the closing movement of the arms K K'. The effect of thus moving the pin I will be to correspondingly swing or turn the sector L, whose slotted arm L' is engaged by the pin, and this movement of the sector, through the gear H, will shift the feed-controlling cam C. Thus according to the varying positions of the successive pattern-pins the feed-controlling cam C will be shifted intermittently and at the proper time to produce any required pattern. The movements of the parts are of course so

timed as to cause the feed to operate in the intervals between the stitches. The combined range of movement of the two feed-regulating caliper-arms is equal to about twice the length of the pattern-drum, (less of course the thickness or diameter of the pattern-pin.) this being necessary for the reason that for some patterns some of the pattern-pins require to be set at one or the other extreme end of the pattern-drum. One revolution of the drum completes one figure or element of the pattern. Larger or smaller drums carrying the requisite number of pattern-pins may be employed, according to the number of stitches required for the pattern element, and for this purpose the bearings which support the pattern-drum should be made adjustable, so as to permit them to be adjusted to and from the ends of the arms K K', according to the diameter of the particular drum that may be employed, and the drum should be so mounted as to permit it to be removed and replaced by another.

I have described what I deem to be, on the whole, the embodiment of my invention which is best adapted to and most conveniently used with the particular feed mechanism herein illustrated. I do not, however, restrict myself to the special mechanical details herein specified, for the same may be varied considerably without departure from my invention. The characteristic of my invention resides in the combination of the pattern drum and pins and the reciprocating feed-regulating arms (whether moving to and from one another in a right line or in a curved path) connected to the universal-feed-controlling device in such manner that the change in position of the said device, which regulates the direction of the feed, shall be determined by and dependent upon the relative extent of movement of said arms; or, in other words, by the difference between the distances traveled by said arms before they respectively meet the pattern-pin at each reciprocation.

What I claim, therefore, as new and of my invention is—

1. The combination of the reciprocating feed-regulating arms, the pattern-drum provided with projecting pattern-pins, which by rotation of said drum are successively brought into the path of movement, and between the ends or points of said arms, the universal-feed-controlling device, and connecting mechanism, substantially as described, whereby the shifting of said feed-controlling device to cause the requisite changes in the direction of the feed is effected to an extent dependent upon and proportionate to the difference between the distances traveled by the said arms before they respectively meet the pattern-pin at each reciprocation, the combination being and acting substantially as hereinbefore set forth.

2. The combination of the feed-controlling cam, the intermittently-rotated pattern-drum and its pins, the vibratory caliper-like and slotted pattern-regulating arm, the sector or gear and its slotted arms, and the pitman, its rotating driving-eccentric and cross-pin entering, on the one hand, the slot in the arm of the sector, and on the other hand the slots of the pattern-regulating arms at their point of intersection, these parts being timed in their movements and adapted to co-operate, substantially as hereinbefore set forth.

3. The combination, with the universal-feed-controlling cam and the driving-shaft of a sewing-machine, of pattern-regulating mechanism deriving its movement from said shaft, and arranged and operating, substantially as hereinbefore set forth, to automatically and at the proper intervals shift the position of said feed-controlling cam in conformity with the requirements of the pattern.

In testimony whereof I have hereunto set my hand this 16th day of October, 1882.

GEO. R. PEARE.

Witnesses:

E. A. CLARK,
C. B. TUTTLE.