Sept. 20, 1955 R. E. JOHNSON ET AL 2,718,202

FEED THROW-OUT MECHANISMS FOR SEWING MACHINES

Filed June 9, 1953 3 Sheets-Sheet 1

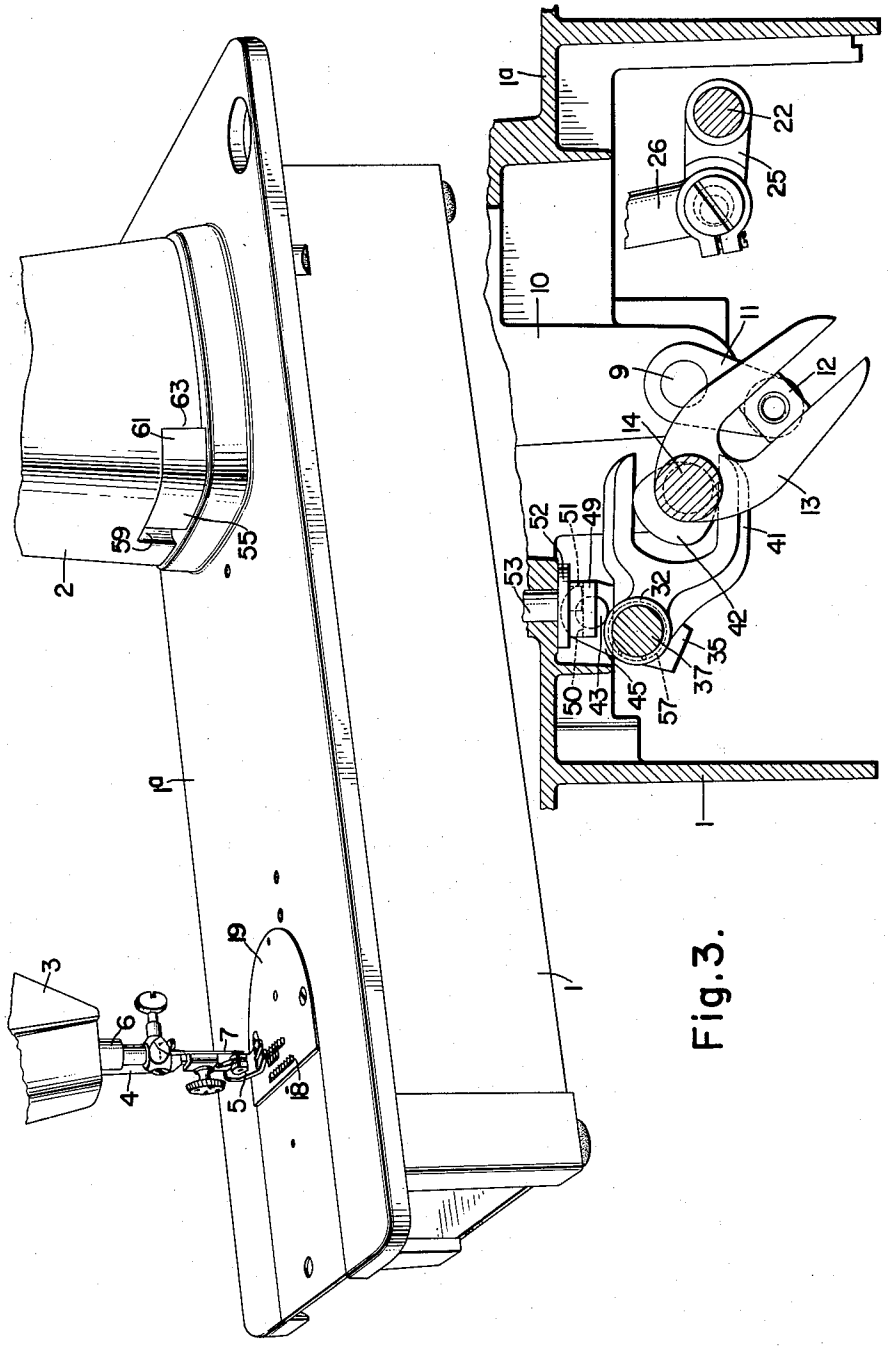


Fig. 1.

Fig. 3.

WITNESS

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Filed June 9, 1953 3 Sheets-Sheet 2

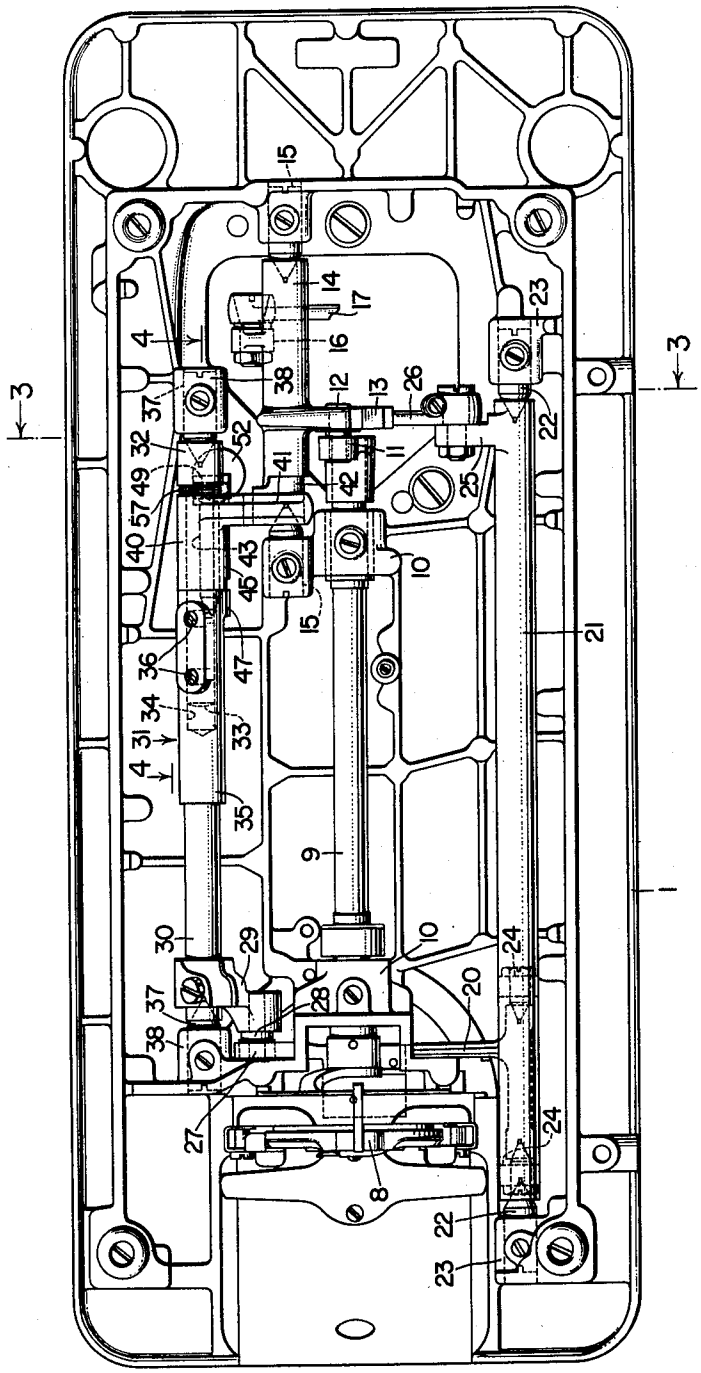


Fig.2.

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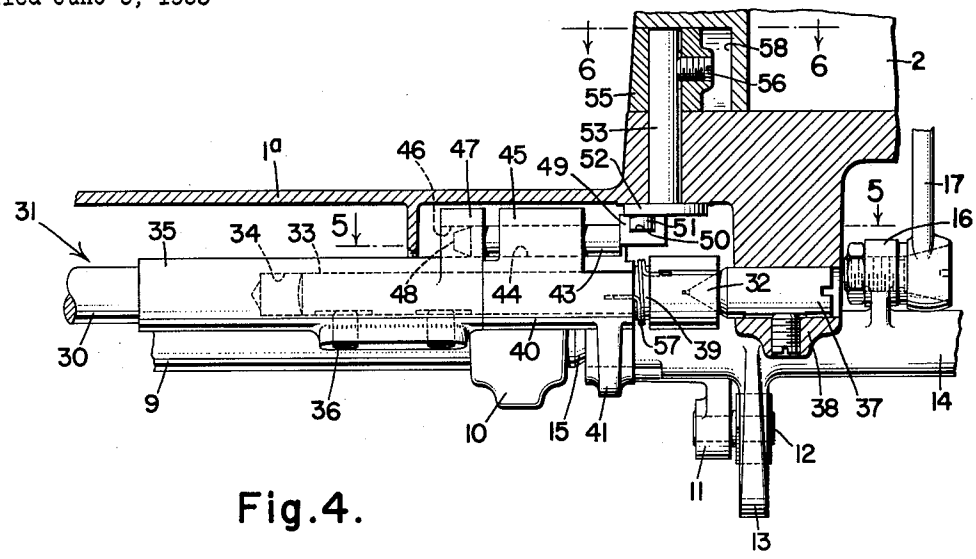


Fig.4.

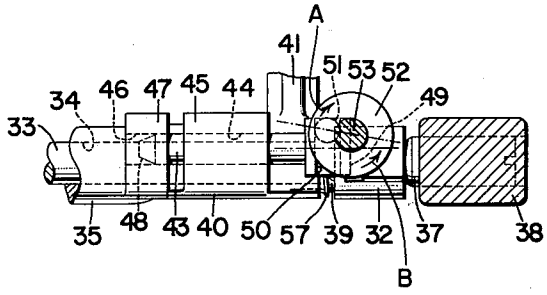


Fig.5.

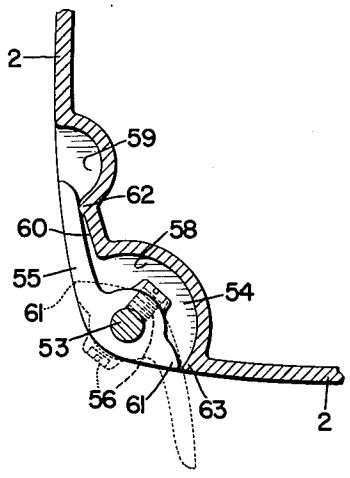


Fig.6.

WITNESS

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FEED THROW-OUT MECHANISMS FOR SEWING MACHINES

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Application June 9, 1953, Serial No. 360,562

9 Claims. (Cl. 112—210)

The present invention relates to sewing machines and has for a primary object to provide an improved feed throwout mechanism therefor.

In particular, it is an object of the present invention to provide an improved feed throw-out mechanism for a sewing machine including an actuating lever that can be positioned in a readily accessible location but will not hinder the free use of the work-supporting surface of the machine and will, in addition, provide a more compact and neat as well as attractive construction.

Having in mind the above and other objects that will be evident from an understanding of this disclosure, the invention comprises the devices, combinations and arrangements of parts as illustrated in the presently preferred embodiment of the invention which is hereinafter set forth in such detail as to enable those skilled in the art readily to understand the function, operation, construction and advantages of it when read in conjunction with the accompanying drawings in which:

Fig. 1 is a fragmentary perspective view of a sewing machine in which a feed throw-out mechanism in accordance with the present invention has been incorporated.

Fig. 2 is a bottom plan view of the sewing machine illustrated in Fig. 1.

Fig. 3 is a fragmentary vertical section view taken substantially on the line 3—3 of Fig. 2.

Fig. 4 is a fragmentary vertical section view taken substantially on the line 4—4 of Fig. 2.

Fig. 5 is a fragmentary horizontal section view taken substantially on the line 5—5 of Fig. 4.

Fig. 6 is a detail section view taken substantially on the line 6—6 of Fig. 4.

The present invention is disclosed as embodied in a sewing machine which is herein illustrated only insofar as is necessary to provide a complete comprehension of the invention. For a more complete disclosure of the machine illustrated, reference may be had to the copending application of Ralph E. Johnson, Serial No. 376,883 filed August 27, 1953.

With reference to the drawings, the preferred embodiment of the present invention is embodied in a sewing machine having a bed 1 including a bed-plate 1*a*, a standard 2 rising from the one end thereof, and an overhanging bracket-arm which terminates in a head 3. In the usual manner, the head 3 is provided with a presser-bar 4 that carries a presser-foot 5, and a vertically reciprocating needle-bar 6 that carries a needle 7. In the formation of stitches, the needle 7 cooperates with an oscillating shuttle 8 located beneath the bed 1 and fixed to the end of an oscillating shuttle-shaft 9 that is journaled longitudinally of the bed 1 as in suitable bosses 10 depending therefrom. Oscillation is imparted to the shaft 9 by a crank 11 fixed thereto and carrying at its end a pivot-block slide 12 that is positioned between the tines of a fork 13. The fork 13 is integral with a countershaft 14 journaled in the bed 1 parallel to the shaft 9 as by suitable cone-bearings 15. Oscillation is

imparted to the countershaft 14 by a crank 16 integral therewith and pivotally connected at its outer end to the lower end of a pitman 17 which may be reciprocated by the usual crank or eccentric on the bracket-arm shaft of the machine (not shown).

The work is fed past the stitching mechanism by feed-dogs 18 (Fig. 1) that extend through appropriate slots in a throat-plate 19, which throat-plate supports the work adjacent the stitching point and lies substantially in the plane of the work-supporting surface of the bed 1. The feed-dogs 18 are carried in the usual manner by a feed-bar 20 to which feed-lift and feed-advance motions are imparted to actuate the feed-dog through the conventional four-motion cycle. Feed-advance motions are imparted to the feed-bar 20 by an oscillating feed-advance shaft 21 journaled longitudinally of the bed 1 by suitable cone-shaped end-bearings 22 carried by bosses 23 depending from the bed 1. The shaft 21 is provided with the usual upstanding feed-rocker 24 to which is pivoted one end of the feed-bar 20. Oscillation may be imparted to the feed-advance shaft 21 by means of a crank 25 integral therewith and pivotally connected at its outer end to a pitman 26 that extends vertically through the standard 2 and connects with the usual and well known eccentric fixed to the bracket-arm shaft of the machine (not shown) whereby reciprocation will be imparted to said pitman, and oscillation will be imparted to said shaft 21 to effect feed-motions of the feed-bar 20. All of the above mechanism is conventional and so, it is not deemed necessary to expand this disclosure in relation thereto. For a more complete description thereof, reference may be had to the above-mentioned copending application of Johnson, Serial No. 376,883.

To effect feed-lift or rising and falling motions of the feed-bar 20, the end thereof opposite to the feed-rocker 24 is formed with a fork 27 that slidably receives a stud 28 extending laterally from a crank 29 secured to a first section 30 of a two-part feed-lift shaft 31. The shaft 31 also includes a second section 32 having a reduced shank 33 and is connected to the first section 30 by means of the reduced shank 33 which extends into a bore 34 formed axially of the section 30 in an enlarged portion 35 thereof. The shank 33 is secured within the bore 34 by means of set-screws 36. The shaft 31 is journaled longitudinally of the bed 1 by suitable cone-shaped end-bearings 37 carried by bosses 38 depending from the bed 1.

The shaft section 32 is provided with an intermediate reduced portion 39. Freely mounted upon the exposed end of the reduced portion 33, and confined between the end of the portion 35 of section 30 and the shoulder between the reduced portions 33 and 39, is a block 40 that includes a laterally extending integral fork 41 embracing an eccentric 42 on the countershaft 14, whereby, when oscillation is imparted to the countershaft 14, a comparable motion will be transmitted to the block 40 which oscillates on the reduced portion 33 of the section 32. The block 40 may be selectively coupled to the enlarged portion 35 of the shaft section 30 by means of a rod or plunger 43 that slidably extends through a bore 44 in a lateral arm 45 integral with the block 40, and into a similar bore 46 in a corresponding lateral arm 47 integral with the shaft section 30. It will be noted that the plunger 43 is provided with a tapered point 48 to facilitate inserting it into the bore 46.

At its end opposite to the point 48, the plunger 43 is provided with an integral rectangular block 49 having a slot 50 therein arranged substantially horizontal and normal to the axis of sliding movement of the plunger. A depending stud 51 is fitted within the slot 50. The stud 51 is carried by a disc 52 that is secured to the lower end of a rod 53 rotatably journaled vertically through

the bed-plate 1*a* and into the standard 2, the stud 51 together with the disc 52 comprising a crank. The parts are so positioned that the rod 53 rises into the standard 2 adjacent the left front corner thereof and extends into a recess 54 formed in the standard. Within the recess 54, the rod 53 has secured thereto an actuating lever 55, as by a set screw 56. From the above, it will be apparent that, as the lever 55 is rotated, the rod 53 will also be rotated together with the disc 52 and the stud 51 carried thereby. The stud 51 can, of course, slide transversely in the slot 50, but that component of the arcuate motion of the stud 51 which is axially of the plunger 43, will slide the plunger relative to the arms 45 and 47 of the block 40 and shaft-section 30, respectively. Axial sliding of the plunger 43 will act to insert it into the bore 46 in the arm 47 and to withdraw it therefrom. It will be obvious that when the plunger is in both bores 44 and 46, as seen in the drawings, the arms 45 and 47 will be effectively coupled together for simultaneous motion. Thus, when the block 40 is oscillated by the eccentric 42, the shaft section 30 will also be oscillated to impart normal feed-lift movements to the feed-bar 20 through the crank 29. When the plunger 43 is withdrawn from the bore 46 in the arm 47, the connection between the block 40 and the shaft-section 30 is destroyed and the block 40 will be oscillated idly on the reduced portion 33 of the shaft-section 32 by the eccentric 42. Under these circumstances, no feed-lift movements will be imparted to the feed-bar 20, and because the feed-dogs 18 do not rise above the work-contacting surface of the throat-plate 19, the feed-dogs will not contact the work and will not impart a feed-stroke thereto. The feed mechanism of the machine has thus been effectively disabled.

To insure that the feed-bar 20 will assume its lowermost position when the lever 55 is moved to effect a throw-out of the feed mechanism, i. e., a position in which the feed-dogs 18 are retracted below the work-supporting surface of the throat-plate 19 and out of contact with the work, there is provided a coil torsion spring 57 that encircles the intermediate reduced portion 39 of the shaft-section 32. The one end of the spring is embedded in a bore in the block 40 while the other end is embedded in the section 32, as seen in Fig. 4. The spring 57 is preset to bias the shaft-section 32 and thus the shaft-section 30 in that direction of rotation in which the crank 29 will be depressed. The spring of course, reacts against the block 40 which is held against rotation by the fork 41 that embraces the eccentric 42.

To hold the plunger 43 in its operative position within the bore 46 of the arm 47 in which the feed mechanism is adapted to perform a normal feeding function, the stud 51 which engages in the slot, is designed to pass a few degrees beyond its maximum throw position, or in other words, a line drawn through the center of the stud 51 and its center of rotation, which is the center of the rod 53, will be inclined to the vertical plane passing through the axis of the plunger 43, as seen in Fig. 5. Thus any forces tending to retract the plunger from its operative position within the bore 46 will only act to rotate the stud 51 more securely into its stop position as indicated by arrow A in Fig. 5. When the lever 55 is rotated to withdraw the plunger from operative position, the stud 51 is rotated in the direction of arrow B, Fig. 5.

The tapered point 48 of the plunger 43 is designed to permit the plunger 43 to be withdrawn from and inserted into the bore 46 while the machine is in operation, that is, while the block 40 and the plunger itself carried thereby are being oscillated by the eccentric 42. Toward this end the plunger and the point 48 thereof are so designed with relation to the bore 46 that the oscillation of the block 40 will not be sufficient to carry the apex of the point 48 beyond the confines of the bore 46. Thus, the plunger 43, by virtue of the tapered point thereof, will be able to cam itself into the bore 46 regardless of the relative positions of the two, and the shaft-sections 30 and 32 will be rotated against the action of the spring 57 into operative alignment with the block 40.

With particular reference to Fig. 6, it will be seen that the recess 54 comprises a well 58, a finger well 59, and an intermediate depression 60. The well 58 is designed to provide clearance for the end 61 of the lever 55 and thus permit rotation of the same. The well 59 is a finger-hole by means of which the operator can place a finger under the lever 55 and move it into feed throw-out position, as illustrated by the dotted lines in Fig. 6. The intermediate depression 60 includes a shoulder 62 against which the lever is adapted to abut and which thus determines its stop position when the feed is in its normal operative position. As seen in Fig. 6, the lever 55 may be turned through substantially one-half a revolution, and when in feed throw-out position as illustrated in dotted lines, the stop-position is determined by the edge 63 of the well 58 against which the lever abuts.

It will be noted that the lever 55 has substantially the same vertical dimension as the recess 54 and that it is formed with substantially the same outer contour as the standard 2. Thus, when the feed is in its normal operative position, the lever forms substantially a flush surface therewith. In this manner, the actuating lever for the feed throw-out has not only been located in a position conveniently accessible to the operator but also where it will not hinder free use of the work-supporting surface of the machine.

Numerous alterations of the structure herein disclosed will suggest themselves to those skilled in the art. However, it is to be understood that the present disclosure relates to a preferred embodiment of my invention which is for purposes of illustration only and not to be construed as a limitation of the invention. All such modifications which do not depart from the spirit of the invention are intended to be included within the scope of the appended claims.

Having thus set forth the nature of the invention, what we claim herein is:

1. In a sewing machine having a bed and a standard rising from said bed, feed throw-out mechanism including a longitudinally slidable rod mounted longitudinally of said bed, means for imparting sliding movement to said rod including a rotatable rod journaled in said standard, operative connections between said rotatable rod and slidable rod for imparting sliding movements to the latter upon rotation of the former, and means for imparting rotation to said rotatable rod comprising a manually actuated lever fixed to said rotatable rod, said standard having a recess formed therein and said lever being normally received within said recess.

2. In a sewing machine having a work-supporting surface and a standard rising from one end of said work-supporting surface, said standard having a recess formed in the outer wall portions thereof, a feed throw-out mechanism including a rotatable rod journaled in said standard and work-supporting surface and extending into said recess, and means for imparting rotation to said rod comprising a manually-actuated lever fixed to said rod within said recess, said lever being formed substantially to coincide in size and shape with said recess and when in one operative position having the outer surface thereof substantially coplanar with the adjacent outer wall portions of said standard.

3. In a sewing machine having a work-supporting surface and a standard rising from one end of said work-supporting surface, said standard having a recess formed in the outer wall portions thereof, a feed throw-out mechanism including a longitudinally slidable rod mounted below said work-supporting surface, means for imparting longitudinal sliding movements to said rod including a rotatable rod journaled in said standard and work-supporting surface and extending into said recess, operative connections between said rotatable rod and said sliding

rod for imparting sliding movements to the latter upon rotation of the former, and means for imparting rotation to said rotatable rod comprising a manually-actuated lever fixed to said rod within said recess, said lever being formed substantially to coincide in size and shape with said recess and when in one operative position having the outer surface thereof substantially coplanar with the adjacent outer wall portions of said standard.

4. In a sewing machine having a work-supporting surface and a standard rising from one end of said work-supporting surface, said standard having a recess formed in the outer wall portions thereof, a feed throw-out mechanism including a longitudinally slidable rod mounted below said work-supporting surface, means for imparting longitudinal sliding movements to said rod comprising a rotatable rod journaled in said standard and work-supporting surface and extending into said recess, a crank carried by said rotatable rod and operatively connected to said sliding rod for imparting sliding movements to the latter upon rotation of the former, and means for imparting rotation to said rotatable rod comprising a manually-actuated lever fixed to said rod within said recess, said lever being formed substantially to coincide in size and shape with said recess and when in one operative position having the outer surface thereof substantially coplanar with the adjacent outer wall portions of said standard.

5. In a sewing machine having a work-supporting surface and a standard rising from one end of said work-supporting surface, said standard having a recess formed in the outer wall portions thereof, a feed mechanism for advancing work transversely of said work-supporting surface, a feed-actuating shaft journaled longitudinally of said work-supporting surface, disconnectible operative connections between said shaft and said feed mechanism for imparting feed-advancing movements to said feed mechanism upon actuation of said shaft, said disconnectible connection comprising a retractible rod extending to a position adjacent said standard, a rotatable rod journaled in said standard and work-supporting surface, a crank carried by said rotatable rod and being operatively connected to said retractible rod for imparting sliding movements to the latter upon rotation of the former, said rotatable rod extending into the recess in said standard, and a manually-actuated lever positioned within said recess and being secured to said rotatable rod for rotating the same upon rotation of said lever.

6. In a sewing machine having a work-supporting surface and a standard rising from one end of said work-supporting surface, said standard having a recess formed in the outer wall portions thereof, a feed mechanism for advancing work transversely of said work-supporting surfaces, a feed-actuating shaft journaled longitudinally of said work-supporting surface, disconnectible operative connections between said shaft and said feed mechanism for imparting feed-advancing movements to said feed mechanism upon actuation of said shaft, said disconnectible connection comprising a retractable rod extending to a position adjacent said standard, a rotatable rod journaled in said standard and work-supporting surface, a crank carried by said rotatable rod and being operatively connected to said retractable rod for imparting sliding movements to the latter upon rotation of the former, said rotatable rod extending into the recess in said standard, and a manually-actuated lever positioned within said recess and being secured to said rotatable rod for rotating the same upon rotation of said lever, said lever being formed to substantially coincide in size and shape with said recess and when in one operative position having the outer surface thereof substantially coplanar with the adjacent outer wall portions of said standard.

7. In a sewing machine having a frame including a work-supporting surface and a hollow standard rising from one end of said work-supporting surface, said frame having a recess formed in an outer surface thereof, a feed throw-out mechanism including a rotatable rod journaled in said frame and extending into said recess, and means for imparting rotation to said rod comprising a manually-actuated lever fixed to said rod within said recess, said lever being fitted within said recess and when in one operative position having the outer surface thereof substantially coplanar with the adjacent outer surface of said frame.

8. In a sewing machine having a frame including a work-supporting surface and a hollow standard rising from one end of said work-supporting surface, said frame having a recess formed in an outer surface thereof, a control mechanism including a rotatable rod journaled in said frame and extending into said recess, and means for imparting rotation to said rod comprising a manually-actuated lever fixed to said rod within said recess, said lever being fitted within said recess and when in one operative position having the outer surface thereof substantially coplanar with the adjacent outer surface of said frame.

9. In a sewing machine having a frame including a horizontal work-supporting surface and a vertical hollow standard rising from one end thereof, said standard having a recess located adjacent the junction of said work-supporting surface and said standard, a lever fitted into said recess and having its outer surface substantially coplanar with the adjacent outer wall portion of said standard, a vertical pivot rod for securing said lever to said standard for movement about a vertical axis located within the confines of the standard, four-motion feeding mechanism carried by said frame, feed throw-out mechanism for disabling said feeding mechanism and operative connections between said lever and said feed throw-out mechanism.

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