

May 28, 1946.

R. BECKER

2,401,216

PRESSER-FOOT LIFTING MECHANISM FOR SEWING MACHINES

Filed June 9, 1945

3 Sheets-Sheet 1

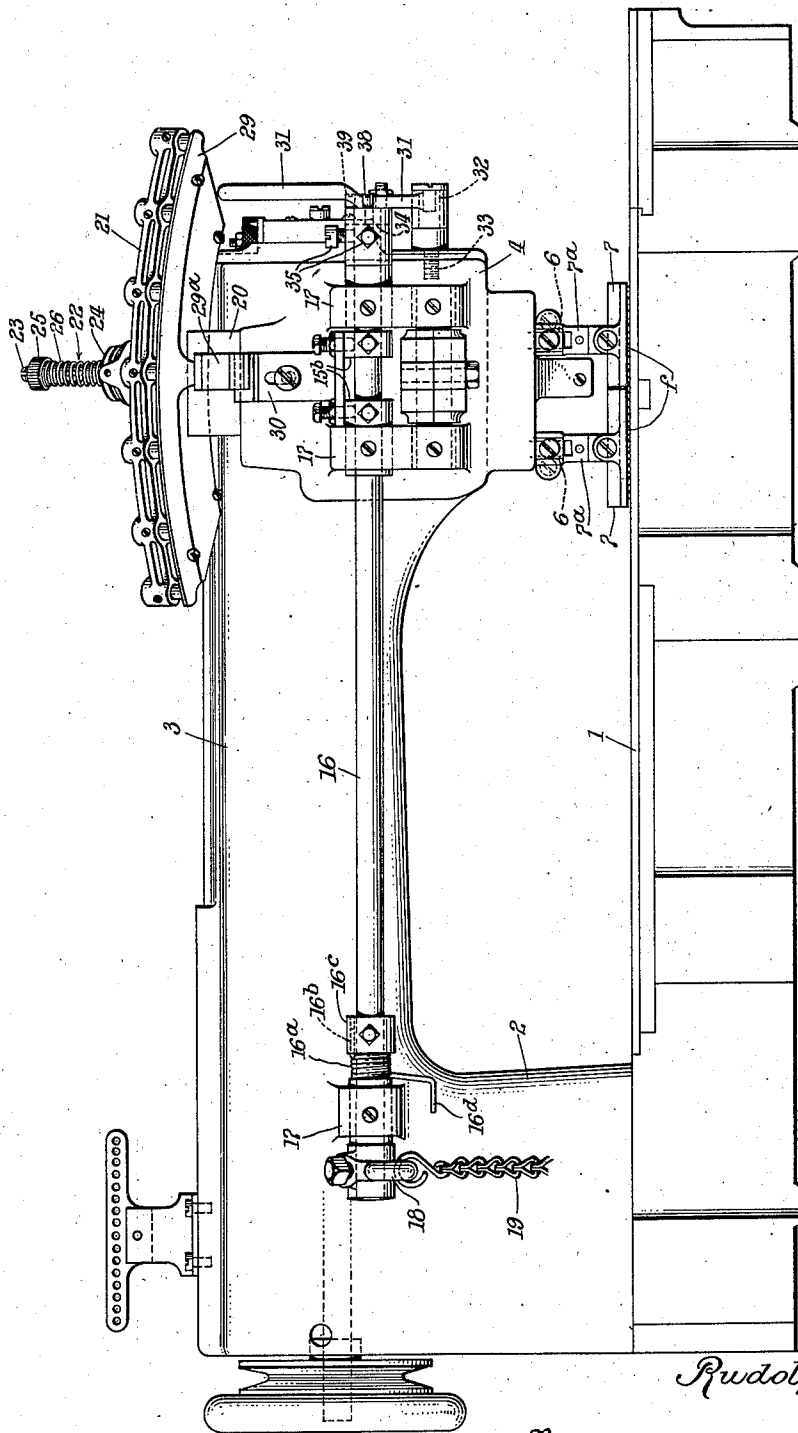


Fig. 1.

Inventor

Rudolph Becker

By *William F. Stewart*
Attorney

May 28, 1946.

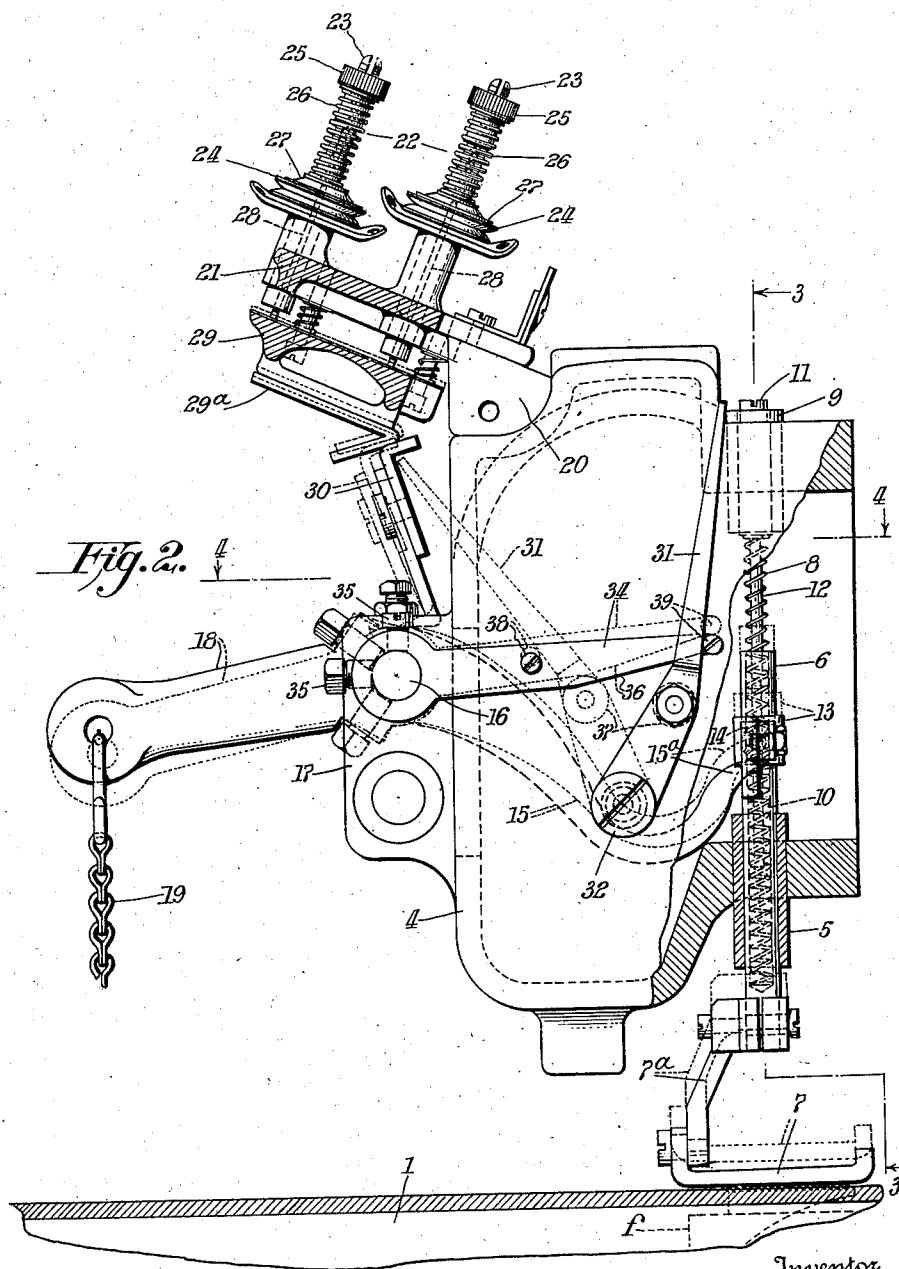
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Inventor
Rudolph Becker

By William P. Stewart
Attorney

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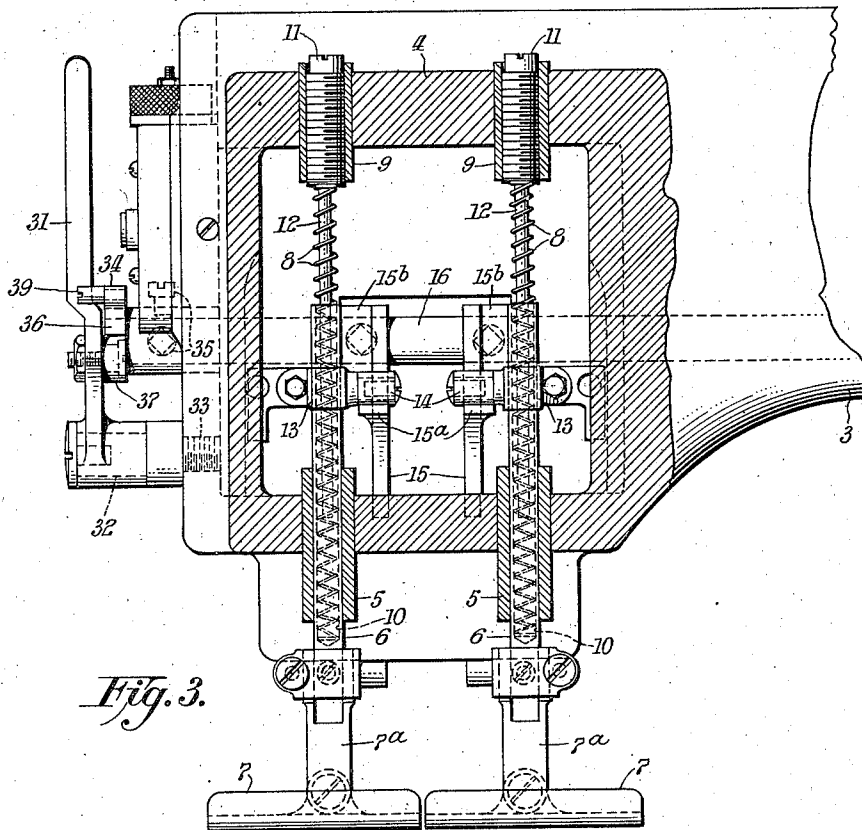
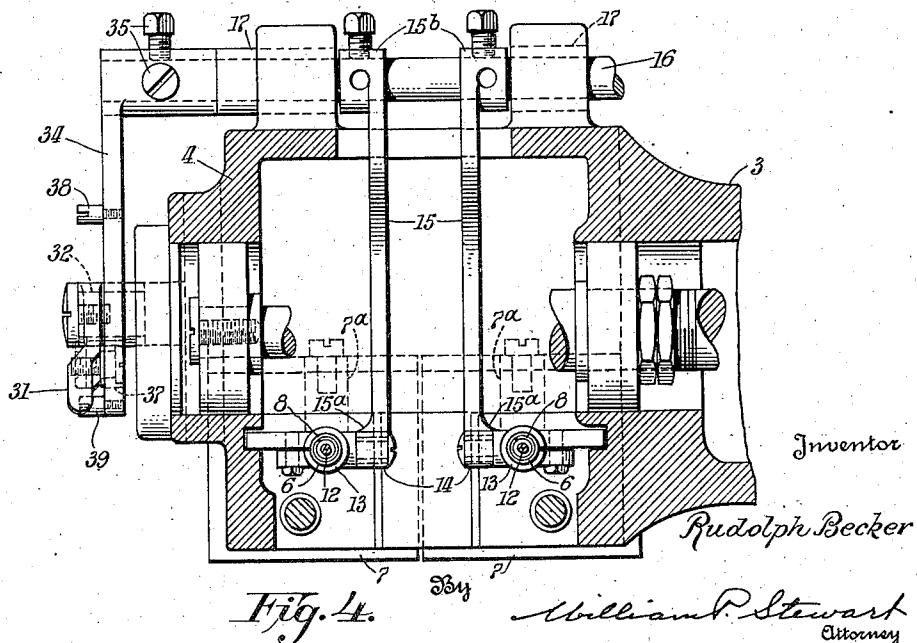
R. BECKER

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PRESSER-FOOT LIFTING MECHANISM FOR SEWING MACHINES

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3 Sheets-Sheet 3



Inventor

Rudolph Becker

William P. Stewart
Attorney

UNITED STATES PATENT OFFICE

2,401,216

PRESSER-FOOT LIFTING MECHANISM FOR
SEWING MACHINESRudolph Becker, North Plainfield, N. J., assignor
to The Singer Manufacturing Company, Eliza-
beth, N. J., a corporation of New Jersey

Application June 9, 1945, Serial No. 598,437

9 Claims. (Cl. 112—238)

This invention relates to sewing machines of the multiple needle, heavy duty type and more particularly to improved manually actuated means for lifting the presser-foot (or presser-feet) of such machines.

In heavy duty sewing machines it is common practice to have one or more presser-bars vertically movable in a bracket-arm head; to have a presser-foot attached to the lower end of each presser-bar; and to have a relatively heavy pressure spring acting on each presser-bar to depress the presser-foot onto the work therebeneath. The presser-foot (or feet) holds the work on the cloth plate during the time the needle is within the work and cooperates with a feeding mechanism, while the needle is out of the work, to effect feeding of the work through the machine.

It is also common practice to utilize the presser-bar lifter to release the needle-thread tensions simultaneously with the lifting of the presser-feet. This is effected by compressing the tension springs away from the tension disks thus relieving the pressure of the disks on the thread. When the machine contains a considerable number of needles, and a corresponding number of thread tensions, this releasing of the tensions adds considerably to the load imposed upon the presser-bar lifter.

In the operation of a sewing machine, it is frequently necessary that the operator lift the presser-foot (or feet) by hand. In heavy duty machines, and especially those employing a plurality of spring-depressed presser-bars and a considerable number of thread tensions, the total downward pressure which has to be overcome by the presser-lifter is relatively great and therefore the repeated lifting of the presser-feet, in opposition to such a spring pressure, is arduous and tiring to the operator.

This invention therefore has a primary object to provide an improved manually operable presser-foot lifting mechanism by means of which the heavy spring pressure of the presser-device of a heavy duty sewing machine may be easily overcome, thus making it possible for the operator to raise and lower the presser-device repeatedly without annoyance or fatigue.

With the above and other objects in view, as will hereinafter appear, the invention comprises the devices, combinations and arrangements of parts hereinafter set forth and illustrated in the accompanying drawings of a preferred embodiment of the invention, from which the several features of the invention and the advantages at-

tained thereby will be readily understood by those skilled in the art.

In the drawings,

Fig. 1 is a rear elevation of a sewing machine embodying the present invention.

Fig. 2 is an enlarged right end view, partly in section, of the bracket-arm head, shown in Fig. 1, showing the improved presser-foot lifting mechanism associated therewith.

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

Fig. 4 is a horizontal sectional view substantially on the line 4—4 of Fig. 2.

Referring more specifically to the drawings, the invention is disclosed as embodied in a sewing machine having a work-support 1, a bracket-arm comprising a standard 2 and an overhanging arm 3 terminating in a head 4, and a lower four-motioned work-feeding mechanism, designated generally as 5 which operates through suitable slots in the work-support. Mounted in bearings 5 in the head 4, for vertical reciprocation, are two presser-bars 6 to the lower end of each of which is secured a bracket 7^a carrying a presser-foot 7. The presser-bars 6 are laterally spaced from each other crosswise of the lines of seam formation. Each presser-bar is depressed by a relatively strong spring 8, the upper end of which abuts the lower end of a spring tension-adjusting screw 11 threaded into a bushing 9 carried by the head 4. The lower end of each spring 8 is located within a bore 10 formed in one of the presser-bars and bears against the lower wall thereof. Each spring-tension-adjusting-screw 11 has, on its lower end, a spring-guiding rod 12. By adjusting the screws 11, any desired spring pressure may be applied to the presser-bars and to the presser-feet carried thereby.

Secured upon each of the presser-bars 6, within the head 4, is a lifting collar 13 carrying a roller-stud 14. These studs overlie, and are engaged by, the flattened forward ends 15^a of two presser-bar lifting arms 15, the hubs 15^b of which are secured upon a presser-bar lifting shaft 16, journaled at the rear side of the bracket-arm 3 and lengthwise thereof in bearings 17. Fixed to the opposite end of the shaft 16, rearwardly of the standard 2, is an arm 18 to which is connected the upper end of a treadle-actuated chain 19, or similar connection. Thus, by the operation of a suitable treadle (not shown) the shaft 16 and the presser-bar lifting arms 15 may be turned counterclockwise, as viewed in Fig. 2 thereby lifting the presser-bars 6 and the presser-feet 7 carried thereby. A torsion spring 16^a surrounds the shaft 16

adjacent the rear bearing 17 and has one offset end 16^b fitted into an aperture in a collar 16^c secured to the shaft 16, and its other offset end 16^d bearing against the standard 2. This spring normally biases the shaft 16 in a clockwise direction, as seen in Fig. 2, and thus maintains a slight clearance between the portions 15^a of the levers 15 and the studs 14. This permits the presser-bars to have their normal up and down movements, under the influence of the feed-dog, without affecting the presser-foot lifters.

Carried by a bracket 20, secured to the head 4, is a plate 21 which, in turn, carries a plurality of thread tensions 22; one for each needle-thread but of which only three are shown. Each thread tension includes a supporting stud 23, a pair of disks 24, between which the thread passes, a tension regulating nut 25 threaded on the stud 23 and a coil spring 26 surrounding the stud between the nut 25 and a washer 27 bearing upon the top of the upper tension disk. Tension on the thread may be released by upward compression of the spring 26 by upward endwise movement of a tension-releasing pin 28 which extends through the tension disks and has its upper end engaging a portion of the washer 27. The lower ends of the pins 28 project below the plate 21 and rest upon a vertically movable frame 29 carrying, at its under side, an angle plate 29^a which is supported upon the upper end of an arm 30 secured upon the hubs 15^b of the presser lifting arms. Thus each oscillation of the shaft 16 to lift the presser-bars also effects release of the needle-thread tensions. Tension releases of this general nature are well known; being shown, for example in United States patents of A. H. DeVoe, No. 1,146,405, July 13, 1915, and No. 1,293,725, Feb. 11, 1919.

This invention provides an improved power-multiplying hand-actuated means for turning the shaft 16 to effect lifting of the presser-bars and releasing the needle-thread tensions. This means comprises a relatively long manually operable lever 31 fulcrumed on a stud 32 threaded, at 33, into the bracket-arm head 4. Cooperating with the lever 31 is a relatively long arm 34 secured to the forward end of the shaft 16, as by set screws 35. Formed on the under side of the arm 34 is a cam surface 36 adapted, during a counterclockwise movement of the hand-lever 31, (Fig. 2) to be engaged by a roller stud 37 carried by the hand-lever. As the hand-lever is turned counterclockwise from the position shown in full lines in Fig. 2 to that indicated in dotted lines, the coaction between the stud 37 and the surface 36 cams the arm 34 upwardly, thus turning the shaft 16 counterclockwise and, through arms 15, studs 14 and collars 13, lifting the presser-bars and the presser-feet carried thereby. A stud 38, carried by the arm 34, lies in the path of the lever 31 and limits its movement in one direction, thus predetermining the elevated position of the presser-feet. In the position indicated in dotted lines in Fig. 2 the lever 31 is overbalanced toward the rear of the machine and when once moved to that position will remain there, holding the presser-feet elevated, until the lever is again moved forwardly by hand.

The hand-lever 31 is so constructed and arranged that, when it is turned to lower the presser-feet, the lever is overbalanced toward the front of the machine and therefore gravitates to the position shown in full lines in Fig. 2 in which the lever rests against a stop screw 39 carried

by the outer end of the arm 34. Thus the roller 37 is prevented from accidentally getting beneath the arm 34 and maintaining it elevated when the presser-bar is lifted by the treadle connection 19.

From the foregoing it will be apparent that the relatively long lever 31 and the power multiplying connection between that lever and the shaft 16, including the arm 34 and the cam and roller connection between the lever 31 and the arm 34, afford an easily actuated means whereby the presser-bars may be lifted and the needle-thread tensions released by the application of a relatively light pressure upon the lever by the hand of the operator.

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

1. In a sewing machine having a head and a spring-depressed presser-bar slidably mounted therein; a presser-bar lifting means comprising a rock-arm journaled rearwardly of said presser-bar and operatively connected therewith, a manually operable presser-bar lifting lever fulcrumed on said head, and a power multiplying connection between said lever and said rock-arm.

2. In a sewing machine having a head and a spring-depressed presser-bar slidably mounted therein; a presser-bar lifting means comprising a first rock-arm journaled rearwardly of said presser-bar and operatively connected therewith, a second rock-arm operatively connected with said first rock-arm, a manually operable lever fulcrumed on said head, and means actuated by said manually operable lever for turning said second rock-arm and thereby said first rock-arm to lift said presser-bar.

3. In a sewing machine having a head and a spring-depressed presser-bar slidably mounted therein; a presser-bar lifting means comprising a first rock-arm journaled rearwardly of said presser-bar and operatively connected therewith, a second rock-arm operatively connected with said first rock-arm, a hand-lever fulcrumed on said head, and a stud carried by said hand-lever and engaging said second rock-arm during one movement of the hand-lever to turn said rock-arms and effect lifting of said presser-bar.

4. In a sewing machine having a head and a spring-depressed presser-bar slidably mounted therein; a presser-bar lifting means comprising a first rock-arm journaled rearwardly of said presser-bar and operatively connected therewith, a second rock-arm journaled coaxially with said first rock-arm and operatively connected therewith, a cam surface on said second rock-arm, a manually operable presser-bar lifting lever fulcrumed on said head, and a stud carried by said lever and engaging said cam surface during one movement of said lever to turn said second rock-arm and thereby the first rock-arm to lift said presser-bar.

5. In a sewing machine having a head and a spring-depressed presser-bar slidably mounted therein; a presser-bar lifting means comprising a first rock-arm journaled rearwardly of said presser-bar and operatively connected therewith, a second rock-arm operatively connected with said first rock-arm, an oscillatable hand-lever fulcrumed on said head, a cam and stud connection between said hand-lever and said second rock-arm whereby movement of the hand-lever in one direction turns said rock-arms and effects lifting of said presser-bar, and stops for limiting the movement of said hand-lever in its opposite directions of movement.

6. In a sewing machine having a bracket-arm

terminating in a bracket-arm head, a shaft journaled lengthwise of said bracket-arm and a spring-depressed presser-bar slidingly mounted in said bracket-arm head; presser-bar lifting means comprising a first rock-arm having one end secured to said shaft and its other end operatively connected with said presser-bar, a second rock-arm secured to said shaft, a manually operable lever, and an operative connection between said lever and said second rock-arm whereby movement of said lever in one direction turns said second rock-arm, shaft and first rock-arm to lift said presser-bar.

7. In a sewing machine having a bracket-arm terminating in a bracket-arm head, a shaft journaled lengthwise of said bracket-arm and a spring-depressed presser-bar slidingly mounted in said bracket-arm head; presser-bar lifting means comprising a first rock-arm having one end secured to said shaft and its other end operatively connected with said presser-bar, a second rock-arm secured to said shaft, a manually operable lever, an operative connection between said lever and said second rock-arm whereby movement of said lever in one direction turns said second rock-arm, shaft and first rock-arm to lift said presser-bar, and supplemental treadle-actuated means for turning said shaft to lift said presser-bar, said manually operable lever being normally biased to an inoperative position in which its connection with said second rock-arm is rendered ineffective during the lifting of said presser-bar by said treadle-actuated means.

8. In a sewing machine having a head support-

ing a plurality of spring-closed thread tensions and having slidingly mounted therein a plurality of spring-depressed presser-bars; means for simultaneously lifting said presser-bars and releasing said thread tensions, comprising a rock-shaft, means actuated by the movement of said rock-shaft for releasing said thread tensions, a pair of arms each having one end connected to said rock-shaft and its opposite end operatively connected with one of said presser-bars, a manually operable lever fulcrumed on said head, and a power multiplying connection between said lever and said rock-shaft for oscillating said shaft to lift said presser-bars and release said thread tensions by a relatively light pressure applied to said lever.

9. In a sewing machine having a head supporting a spring-closed thread tension and having slidingly mounted therein a spring-depressed presser-bar; means for simultaneously lifting said presser-bar and releasing said thread tension, comprising a rock-shaft, means actuated by the movement of said rock-shaft for releasing said thread tension, a rock-arm having one end connected to said rock-shaft and its opposite end operatively connected with said presser-bar, a second rock-arm secured to said rock-shaft, a hand-lever fulcrumed on said head and operatively connected with said second rock-arm whereby movement of said hand-lever in one direction turns said second rock-arm and thereby said shaft to lift said presser-bar and release said thread tension.

RUDOLPH BECKER.