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FEED LIFT THROW-OUT MECHANISM FOR SEWING MACHINES

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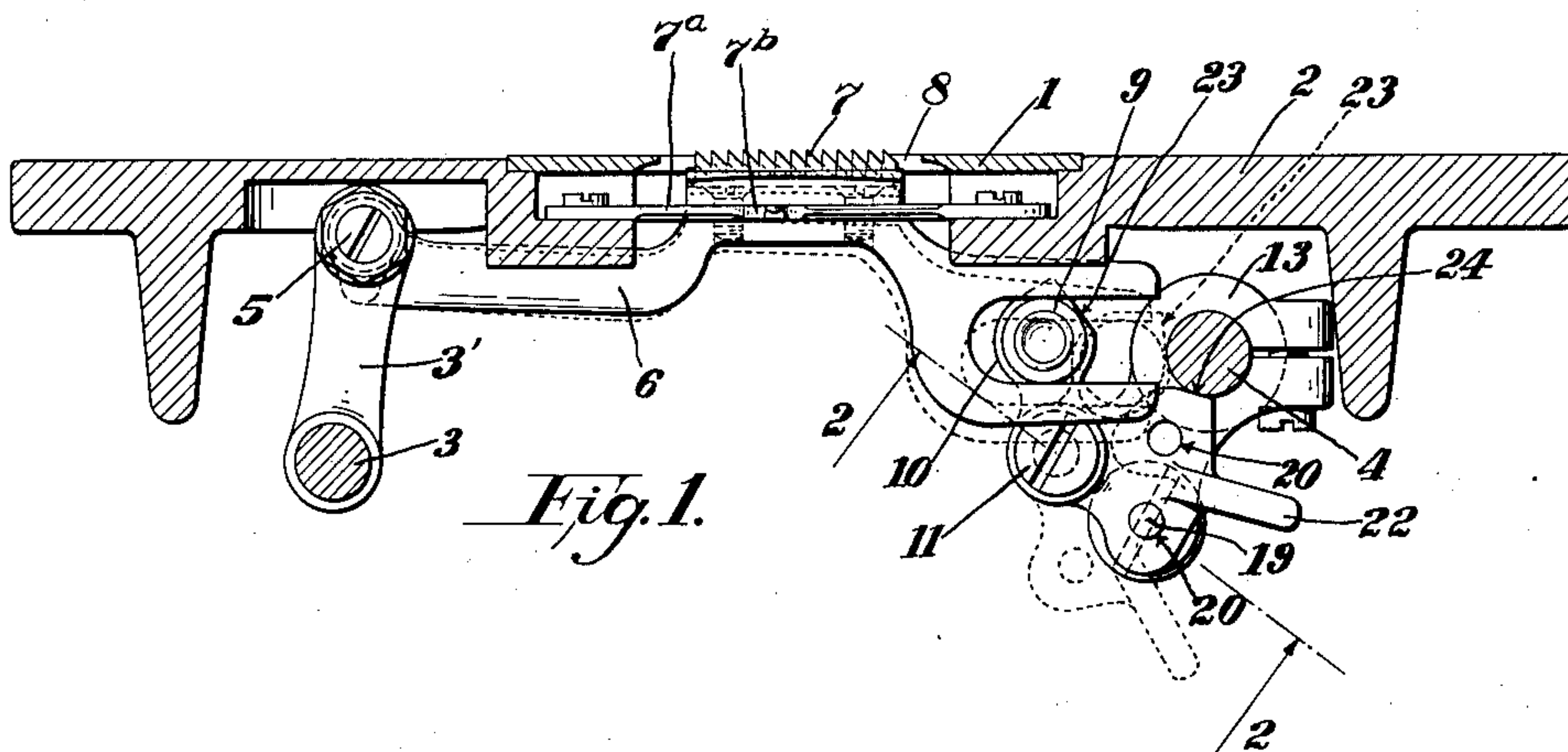


Fig. 1.

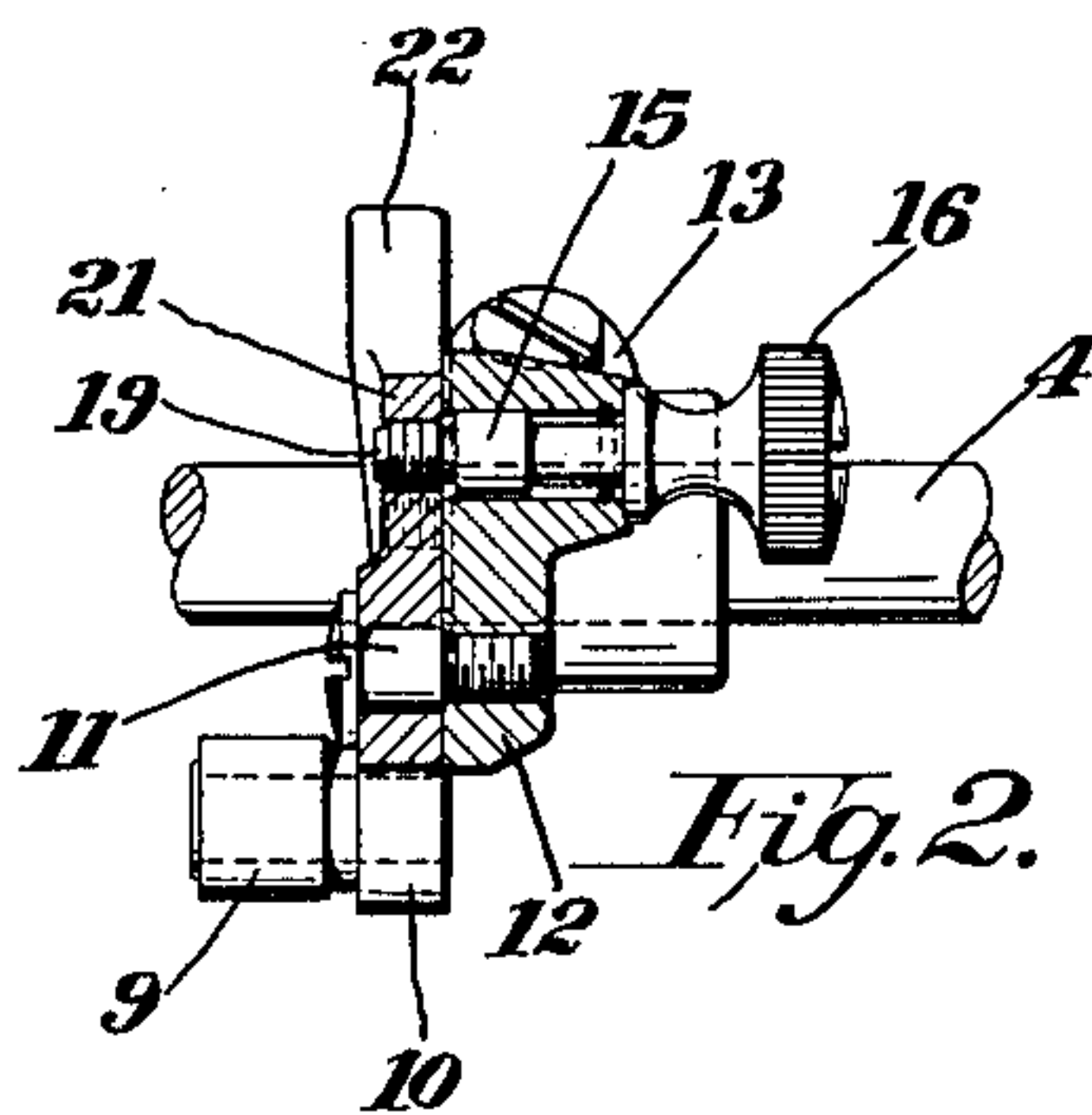


Fig. 2.

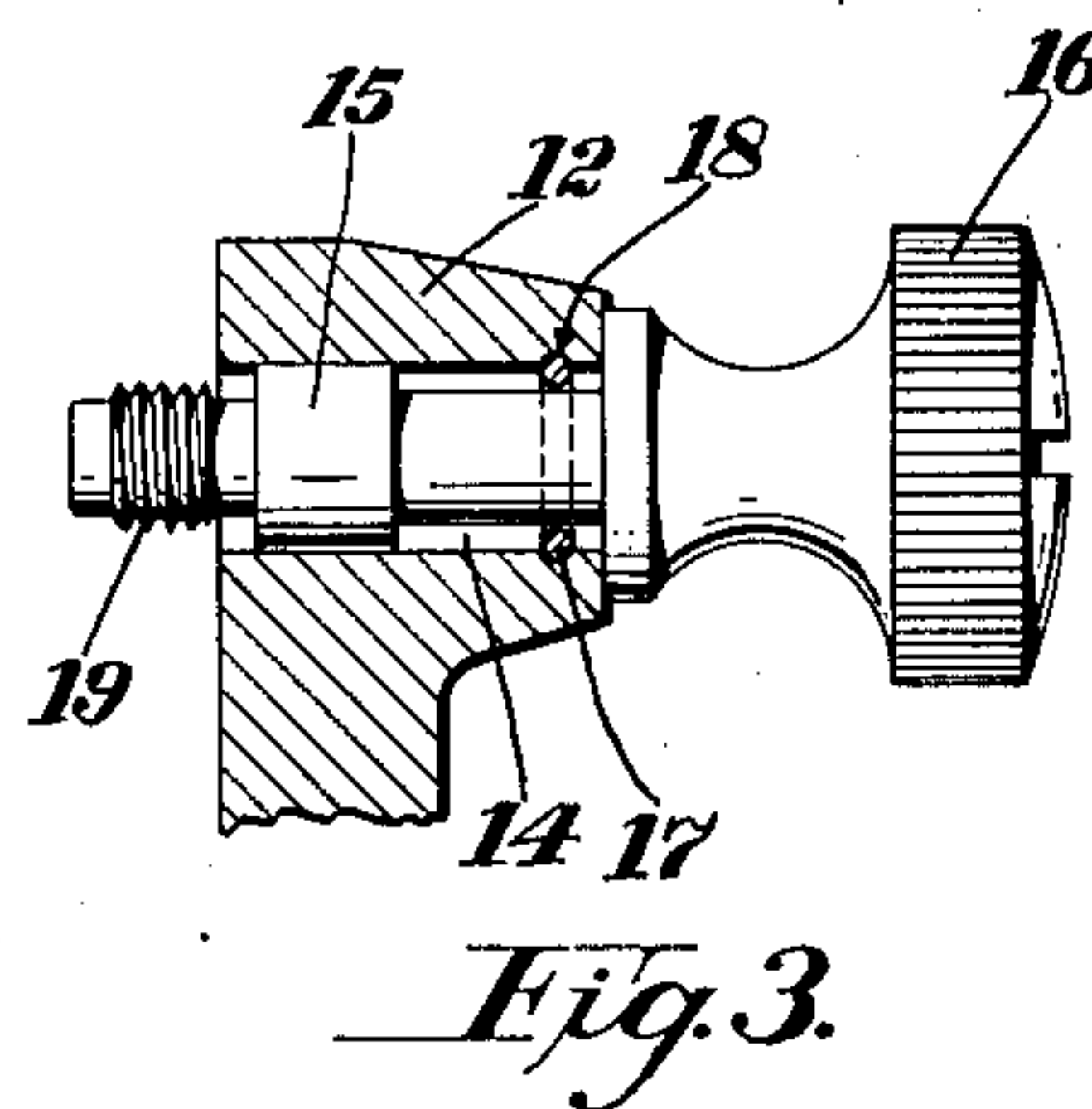


Fig. 3.

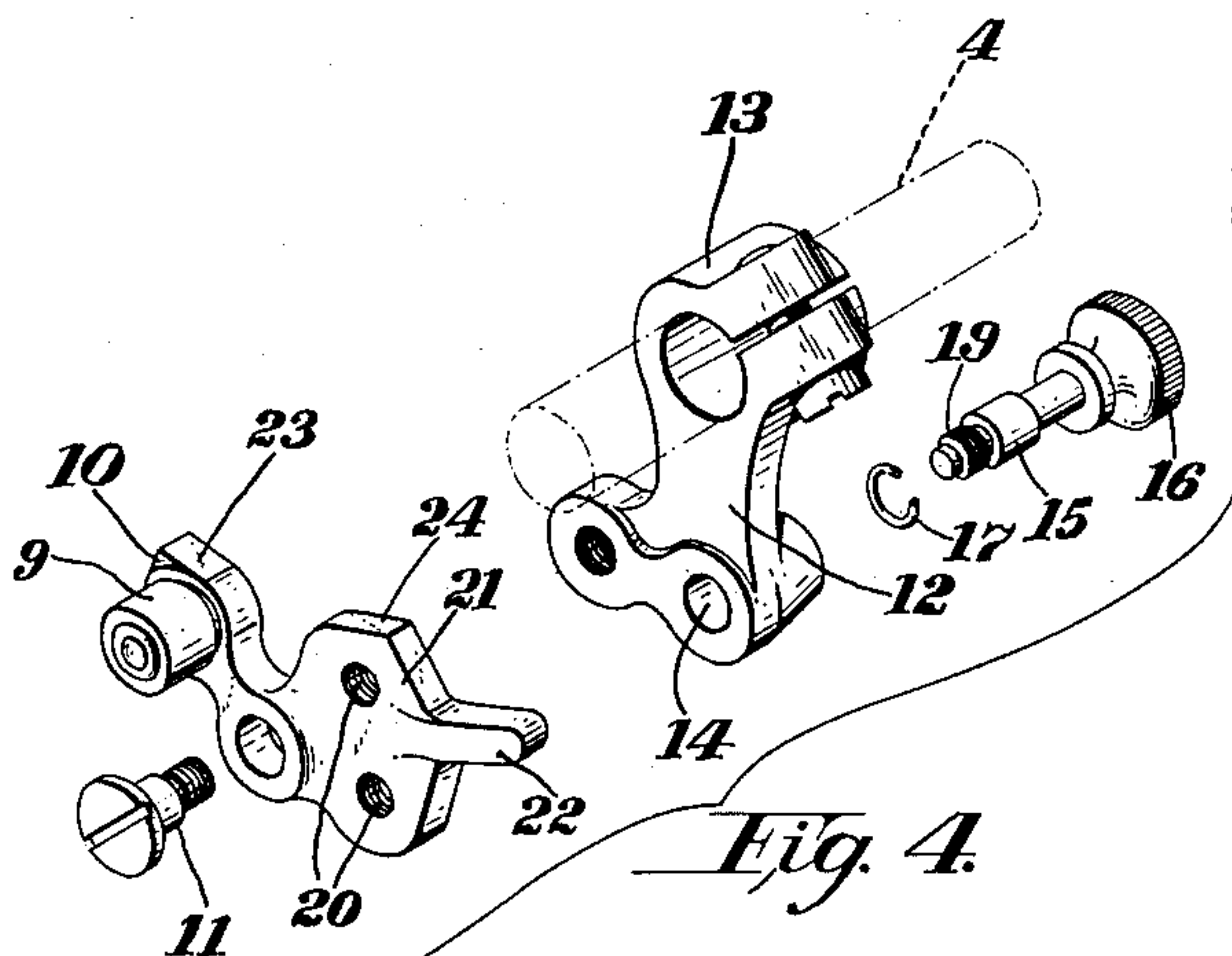


Fig. 4.

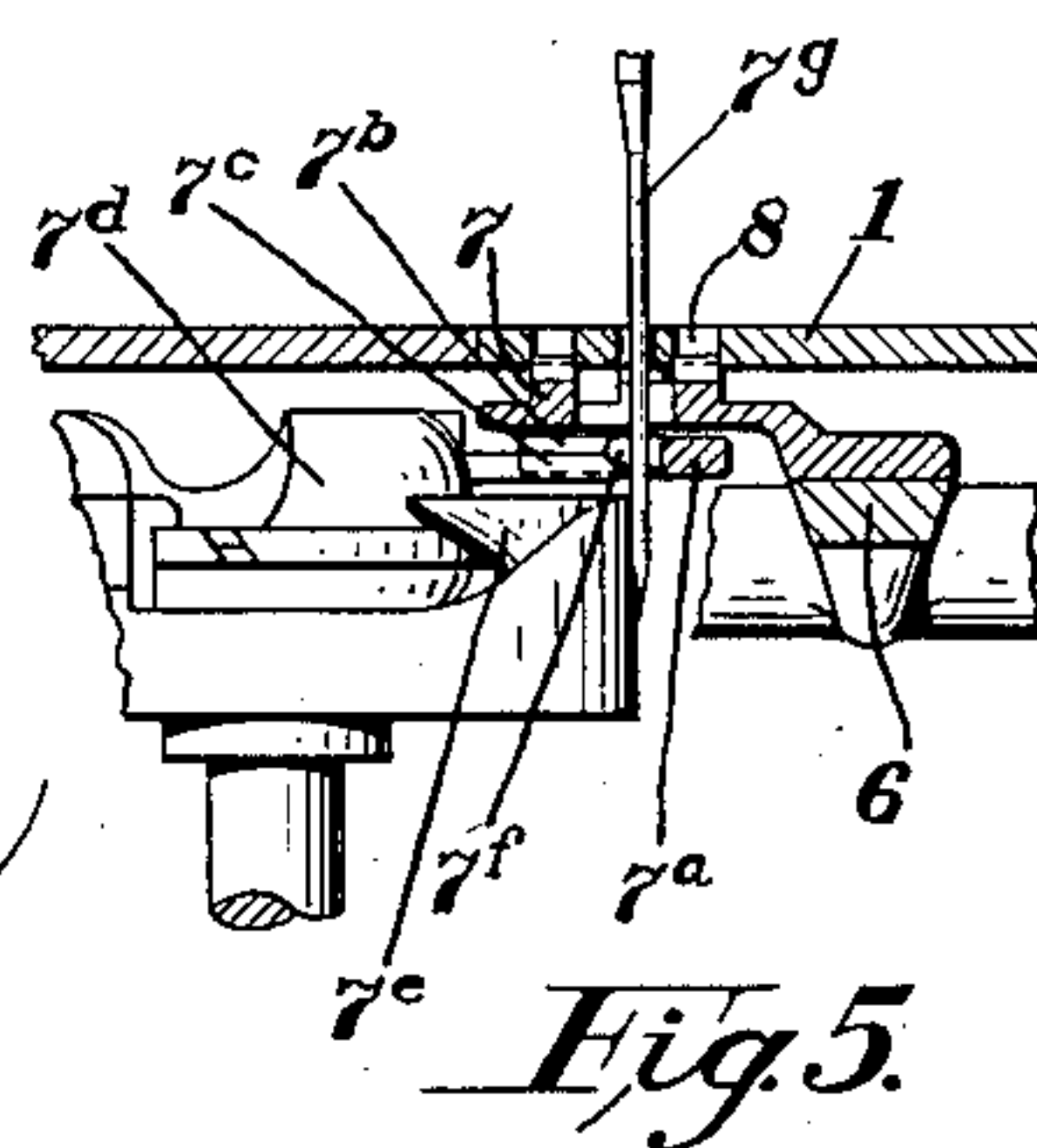


Fig. 5.

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## UNITED STATES PATENT OFFICE

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## FEED-LIFT THROW-OUT MECHANISM FOR SEWING MACHINES

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For certain operations with a sewing machine, such as embroidering and darning operations, it is desirable that the usual four-motion feed-dog be rendered ineffective, so that the work may be freely moved by hand without interference by the feed-dog.

The present invention has for an object to provide improved means, operable at will, for dropping the feed-dog below the throat-plate of the sewing machine, so that it cannot engage the work. The invention also aims to accomplish the above result without disconnecting the feed-bar from the feed-lift rock-shaft, and without collision of the feed-dog or feed-bar with the loop-taker mechanism or any of the parts associated with it.

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 drawing of a preferred embodiment of the invention, from which the several features of the invention and the advantages attained thereby will be readily understood by those skilled in the art.

In the accompanying drawing, Fig. 1 is a transverse vertical section through the bed-plate of a sewing machine, showing the feed-bar and associated parts in side elevation. Fig. 2 is a section on the line 2—2, Fig. 1. Fig. 3 is an enlarged view of a portion of Fig. 2. Fig. 4 is a disassembled perspective view of the feed-lift parts shown in Fig. 1, and Fig. 5 is a transverse section through the feed-dog and associated parts; the feed-dog being at the bottom of its motion in its lowered position.

1 represents the throat-plate of a sewing machine which is carried by the bed 2 below which is journaled the usual feed-advance rock-shaft 3 and feed-lift rock-shaft 4. Rising from the feed-advance rock-shaft 3 is the usual feed-rocker 3' to which is pivotally connected at 5 the usual feed-bar 6 carrying the feed-dog 7 which rises through the slot 8 in the throat-plate 1 to engage and feed the work. The feed-dog 7 may overhang certain elements of the under stitch-forming devices such as the usual bridge-bar 7<sup>a</sup> having a notch 7<sup>b</sup> in one side edge entered by the

tongue 7<sup>c</sup> of the bobbin-case 7<sup>d</sup> to restrain the latter against rotation with the rotary hook 7<sup>e</sup> in which the bobbin-case is journaled. The bridge-bar 7<sup>a</sup> is also formed with a clearance notch 7<sup>f</sup> for the reciprocating needle 7<sup>g</sup>, all substantially as shown in the patent to Hemleb, No. 1,149,049, of Aug. 3, 1915. The present hook 7<sup>e</sup> rotates in a direction opposite to that shown in the Hemleb patent, so that the notches 7<sup>b</sup> and 7<sup>f</sup> are reversed from their respective positions shown in said patent.

The feed-bar 6 is forked or slotted at its front end to receive the feed-lift element or roller 9 mounted on the upstanding arm 10 of a bell-crank lever fulcrumed by the screw 11 upon one end of the feed-lift arm 12 having a split boss 13 at its other end clamped to the feed-lift rock-shaft 4. The feed-lift arm 12 is formed at its end adjacent the fulcrum-screw 11 with a smoothly bored aperture 14 slidably receiving the smooth shank portion 15 of a thumb-screw 16. An outwardly expansible spring-ring 17 seated in the groove 18 within one end of the bore 14 prevents accidental withdrawal of the shank 15 of the thumb-screw from the bore 14. The free end of the thumb-screw shank is reduced and threaded at 19 to enter a selected one of the apertures 20 in the other arm 21 of the bell-crank lever 10, 21; the apertures 20 being equidistant from the fulcrum-screw 11. The free end of the bell-crank lever arm 21 is formed with a finger-piece 22 to facilitate manual shifting of the bell-crank lever upon the feed-lift arm 12.

The arm 10 of the bell-crank lever is formed with a stop-shoulder 23 which, in the dotted line position of such lever, Fig. 1, engages the feed-lift rock-shaft 4, in which position one of the apertures 20 is in register with the threaded shank 19 of the thumb-screw 16. The bell-crank lever-arm 21 is formed with a stop-shoulder 24 which, in the full line position of the bell-crank lever shown in Fig. 1, engages the feed-lift rock-shaft 4 and determines the position of register of the other aperture 20 with the threaded thumb-screw shank 19.

With the bell-crank lever in its full line position, Fig. 1, the feed-bar will be given



its usual rising and falling movements by the feed-lift rock-shaft 4; the amplitude of such movements being sufficient to lift the teeth of the feed-dog 7 above the level of the throat-plate 1 for engagement with the work preparatory to the usual feed-advancing movement given to the feed-bar by the feed-rocker 3'. When it is decided to use the machine for embroidering, darning, or like operations, the operator unscrews the thumb-screw 16 and shifts the bell-crank lever 10, 21 to its dotted line position, Fig. 1, and tightens the thumb-screw in the other aperture 20. This movement or shift of the bell-crank lever 10, 21 simultaneously lowers the roller 10 and moves it closer to the feed-lift rock-shaft 4, thereby dropping the feed-bar to the position shown in Fig. 5 or to the dotted line position shown in Fig. 1, in which position the teeth of the feed-dog 7 are at all times below the upper surface of the throat-plate 1 and are ineffective to engage the work. The amount of lift or up-and-down motion imparted to the feed-bar by the feed-lift rock-shaft 4, in the dotted line positions of the parts, is materially reduced due to the shorter working radius of the feed-lift roller 9. This desirable feature avoids collision of the feed-dog 7 with the bobbin-case rotation restraining bar 7<sup>a</sup> or other parts of the under thread mechanism; the vertical motion of the feed-dog being sufficiently reduced that it neither strikes any of the closely adjacent underlying parts or projects its teeth above the upper surface of the throat-plate 1. As the feed-bar is never disconnected from the feed-lift roller 9, the operator is not required to exercise any particular care in returning the throw-out mechanism to normal feeding position. Furthermore, the both ends of the feed-bar 6 are always under control and positive operation is assured under all conditions.

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

1. In a sewing machine, a feed-advance rocker, a feed-lift rock-shaft, a feed-bar pivotally connected to said feed-advance rocker, an arm on said feed-lift rock-shaft, a feed-bar lifting element carried by said arm, and means for shifting said feed-bar lifting element upon and relative to said arm from normal operative position to a lower position closer to said feed-lift rock-shaft.

2. In a sewing machine, a throat-plate, a feed-advance rocker, a feed-lift rock-shaft, a feed-bar pivotally connected to said feed-advance rocker, a feed-dog on said feed-bar, an arm on said feed-lift rock-shaft, a lever fulcrumed on said arm, and a feed-lift roller carried by said lever, said lever being manually shiftable about its fulcrum to carry said roller from a normal position operative to lift the feed-dog above the throat-plate to a lower position nearer to the feed-lift rock-

shaft, to drop the feed-dog to an ineffective position below said throat-plate.

3. In a sewing machine, the combination with a feed-advance rocker and feed-bar, of a feed-lift rock-shaft, an arm fixed to said rock-shaft, a lever fulcrumed on said arm and formed with two tapped apertures equidistant from the fulcrum point of said lever, a thumb-screw passing freely through said arm and adapted to be screwed into one or the other of said apertures, and feed-bar supporting means on said lever so positioned relative to said fulcrum point that it is simultaneously lowered and moved toward the feed-lift rock-shaft when said lever is shifted from a position of register of one of said tapped apertures with said thumb-screw to a position registering the other tapped aperture with said thumb-screw.

4. In a sewing machine, the combination with a feed-advancing rock-shaft and feed-bar, of a feed-lift rock-shaft, an arm on said rock-shaft, a manually shiftable bell-crank lever fulcrumed on said arm, each arm of said bell-crank lever being formed with a stop adapted to engage said feed-lift rock-shaft to limit the manual shift of said bell-crank lever in opposite directions, means for fixedly securing said bell-crank lever to said arm in either of its extreme positions determined by said stops, and feed-bar engaging means on one arm of said bell-crank lever.

5. In a sewing machine, the combination with a reciprocating needle, under thread mechanism and a throat-plate, of a feed-bar, a feed-dog carried by said feed-bar and overhanging said under thread mechanism, means for imparting feed-and-return movements to said feed-bar, and means for imparting normal operative rising-and-falling movements to said feed-bar to cause said feed-dog to engage and feed the work, said last mentioned means including selective shift mechanism for sufficiently reducing the amplitude of the rising-and-falling movements imparted to the feed-bar to render the feed-dog inoperative, without disconnecting the feed-bar from the feed-lift mechanism.

In testimony whereof I have signed my name to this specification.

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