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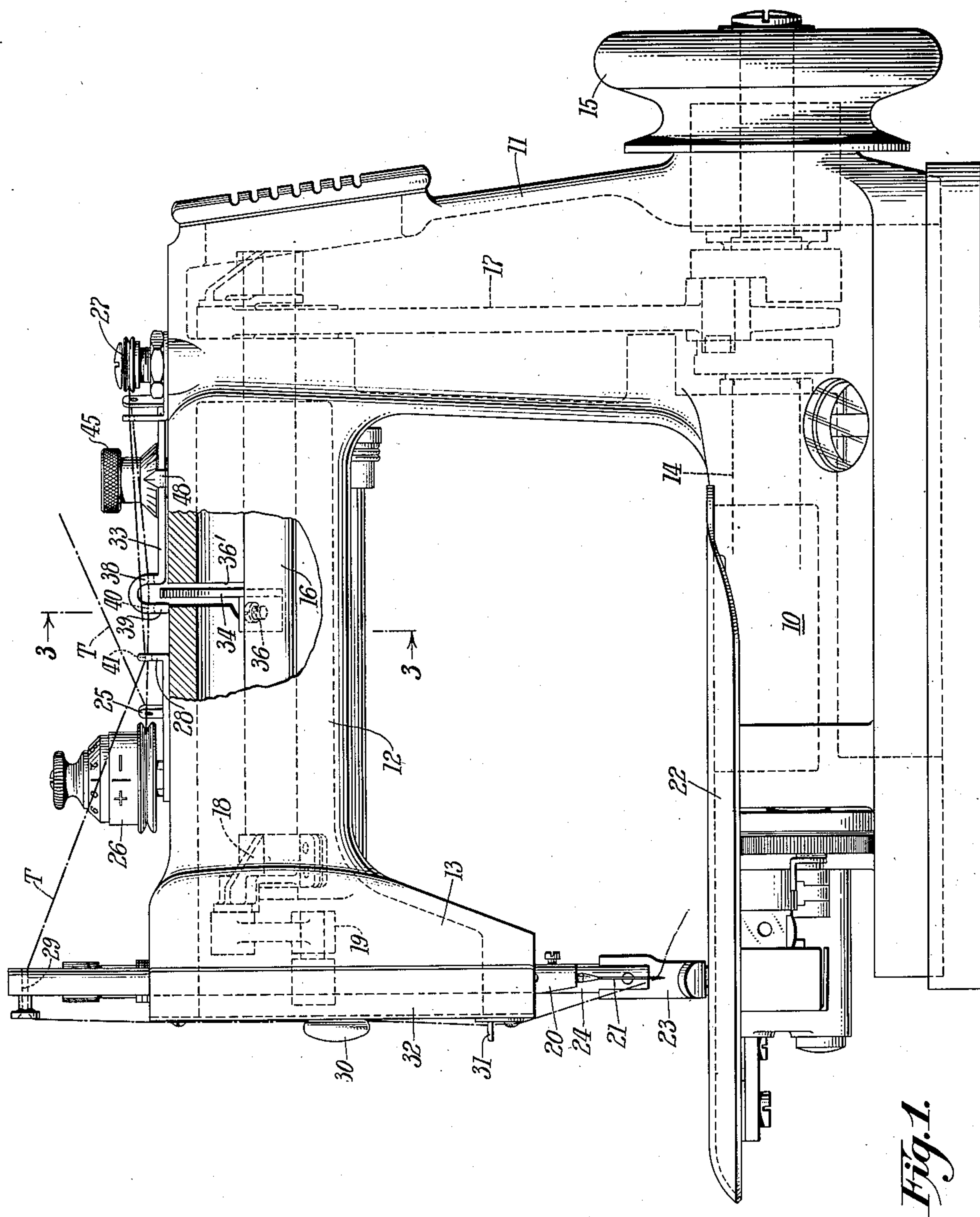
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2,626,580

THREAD PULL-OFF DEVICE FOR SEWING MACHINES

Filed May 12, 1951

2 SHEETS—SHEET 1



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2 SHEETS—SHEET 2

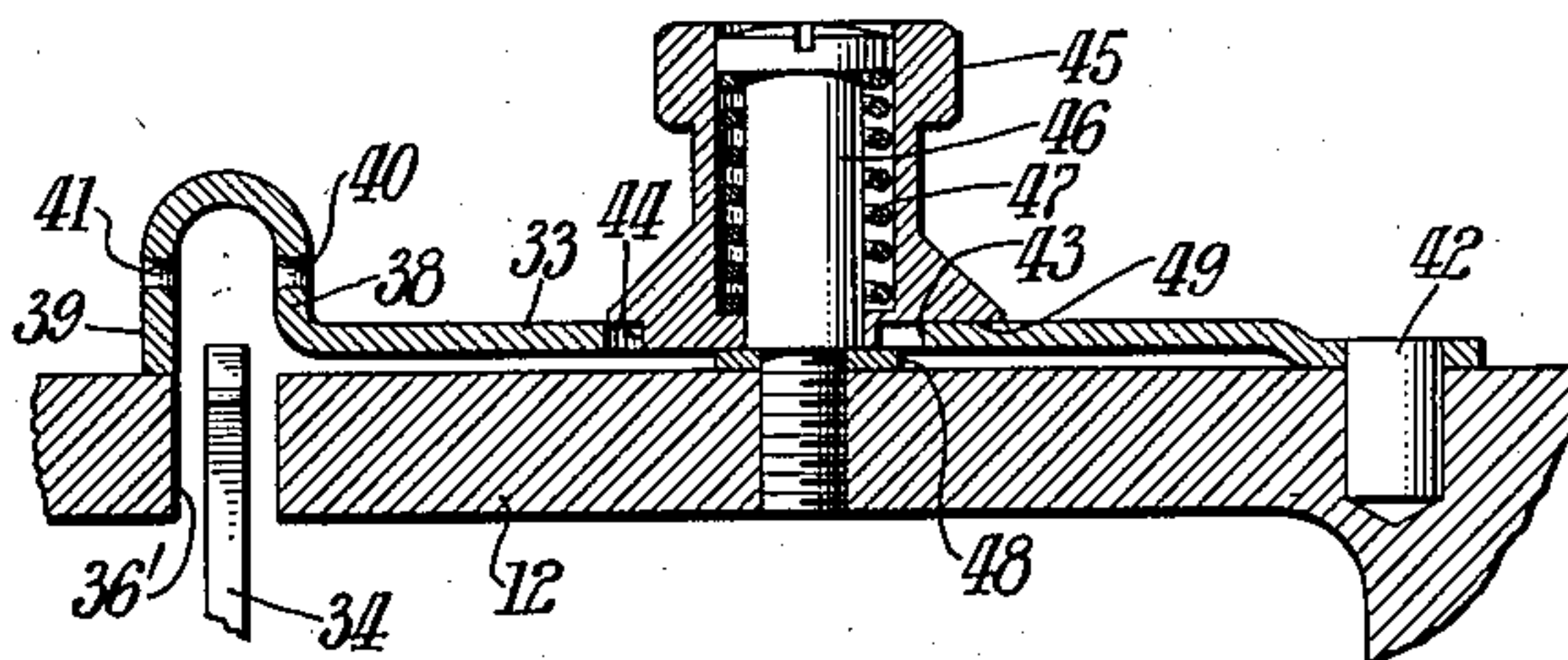
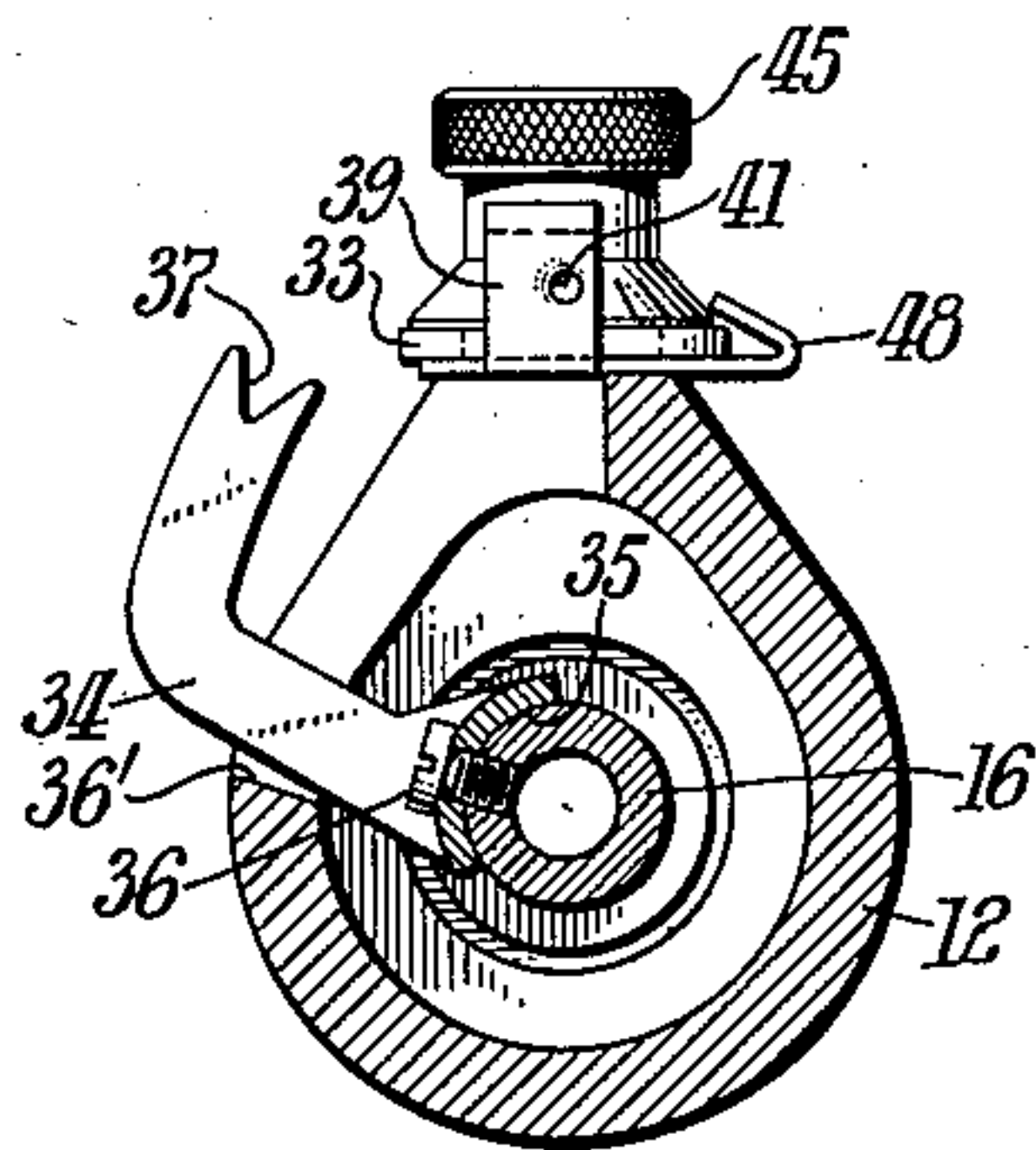
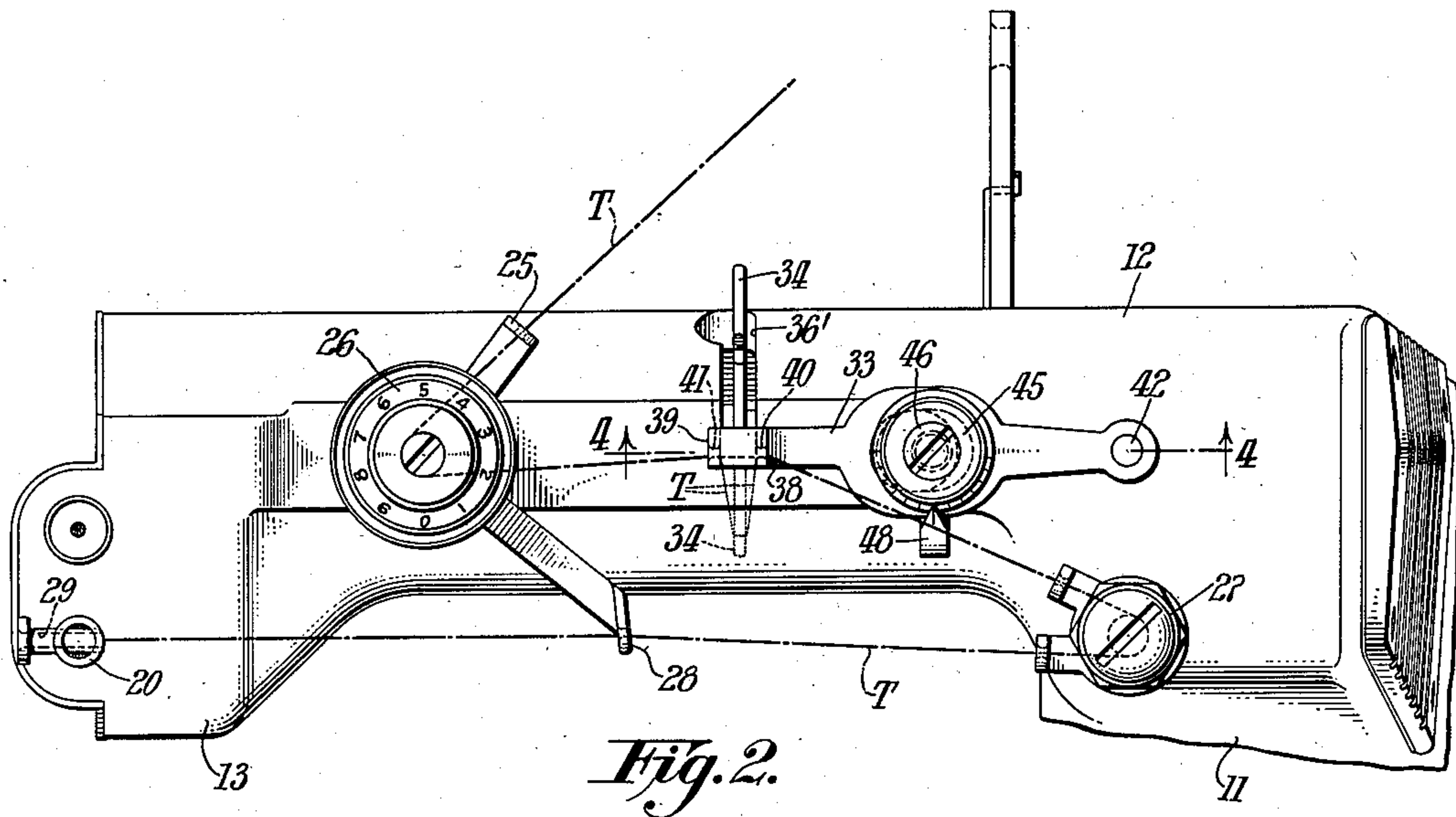


Fig. 3.

Fig. 4.

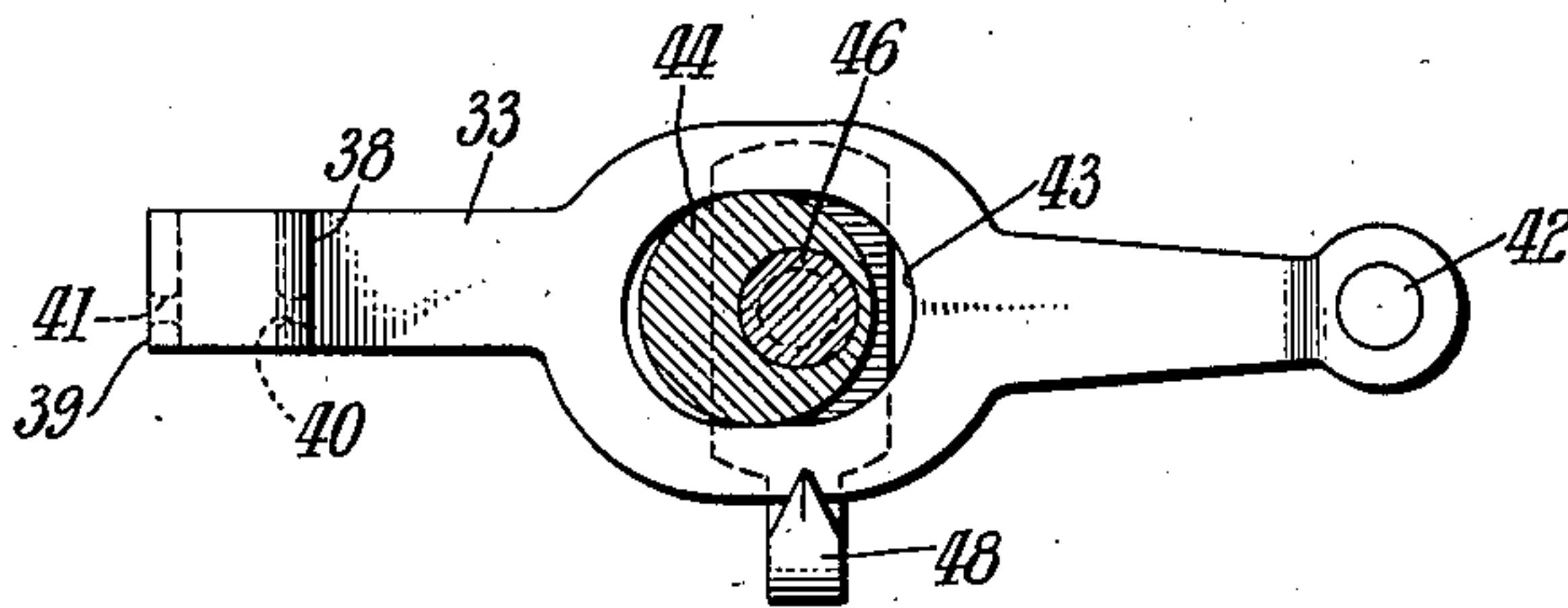


Fig. 5.

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THREAD PULL-OFF DEVICE FOR SEWING MACHINES

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6 Claims. (Cl. 112-242)

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This invention relates to sewing machines and more particularly to a thread pull-off device which operates during each stitch-forming cycle to draw thread from a source of supply so that it may be made available for stitching purposes.

One of the objects of the present invention is to provide an improved thread pull-off device which is adjustable so that various predetermined amounts of thread may be made available for stitching purposes.

Another object of the present invention is to provide an improved compact and inexpensive needle-thread pull-off device having incorporated in it adjusting means whereby the amount of thread pulled from the supply can be very accurately controlled.

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

In the accompanying drawings, Fig. 1 is a front elevational view of a sewing machine embodying the present invention, a portion of the bracket-arm of the machine being broken away better to show the mounting of the movable member of the pull-off device.

Fig. 2 is a top plan view of the machine shown in Fig. 1, showing, in full lines, the movable pull-off arm in fully retracted position and, in dotted lines, the movable pull-off arm in advanced position.

Fig. 3 represents a vertical transverse sectional view taken substantially along the line 3-3, Fig. 1.

Fig. 4 represents an enlarged vertical sectional view taken longitudinally of the bracket-arm substantially along the line 4-4, Fig. 2.

Fig. 5 represents a top plan view of the stationary member and the adjustment indicator of the pull-off device, with the adjusting eccentric and its supporting stud in section, illustrating the cooperation between the normally stationary element and the adjusting eccentric of the pull-off device.

Referring more specifically to the drawings, the invention is disclosed as embodied in a sewing machine forming the subject of a copending application, Serial No. 226,082, filed May 12, 1951, in the name of A. N. Hale. The sewing machine comprises a frame including a bed 10, standard

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11, and an overhanging bracket-arm 12 which terminates in a hollow head 13. A main or bed-shaft 14 is journaled lengthwise of the bed 10 and mounted on its rear end is a combined belt- and hand-wheel 15. Journaled for oscillation in the bracket-arm 12 is an arm-shaft 16 connected within the standard 11 by a driving link 17 to the bed-shaft 14. At its front end, the oscillatory arm-shaft is connected by a rock-arm 18 and link 19 to a needle-bar 20 journaled for endwise reciprocation in the head 13. The needle-bar 20 carries at its lower end an eye-pointed thread-carrying needle 21, the needle cooperating with a suitable wing-type chain-stitch looper (not shown) carried in the outer end of the bed-shaft 14. The work is adapted to be advanced past the stitch-forming devices by means of a four-motion feeding mechanism located beneath the bed and including a feed-dog which is adapted to operate in the usual four-motion path through a slot in the cloth-plate 22. As is customary the work is yieldingly held in contact with the feed-dog by a presser-foot 23 carried on the lower end of a spring-depressed presser-bar 24 vertically slidable in the head 13.

The devices for controlling the needle-thread T in its travel from the source of supply to the needle 21 is best shown in Figs. 1 and 2. Referring to these views, it will be seen that the needle-thread T is led from a source of supply through a thread-guide 25, then between the disks of a tension device 26 of the type substantially like that disclosed in the Chason Patent No. 1,862,658, issued June 14, 1932. From the tension device 26, the thread T passes through my improved thread-measuring or stitch-by-stitch pull-off device later to be described in detail, and thence between the disks of a thread-nipper 27 to a thread-guide 28, a take-up hole 29 in the needle-bar 20, a thread-check 30 and a thread-guide 31 on a face-plate 32 attached to the head 13, and then to the eye in the needle 21. As is common in machines of the type disclosed, the thread-nipper 27 is operated each stitch-forming cycle to nip or lock the thread T, and during the time that the thread T is so locked the pull-off device is actuated to draw thread from the supply. The closed nipper prevents any thread from being stolen from the needle.

The stitch-by-stitch pull-off device comprises a normally stationary plate-like member 33 and a movable thread-engaging member or element 34 formed at its lower end with a concaved seat 35 (Fig. 3) shaped to engage the arm-shaft 16 and be secured thereto by a screw 36 threaded

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into the arm-shaft. The movable member 34 projects through a slot 36' in the bracket-arm and its free end is formed with a V-shaped extremity 37 which is disposed so that it passes between the spaced limbs 38 and 39 provided on the stationary member 33 and engages the needle-thread T extending between the aligned thread-guiding eyes 40 and 41 provided in the spaced limbs 38 and 39. The pull-off arm 34, in its advanced position of oscillation shown in dotted lines in Fig. 2, forms a bight in the needle-thread T, the excess thread forming the bight being pulled from the supply through the tension device 26. To insure that all the thread forming the bight is pulled from the supply, the pull-off arm 34 is timed so that it engages the thread only while the nipper 27 is closed.

Means are provided for regulating the amount of thread pulled from the supply and to that end the normally stationary member 33 is supported so that it can be manually shifted relative to the free end of the pull-off arm 34, thus to change the effective stroke of the pull-off arm. As shown in Figs. 4 and 5, the stationary member 33 is provided at one end with a pivot-pin 42 which projects into a hole drilled in the bracket-arm 12. Intermediate its ends, the stationary member 33 is enlarged and apertured, as at 43, to receive an adjusting eccentric 44 preferably integrally formed on the lower end of a regulating knob 45 journaled for turning movement on a stud 46 threaded into the bracket-arm 12. To eliminate accidental turning of the regulating knob 45, there is provided a compression spring 47 operating between the head of the stud 46 and a flange on the regulating knob 45, whereby said knob is frictionally held in its selected position of adjustment. To facilitate the proper adjustment of the thread measuring device, there is clamped between the bracket-arm 12 and a shoulder on the stud 46 (Fig. 4) a pointer or indicator 48 which is disposed to cooperate with suitable indicia scribed in the skirt portion of the regulating knob 45.

It will be observed in Fig. 6 that the pointer or indicator 48 is secured in place by the shouldered stud 46, adjustment of the indicator being possible by loosening the stud and manually turning the indicator. Also, it will be seen that the eccentric 44 is sized so that it contacts simultaneously the opposite sides of the aperture 43 in the member 33 and thereby maintains the member 33 against sidewise movement. It will further be observed that the compression spring 47 functions to depress the regulating knob 45 into contact with the upper face of the indicator 48, thus frictionally to maintain the regulating knob against accidental turning, and at the same time the shoulder 49 defining the bottom of the skirt of the regulating knob 45 bears lightly against the member 33 and maintains it in proper assembled relation upon the bracket-arm 12 of the machine.

From the foregoing, it will be understood that the length of needle-thread pulled off from the supply at any one stroke of the pull-off member 34 depends upon the position of the thread-guides 40 and 41 relative to the pull-off member. It will be seen in Fig. 2 that by turning the regulating knob 45 so that the member 33 moves clockwise about its pivot-pin 42 the pull-off arm 34 will engage the thread spanning the thread-eyes 40 and 41 for a longer period of time and thus pull off a greater length of thread from the supply. Obviously, by turning the regulating knob 45 in the

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opposite direction less thread is pulled from the supply.

The needle 21 and the loop-taker (not shown) form the stitches in the usual manner and the needle-bar take-up thread-eye 29 on its downward stroke with the needle-bar 20 gives its thread up to the loop-taker. As the needle-bar begins its upstroke, the nipper 27 opens and releases the thread made available by the pull-off member 34. The take-up eye 29 also ascends and thereby, in conjunction with the combined actions of the feeding mechanism and the loop-taker, draws up the stitch. At the same time that it helps to draw up the stitch, the take-up thread-eye 29 also pulls from the supply side of the nipper the length of thread made available by the pull-off member 34. As the pull-off member and the take-up thread-eye approach the top of their strokes, the nipper 27 closes and thus completes the cycle of the needle-thread controlling mechanism.

From the above, it is to be understood that a sewing machine having the present stitch-by-stitch pull-off device is particularly adapted for the production of uniform stitches by virtue of having a manually adjustable member by means of which the operator may adjust the pull-off action to compensate for any changes made in the stitch length or required tightness of stitch.

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

1. A thread pull-off device for a sewing machine having a frame and an actuating shaft journaled in said frame, comprising, a normally stationary member adjustably supported on said frame and providing spaced thread-guiding eyes, a movable thread-engaging element secured to said actuating shaft and traversing the space between said thread-guiding eyes to form a bight in the thread and thereby pull a length of thread from a source of supply, and means for moving said spaced thread-guiding eyes relative to said movable element including a manually turnable regulating knob, and an eccentrically disposed surface associated with said regulating knob and engaging said normally stationary member so that the turning of said knob will effect an adjustment of said normally stationary member.

2. A thread pull-off device for a sewing machine having a frame and an actuating shaft journaled in said frame, comprising, a pivotally supported member providing spaced thread-guiding eyes, a movable thread-engaging element secured to said actuating shaft and traversing the space between said thread-guiding eyes to form a bight in the thread and thereby pull a length of thread from its source of supply, and means for moving said member about its pivot to shift said thread-guiding eyes relative to said movable thread-engaging element, said means including a regulating knob mounted for turning movement on said frame, an eccentrically disposed surface formed on said knob and engaging said pivotally supported member, and yielding means associated with said regulating knob for precluding accidental turning of said regulating knob.

3. A thread pull-off device for a sewing machine having a frame and an actuating shaft journaled in said frame, comprising, a member pivotally supported at one end on said frame and at its other end formed with spaced limbs providing a pair of thread-guiding eyes, a movable thread-engaging element secured to said actuating shaft and traversing the space between said thread-guiding eyes to form a bight in the

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thread and thereby pull a length of thread from its source of supply, and means for swinging said member about its pivot to shift said thread-guiding eyes relative to said movable thread-engaging element, said means including a turn-
able regulating knob, an eccentrically disposed surface formed on said knob and engaging said member intermediate its ends, a stud on which said regulating knob is mounted, and a spring acting between said stud and said regulating knob for frictionally locking said regulating knob against accidental turning.

4. A thread pull-off device for a sewing machine having a frame and an actuating shaft journaled in said frame, comprising, a member pivotally supported at one end on said frame and at its other end formed with spaced limbs providing a pair of thread-guides, a movable thread-engaging member operatively connected to said actuating shaft and movable between said thread-guides to form a bight in the thread and thereby pull a length of thread from its source of supply, and means for moving said member about its pivot to shift said thread-guides relative to said thread-engaging element, said means including a regulating knob having a shoulder overlying said member intermediate its ends, an eccentrically disposed surface provided on said regulating knob adjacent said shoulder and engaging said member, a stud threaded into said frame and supporting said regulating knob, and a coil spring mounted on said stud and acting between said stud and said regulating knob yieldingly to maintain said regulating knob in its selected position of adjustment.

5. A thread pull-off device for a sewing machine having a frame and an actuating shaft journaled in said frame, comprising, a plate-like member pivotally supported on said frame and provided with spaced thread-guides, a movable thread-engaging member operatively connected to said actuating shaft and movable between said thread-guides to form a bight in the thread and thereby pull a length of thread from its source of supply, and means for moving said member about its pivot to shift said thread-guides relative to said thread-engaging element, said means including a regulating knob disposed on one side

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of said plate-like member and having a shoulder overlying said member and indicia scribed in said knob adjacent said shoulder, an eccentrically disposed surface provided on said regulating knob in position to engage said member, a pointer arranged on the other side of said plate-like member and disposed to cooperate with said indicia, a stud extending through said knob, plate-like member and pointer and threaded into said frame, and a coil-spring mounted on said stud and disposed frictionally to maintain said knob in selected set position.

6. A thread pull-off device for a sewing machine having a frame and an actuating shaft journaled in said frame, comprising, a plate-like member pivotally supported on said frame and provided with an aperture and spaced thread-guides, a movable thread-engaging member operatively connected to said actuating shaft and movable between said thread-guides to form a bight in the thread and thereby pull a length of thread from its source of supply, and means for moving said member about its pivot to shift said thread-guides relative to said thread-engaging element, said means including a regulating knob disposed on one side of said plate-like member and having indicia provided on said knob, an eccentrically disposed surface provided on said regulating knob and projecting into and contacting the opposite sides of said aperture in said member, a pointer arranged on the other side of said plate-like member and disposed to cooperate with said indicia on said knob, a stud extending through said knob, plate-like member and pointer and threaded into said frame, and a coil-spring mounted on said stud and acting frictionally to maintain said knob in selected set position.

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