April 12, 1960 F. LUTZ ET AL 2,932,266

ELECTRICALLY DRIVEN PORTABLE BAG SEWING MACHINE

Filed July 15, 1957 4 Sheets-Sheet 1

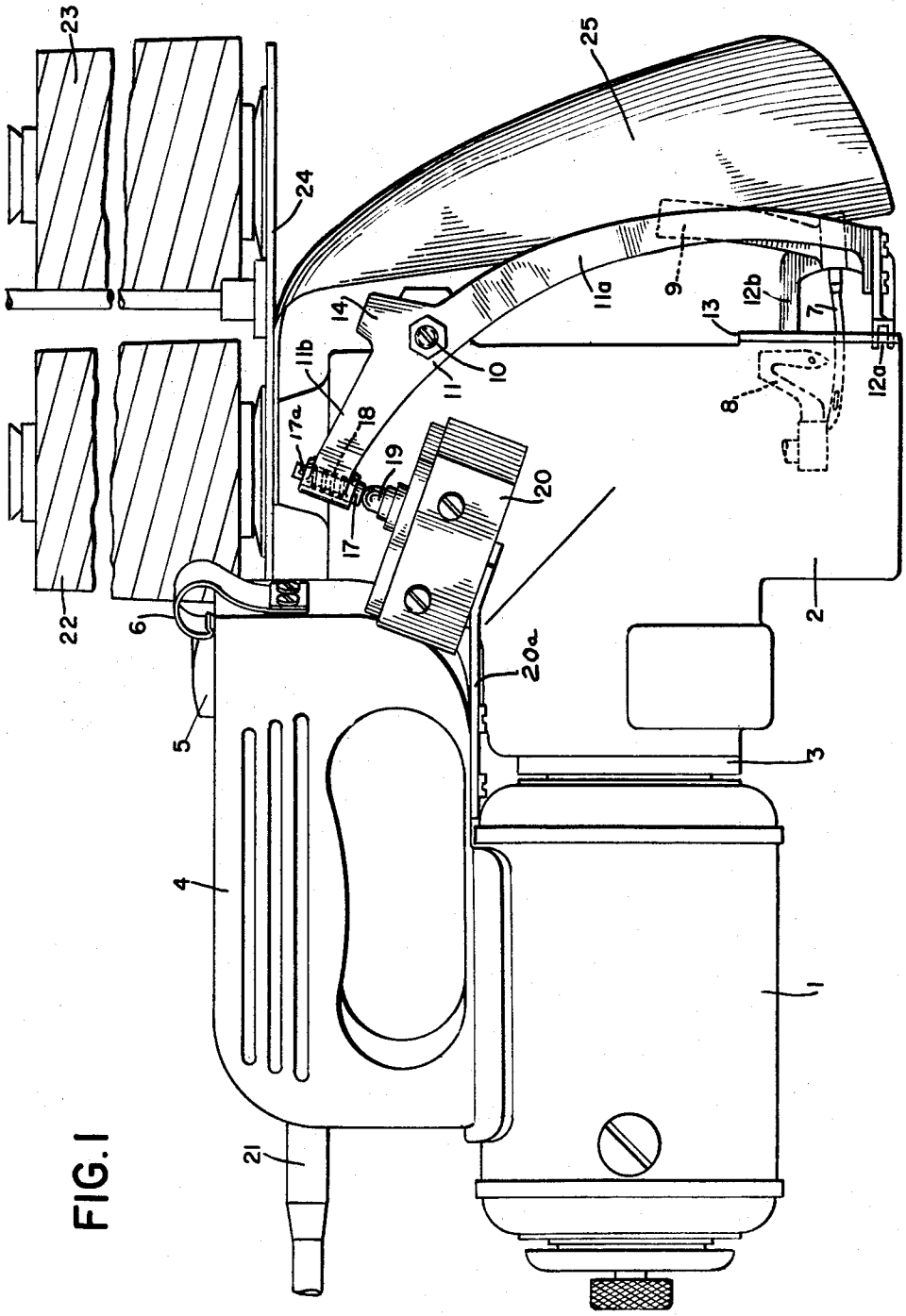


FIG. 1

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FIG. 3

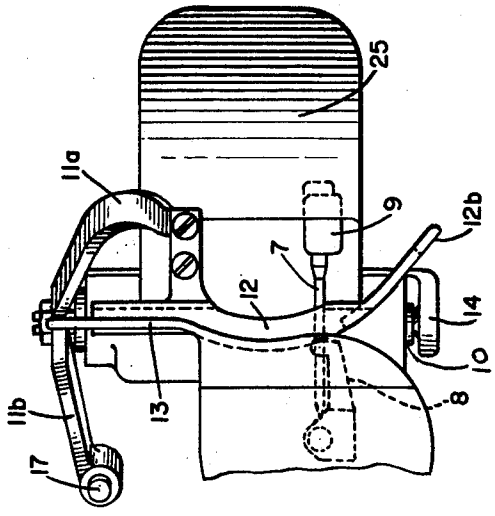
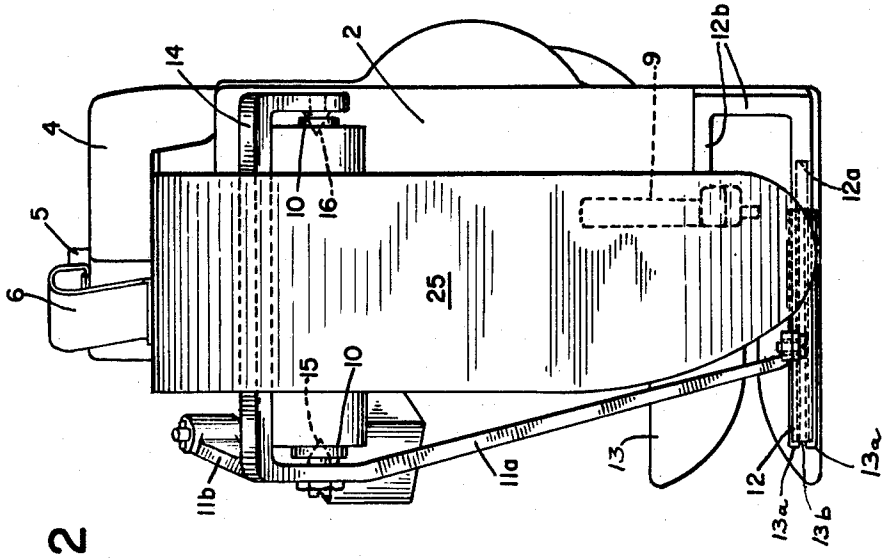


FIG. 2



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ELECTRICALLY DRIVEN PORTABLE BAG SEWING MACHINE

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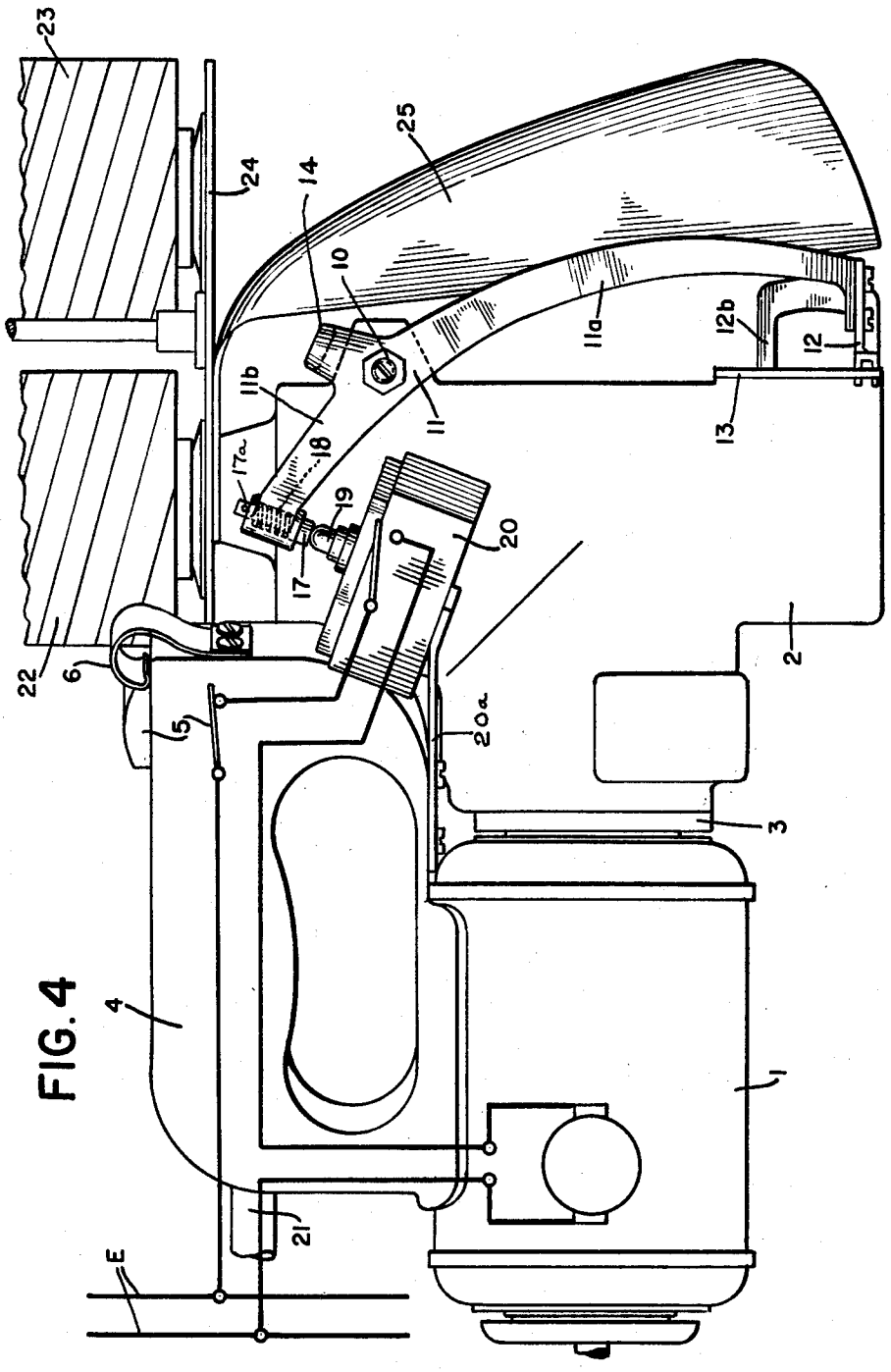


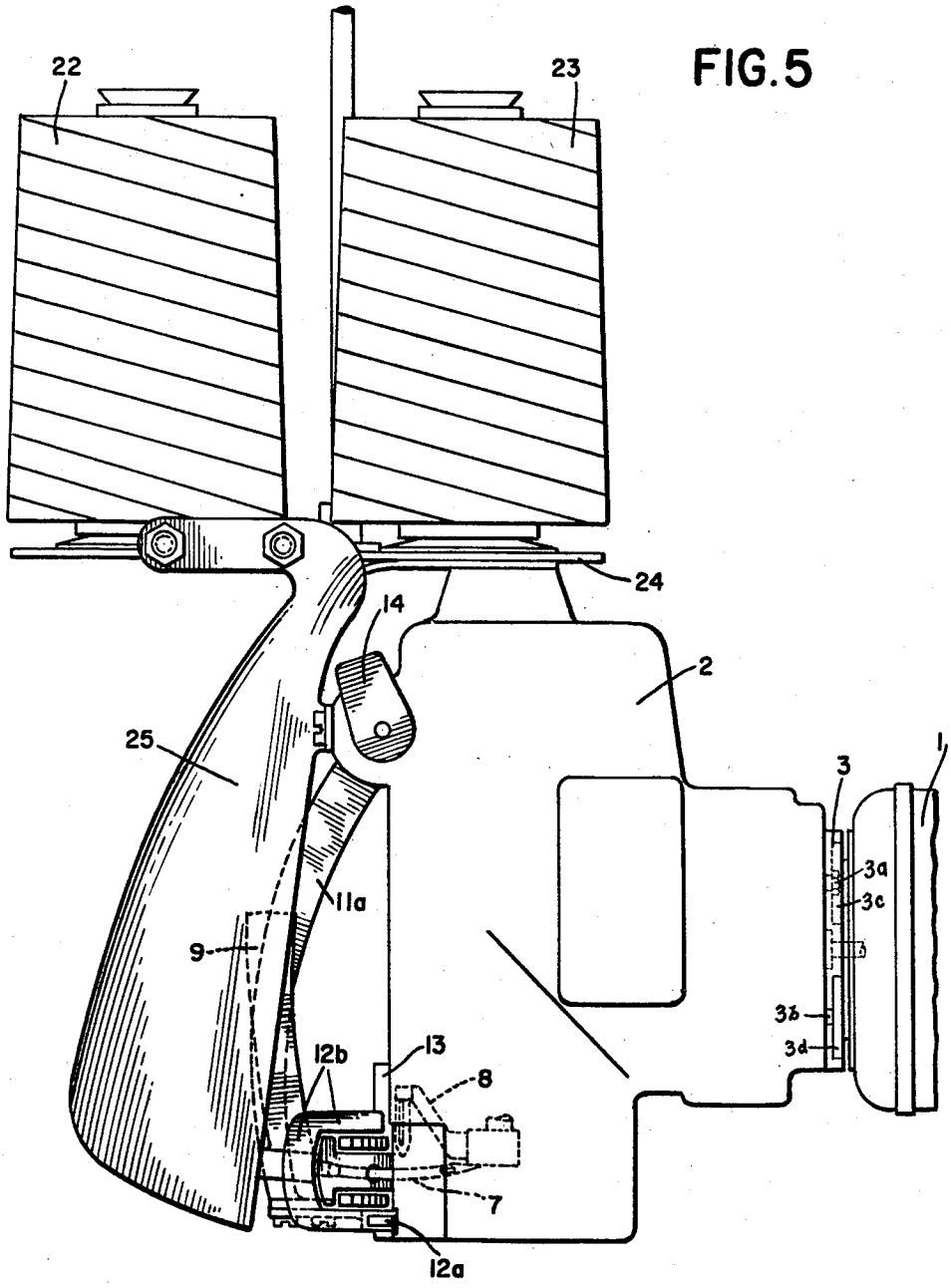
FIG. 4

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FIG.5



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ELECTRICALLY DRIVEN PORTABLE BAG SEWING MACHINE

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Application July 15, 1957, Serial No. 672,021

Claims priority, application Germany July 31, 1956

8 Claims. (Cl. 112—11)

This invention relates to electrically driven portable bag sewing machines of the character adapted to be held in the hand of the operator and guided by such hand across the tops of filled bags for closing the same.

An object of the invention has been to facilitate the manipulation of the sewing machine during its operation. Toward this end novel means are provided for energizing and deenergizing the electric motor which is connected with the sewing machine for driving the same. The necessity for operation of a switch by the hand or a finger or thumb of the operator to connect and disconnect the driving motor from a power source has been eliminated. Means are provided for automatically closing and opening a switch, for the purpose indicated, by the action of the work, such as the tops of filled bags, in the course of their movement relative to the stitch forming, work feeding and other operating devices of the machine.

Heretofore the operation of portable electrically driven bag sewing machines has been controlled by the hand of the operator, usually by the thumb of the hand holding the unit, and for this purpose an electric switch has been provided on or adjacent the handle of the sewing machine. With this arrangement it has been necessary to hold the switch in its on position by the hand or thumb as long as it is desired to maintain the machine in operation. As a result, the hand of the operator has become fatigued at more frequent intervals than is desirable. Moreover, experience has shown that, depending upon the skill of the operator, the switch has been operated to cause driving of the motor and the sewing machine for varying lengths of time before it has been necessary or desirable and the motor has been disconnected from the power source for varying periods after it has been necessary or desirable to have the machine in operation. This has resulted in the formation of excessively long chains of thread both in advance of and following the actual stitching of the bag closure itself, with attendant thread wastage.

In accordance with the present invention, the connection and disconnection of the driving motor with the power source does not depend upon the skill of the operator. A feeler member provided on the sewing machine in the path of the relative movement between the machine and the work being stitched is arranged to be acted upon by the work as it approaches the stitching point and this feeler member is permitted to return to normal after the work has passed an appropriate distance beyond the stitch forming point. This results in the consumption of only the desired amount of thread in performing the stitching operation, such as the closing of filled bags. Moreover, the operator is no longer called upon to use his hand or a finger or thumb to depress a switch button continuously during the seaming operation. Thus fatigue of the operator is minimized and the operator is able to direct his attention exclusively to the correct guiding of the sewing machine across the top of the filled bag. The arrangement is such that

the lifting of the feeler member operates an electric switch which controls the delivery of current to the driving motor and the latter remains in operation until the work has passed through the stitch forming zone of the machine and a suitable amount of thread chain has been formed and cut.

The feeler member in accordance with the invention is of elongated form and extends in a direction parallel to the direction of sewing, preferably outwardly of the surface of the throat plate which serves to support the work, such as the pinched together walls at the top of a filled bag, during the relative movement between the machine and the work. A special feature of the feeler member is the provision of a longitudinally extending recess in the work engaging face thereof. The work engaging portion of the member is thus of channel form or U-shaped in cross-section and the legs of the U, when no work is present, are adapted to pass through parallel elongated openings or slots in the throat plate of the machine. The arrangement is such that the member engages the work, which passes between it and the throat plate, along two relatively long but narrow strips while the intermediate portion of the work between these strips and the portions at the opposite sides thereof are well supported by the throat plate. This makes possible the proper actuation of the feeler member by relatively soft and thin material such as involved in onion bags, small linen bags and the like which may be stitched by the machine. Such soft and thin material will resist being depressed into the elongated narrow slots in the throat plate in view of the support of the material between the two slots and at the two sides thereof. This is in spite of the fact that the feeler member is urged by a spring action, preferably a relatively light one, in a direction to carry the legs of the U into the elongated slots or openings in the throat plate. It will be apparent that if the feeler member serves to force the thin material into the elongated openings of the throat plate, the switch mentioned above would be shifted to or left in its open position and the motor would stop.

Another feature of the invention is the mounting of the feeler member at the free end of one arm of a two-armed lever, the latter being mounted to swing about the same axis as the needle lever of the sewing machine. Adjacent its pivot point the lever is provided with a transversely extending portion of generally U-shaped configuration which provides two laterally spaced pivot points, along the same axis, for the lever as a whole. Aligned pivot pins provide for mounting of the lever on a hollow shaft about which the needle lever is rocked. Thus, a very simple, compact and reliable mounting for the feeler member is provided. The second arm of the lever mentioned is provided with a spring urged pin or plunger adjacent its outer end arranged to cooperate with an outwardly spring urged plunger or button of a quick action switch. The arrangement is such that when the feeler member is raised or forced away from the throat plate by the work the spring urged pin carried by the lever will depress the switch button to close the circuit to the motor. If the feeler member is raised or shifted to a greater extent than required to move the switch button through its full travel the spring urged pin carried by the lever will be shifted in relation to the latter to compress the spring. When the work being stitched has passed beyond the feeler member, the latter returns to its normal position under the action of the two springs mentioned. That acting on the switch button is the one which needs to be overcome in closing the circuit to the motor by the action of the work.

A further feature of the invention is the formation of the forward end of the feeler member in a U-shape. This serves as a guard for the fingers of the operator to

prevent accidental contact with the stitch forming devices and top feed mechanism upon introducing the work into the machine. It is arranged to surround the outer or top feed dog and the free end of the presser foot of the machine and thus forms a guard around these. Also, the U-shaped portion of the feeler may at times be grasped by the operator to lift the feeler member and thus rock its carrying lever to close the switch and bring about operation of the motor. This may be done when it is found that the material being stitched has too little strength or stiffness to raise the feeler member itself.

A special feature is the arrangement by which the lever that carries the feeler member is connected with the switch only by contact between the plunger on the lever with the push button of the switch. Moreover, the switch and its electrical connections with the motor are all carried by the latter. In this way the motor may be disconnected from the sewing machine without disturbing the electrical connections to the driving motor.

Other objects, features and advantages of the invention will appear from the detailed description of an illustrative embodiment of the invention which will now be given in conjunction with the accompanying drawings in which:

Fig. 1 is a side elevational view of the sewing machine as seen from the side from which the work leaves the machine;

Fig. 2 is an end elevational view of the machine as seen from the right in Fig. 1, the thread supply spools or cones being omitted;

Fig. 3 is a bottom view of the right hand portion of the machine as shown in Fig. 1;

Fig. 4 is a view similar to Fig. 1 but shows schematically the electrical circuit for delivering current to the driving motor; and

Fig. 5 is a side elevational view of a portion of the machine as seen from the opposite side from that illustrated in Figs. 1 and 4.

The improved control mechanism of the present invention has been shown as applied to an electrically driven portable bag sewing machine of the character fully disclosed in applicants' pending application Serial No. 535,316, filed September 20, 1955. Since the present invention is not concerned with the details of the construction of the machine itself, these are shown to only a limited extent in the present case. Reference should be had to the pending application for a fuller disclosure of suitable stitch forming, work feeding and thread chain cutting mechanism.

As shown, the sewing unit comprises a motor **1** which is connected with a sewing machine **2** directly through a flange **3** of the motor housing. A bayonet type connection may suitably be provided between the motor flange **3** and the machine, as disclosed in said pending application. This comprises hexagonal head screws **3***a*, only one being shown in Fig. 5, extending from the machine frame and arranged to cooperate with key slots **3***b* in the flange with the heads of the screws extending into recesses **3***c* and **3***d* in the flange. As also disclosed therein, the rotary shaft of the motor is connectable with and disconnectable from driven parts within the sewing machine by mere application and removal of the motor. To the top of the motor housing there is secured a carrying handle **4** by which the entire unit may be carried and by which the sewing machine may be guided across the work during the sewing operation. In the top of the handle, adjacent the forward end thereof, is the operating button of a switch **5**, which button is adapted to be depressed to close the switch. It is illustrated in depressed position in Fig. 1 and is being held in such position by a spring detent or clip **6** which, upon depression of the push button, rides over a shoulder at the forward end of the button to retain the same flush with the top of the handle. When the machine is in use the switch **5** is retained continuously in its closed position by the spring element **6**. Should it become necessary, however, to stop the machine in the course of a seaming operation, the operator may release the push button **5** by simply pressing the spring latch **6** forwardly by a finger or thumb. A spring embodied in the switch **5** will at this time lift the push button and open the switch.

The sewing machine is adapted to produce a double chain stitch and is provided for this purpose with a curved needle **7** and a thread carrying looper **8** which are shown in Figs. 1, 3 and 5. The curved needle **7** is mounted in a socket in the lower end of a needle lever **9** which is arranged for rocking movement about the axis of a hollow shaft **10** (Figs. 1, 2 and 3). A two-armed lever **11** having arms **11***a* and **11***b* is also pivotally mounted for rocking movement about the axis of the shaft **10**. At the lower end of the arm **11***a* of the lever, which is substantially longer than the arm **11***b* thereof, there is mounted a feeler member **12**, this being secured to the lever by screws or the like as shown in Fig. 1. Feeler member **12** is urged against a throat plate **13** of the sewing machine and is arranged to be engaged by the work, such as the pinched together tops of filled bags, as the machine is moved into engagement with such work to effect a seaming operation. The arrangement is such that the feeler member is urged by the work away from the throat plate **13** thus swinging the lever **11** about its pivot **10**. This, by the connections to be described, will serve to close a second switch, which is in series with the switch **5**, in the circuit from a power source to the driving motor **1**. Feeler member **12** has its main portion extending parallel with the line of stitch formation and is elongated in this direction to an extent sufficient to insure its maintenance of the switch, which it controls, in closed position from a time slightly before the work reaches the stitch forming point until a suitable time after the trailing end of the work passes beyond the stitch forming point. That portion of the feeler member which cooperates with the work is of channel form, i.e., U-shaped in cross-section. It has a recess **12***a* in its work engaging surface so as to provide two elongated ribs or legs arranged to cooperate with slots or openings **13***a* in the throat plate **13**. Normally these ribs or legs are retained within the slots in the throat plate. The arrangement is such that between the two slots there is a long, narrow section **13***b* of the throat plate which lends support to the work during the relative movement between the work and the throat plate. By virtue of this construction the danger of forcing relatively light or thin material into the openings in the throat plate, by the action of the feeler member, is minimized. This insures proper action in the seaming of most types of bags. The relatively thin and flexible material of onion bags and the like is capable of forcing the feeler member away from the throat plate and retaining the same with the ribs thereof out of cooperation with the slots **13***a* in the throat plate. It will be noted in this connection that the material being stitched is supported by portions of the throat plate above and below the slots **13***a* as well as by the strip extending longitudinally between these slots.

At its forward end the feeler member **12** is bent upwardly and rearwardly, as indicated at **12***b* in Fig. 2, to provide a U-shaped configuration. This portion of the feeler member, moreover, as shown in Fig. 3, is curved outwardly away from the throat plate **13**. It serves the dual purpose of providing a guard to prevent the hand of the operator from coming into the region of the curved needle, the presser foot and the top or outer work feeding members and of also providing a means for lifting the feeler member in the event that this should become necessary due to the failure of especially thin, lightweight material to force it outwardly as the machine is moved relative to the work. The operator may simply force the portion **12***b* away from the throat plate by means of the hand which assists in guiding the work in relation to the sewing machine, thereby rocking the lever **11** and closing the switch in the circuit to the motor.

The lever 11 has, adjacent its pivot, a substantially U-shaped, laterally extending portion 14 (Figs. 1, 2 and 3). This portion of the lever extends around the housing 2 and enables the mounting of the lever on the shaft 10 by means of conically pointed pivot elements 15 and 16 adapted to enter the ends of the axially extending bore of the shaft. The element 15 is preferably screw threaded into the lever 11 and is provided with a lock nut for holding it in set position. This enables adjustment of the pivot 15 to provide the desired free swinging action of the lever while maintaining it against any appreciable lateral or wobbling movement. Also, the screw element 15 may be removed or loosened sufficiently to enable the entire lever structure to be removed from and applied to the machine. Pivot 16 may suitably be riveted to the other arm of extension 14.

In a socket at the free end of the arm 11*b* of the lever there is mounted a pin or plunger 17 which is urged downwardly by a spring 18. The spring 18 normally urges the plunger 17 into the position shown in Figs. 1 and 4. A cross pin 17*a* in the plunger serves to prevent further downward movement thereof. At its free end the plunger 17 engages a button or plunger 19 of an electric switch 20 of any suitable construction, preferably of the quick action type which closes the switch quickly upon a predetermined inward movement of the button 19. When this switch is closed and the switch 5 is also closed, a circuit is completed from line E extending from a suitable source of power to the motor 1 (Fig. 4). It will be noted from Figs. 1 and 4 that when the feeler member 12 is urged toward the right by the action of the work passing between the feeler and the throat plate 13, the lever 11 will be rocked in a counterclockwise direction to bring about depression of the button 19 to close the switch 20. If the lever 11 is given a greater movement than that permitted by the pin 19, the plunger 17 will remain stationary and the lever will simply compress the spring 18 to allow for the extra movement. This may occur, for example, when thick materials are involved in the work being stitched. When the work passes beyond the opposite end of the feeler member 12, the latter will move again toward the left (Figs. 1 and 4) to carry the ribs into the slots 13*a* of the throat plate, and the lever 11 will be rocked in a clockwise direction by the spring acting on the button or plunger 19 of the switch. This will cause opening of the switch. If the spring 18 has been compressed due to the thickness of the work, this will also participate in the clockwise movement of the lever 11. Spring 18 is somewhat stiffer than that serving to force the button 19 outwardly so that the latter will be compressed first in the course of actuating the switch.

Switch 20 is connected with the handle 4 of the machine. For this purpose a bracket 20*a* is secured to the bottom of the handle and is provided with a downwardly extending portion at its free end to which the switch is secured. This arrangement is such that if the motor 1 is detached from the sewing machine 2, the switch 20 will remain rigidly connected with the motor since the handle 4 is attached to the latter. Thus, none of the electrical connections are disturbed in detaching the motor from the machine. As explained, the only connection between the lever 11, carried by the sewing machine, and the switch 20 is the contact between the plunger 17 and the button 19 which will not interfere with the detachment of the motor. In this way it is insured that no improper connection of the electrical circuits will take place upon the detachment and reconnection of the motor with respect to the sewing machine.

The length of the feeler member 12 is determined in accordance with the requirements for the specific purpose of the machine. In any case it is desirable to start the motor and to maintain it and the machine in operation from a time slightly before the bag reaches the stitch forming point until a sufficient time after the bag has passed the stitch forming point so that a chain of suitable length is produced by the stitch forming devices beyond the trailing end of the work to enable the chain cutting devices provided on the machine to be made effective to sever the free chain. As explained in the above-mentioned pending application, the chain cutting device is operated so long as the machine is in operation, but it is not effective to sever the chain until the bag or other work is shifted laterally relative to the machine to a certain extent.

Referring again to Fig. 4, it will be seen that in the normal use of the unit the switch 5 will be held closed by the spring clip or detent 6 but no current will be delivered to the motor until the switch 20 is closed by the swinging of the lever 11 under control of the member 12. If during the sewing operation anything should develop which makes it necessary to immediately stop the motor 1, while the work is still holding the switch 20 in closed position, the operator may simply shift the spring latch 6 with his thumb into releasing position to permit the switch 5 to open under the action of its own spring. This will immediately open the circuit from the power source to the motor. It is therefore unnecessary to remove the work from its operative relation to the machine in order to stop the latter. This not only saves time in correcting the difficulty but avoids the danger of serious damage to the unit.

A cable 21 (Fig. 1) serves to deliver the current from the lines E—E of Fig. 4 to the circuit provided within the handle and the motor 1.

In Fig. 1 there is also shown the source of supply of thread for the needle 7 and looper 8. This comprises a pair of cones or spools 22 and 23 which are mounted on suitable rods carried by a support 24 mounted at the top of the sewing machine in the manner more fully disclosed in said pending application. Support 24 is preferably carried by a hood 25 which is secured to the frame of the sewing machine 2 and which serves to cover and provide a guard over the needle lever 9 and other operating parts of the machine which extend outwardly from the main frame of the machine.

While the invention has been described in considerable detail as applied to a machine of the character disclosed in said pending application, it will be understood that the invention is of broader application and may be used in connection with other types of sewing machine which may, if desired, produce other types of stitching than the double chain stitch produced by the machine disclosed. Other changes may be made in the construction and arrangement of the parts within the scope of the invention as defined by the appended claims.

What is claimed is:

1. A sewing unit comprising a portable sewing machine having a handle for carrying and guiding the same by the hand of the operator across the work to be stitched, an electric motor rigidly connected with said machine in constant driving relation thereto, means including a switch for electrically connecting said motor with a power source, feeler means carried by said sewing machine in the path of the work and arranged to be operated by the work as the machine is moved into engagement therewith by the hand of the operator, connections from said feeler means for operating said switch to control the delivery of current from said power source to said motor, a manually operable switch in series with said first-mentioned switch for further controlling delivery of current from said power source to said motor, and means readily accessible to the hand of the operator by which said machine is being guided for releasing said manually operable switch by said hand of the operator.

2. A sewing unit comprising a portable sewing machine having a handle for carrying and guiding the same by the hand of the operator across the work to be stitched, an electric motor rigidly connected with said machine in constant driving relation thereto, readily disconnectable

means for connecting said motor with said machine, means including a switch mounted on said motor for electrically connecting said motor with a power source, said switch including an operating element, feeler means carried by said sewing machine in the path of the work and arranged to be operated by the work as the machine is moved into engagement therewith by the hand of the operator, and connections from said feeler means for operating said switch to control the delivery of current from said power source to said motor, said connections from said feeler means comprising a member mounted for movement on said sewing machine and arranged to operate said switch by free engagement with said operating element, said member being lightly spring urged into inactive position, whereby said switch may be operated upon the application of a relatively small force to said member through said feeler means.

3. A sewing unit of the character set forth in claim 2 in which said member comprises a two-armed lever pivotally mounted on said sewing machine and in which the arm extending from the pivot of said lever to said feeler means is substantially longer than the arm which extends from said pivot to said switch.

4. A sewing unit of the character set forth in claim 2 in which said sewing machine has a throat plate relative to which the work is advanced, a shaft extending parallel with the line of stitch formation substantially in the plane of said throat plate, and a needle carrying lever rockable about the axis of said shaft and in which said member comprises a two-armed lever pivotally connected with said shaft, one end of said lever carrying said feeler means and the other end thereof cooperating with said switch.

5. A sewing unit comprising a portable sewing machine having a handle for carrying and guiding the same by the hand of the operator across the work to be stitched, an electric motor connected with said machine in constant driving relation thereto, means including a switch for electircally connecting said motor with a power source, said sewing machine having a throat plate relative to which said work is moved in the course of stitch formation, said throat plate having a pair of narrow elongated slots therein parallel with the direction of stitch formation, a feeler member cooperating with the outer face of said throat plate, said feeler member having a pair of elongated narrow ribs arranged to extend into said slots in the throat plate and being normally in the path of the work, the arrangement being such that work moving relative to said throat plate in the direction of stitch formation will shift said feeler member to carry said ribs out of said slots, means connecting said feeler member with said switch for operating the latter into closed position upon such movement of the feeler member to electrically connect the motor with the power source, and spring means normally urging said switch into open position and through said connecting means urging said ribs into said slots.

6. A sewing unit of the character set forth in claim 5 in which said feeler member has a portion of channel formation and is U-shaped in cross-section, said ribs being formed by the sides of said channel.

7. A sewing unit comprising a portable sewing machine and an electric motor rigidly connected with said machine in constant driving relation thereto, said unit having a handle for carrying and guiding the same by

the hand of the operator across the work to be stitched, a throat plate on said machine relative to which the work is advanced, a shaft in said machine extending parallel with the line of stitch formation substantially in the plane of said throat plate, a needle carrying lever rockable about the axis of said shaft, means including a switch mounted on said motor for electrically connecting said motor with a power source, feeler means carried by said sewing machine in the path of the work and arranged to be operated by the work as the machine is moved into engagement with the latter by the hand of the operator, and connections from said feeler means to said switch for operating the same to control the delivery of current from said power source to said motor, said connections from said feeler means comprising a two-armed lever pivotally connected with said shaft, one end of said lever carrying said feeler means and the other end thereof cooperating with said switch to operate the same, said two-armed lever having a bridging extension in the region of its pivotal connection with said shaft, said lever itself and said bridging extension being pivotally connected with the opposite ends of said shaft, said lever being lightly spring urged into inactive position, whereby the application of a relatively small force to said lever through said feeler means serves to operate said switch.

8. A sewing unit comprising a portable sewing machine and an electric motor rigidly connected with said machine in constant driving relation thereto, said unit having a handle for carrying and guiding the same by the hand of the operator across the work to be stitched, a throat plate on said machine relative to which the work is advanced, a shaft in said machine extending parallel with the line of stitch formation substantially in the plane of said throat plate, a needle carrying lever rockable about the axis of said shaft, means including a switch mounted on said motor for electrically connecting said motor with a power source, feeler means carried by said sewing machine in the path of the work and arranged to be operated by the work as the machine is moved into engagement therewith by the hand of the operator, connections from said feeler means to said switch for operating the same to control the delivery of current from said power source to said motor, said connections from said feeler means comprising a two-armed lever pivotally connected with said shaft, one end of said lever carrying said feeler means and the other end thereof cooperating with said switch to operate the same, said lever being lightly spring urged into inactive position, whereby the application of a relatively small force to said lever through said feeler means serves to operate said switch, and a spring urged plunger mounted in the end of said lever which cooperates with said switch, said switch having a spring urged actuating element which is engaged by said plunger.

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