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PORTABLE WIRE STITCHING MACHINE

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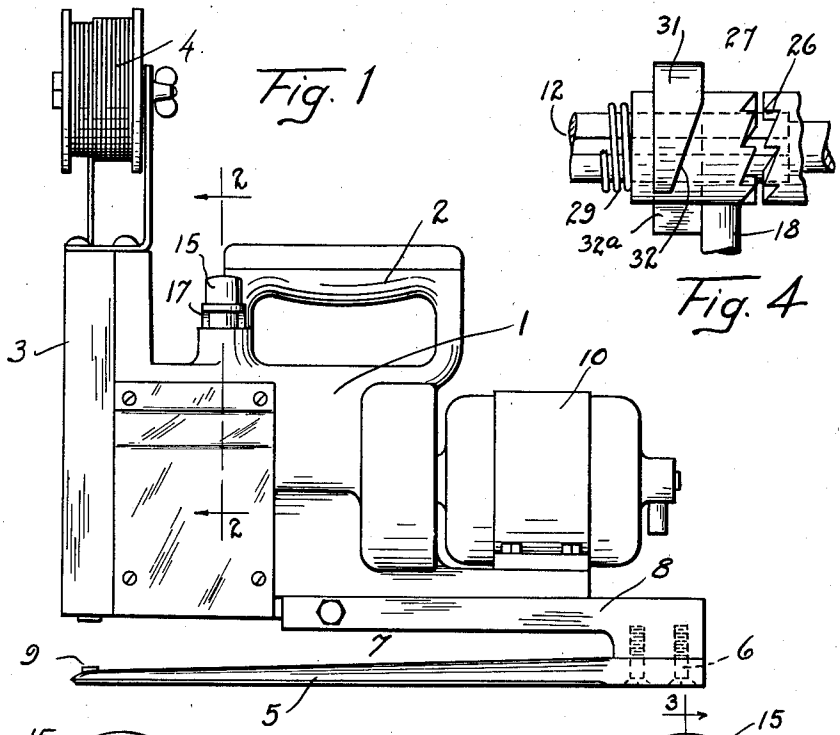


Fig. 1

Fig. 4

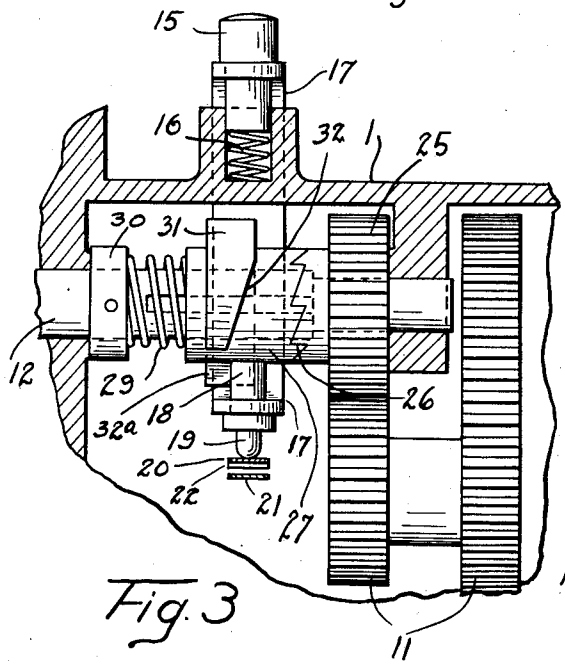


Fig. 3

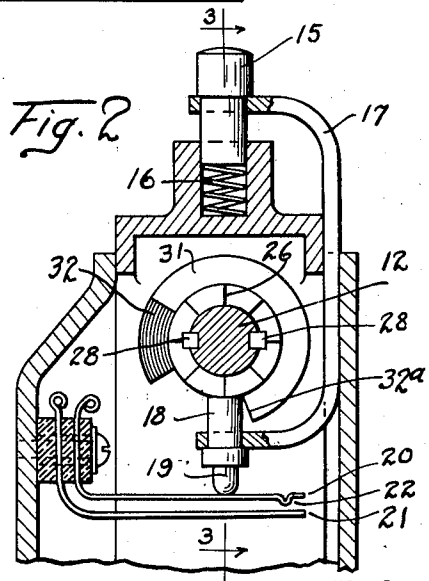


Fig. 2

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PORTABLE WIRE STITCHING MACHINE

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This invention relates to a wire stitching machine, and it has to do especially with a machine of a portable nature which can be handled by an operator.

The invention is concerned particularly with a wire stitching machine of the type for securing wire stitches in fibre board shipping containers. Heretofore, it has been the practice to use relatively large heavy machines for this purpose, of a relatively immovable character; that is, immovable during operation, and the fibre board containers are moved relative to a stationary stitch-forming head and anvil. One very good example of where a wire portable stitching tool of the present invention is useful is in the stitching of the fibre board parts of large containers, such as are used for the shipping of large articles such as beds, or bed frames. Such a large container, with a large article therein, cannot easily be handled, and it has been the practice to move such a container with its contents past stitching machines by the use of some sort of a conveyor as for example, a car running on rails. There may be a large stitching machine on each side and the container is moved between them and the stitches are taken through the parts of the container in rows as the container moves between the machines.

In accordance with the present invention, a small portable stitching machine is contemplated which can be carried in the hand of an operator. With such stitching machines, these various large fibre board containers may merely be allowed to rest stationary and the operator may manually move the portable machine relative to the container, taking stitches through overlapping parts thereof during such moving.

On the other hand, the large container may be placed upon a conveyor and an operator may take stitches as the container passes him, by the use of one of these small machines. In this last case, the expense of the large heavy stitching machine is avoided.

In the accompanying drawings:

Fig. 1 is a side elevational view of a portable stitching machine, constructed in accordance with the invention.

Fig. 2 is an enlarged sectional view taken on line 2—2 of Fig. 1, in illustration of the control mechanism.

Fig. 3 is a similar cross sectional view taken at right angles to Fig. 2 on line 3—3 of Fig. 2.

Fig. 4 is a detail of the clutch.

This portable stitching machine comprises essentially a body which includes a housing 1, provided with a suitable handle 2 for manipulation by an operator, and this housing, or body, supports a stitcher head 3. The mechanism of this stitcher head may be of any well-known design or construction, and accordingly, the interior parts are not shown or claimed herein. In any event, however, this stitching mechanism is one designed to sever a length of wire from a continuous supply, such supply being shown upon spool 4, to shape the severed length into a stitch, and then drive the same into the material to be secured together. Such stitcher heads are well known in the art and a detail description is not necessary.

An anvil is provided for clinching the legs of the stitch. This anvil is preferably in the form of the so-called blade anvil, as illustrated at 5. This anvil is rigidly attached to the body of the stitching machine, as shown at 6 and is arranged to leave a space 7 between the body of the stitching machine and the anvil. A suitable supporting member 8 may be used for connecting the anvil to the body. The fibre board parts which are to be secured together by one or more stitches, are disposed between the body and the blade anvil in space 7, and as the stitcher head operates, a stitch is driven through the fibre board parts and the legs thereof are clinched, as by means of a hardened steel member 9.

The fact that this stitching machine embodies, in a portable unit, both a stitching head and the anvil, is an important one when considered in connection with the fact that the tool or machine is rather light and portable. There is, of course, considerable impact in the throwing and the clinching of the legs of the stitch, some of which in fact, is due to the driving of the legs of the stitch

through the material in space 7. Inasmuch as the anvil and the stitching head are carried rigidly as regards each other, this impact is not delivered to the arm of the operator. To state the matter in a little different manner; the impact is the force which tends to move the stitcher head in a direction toward the arm of the operator, and if this force were not overcome, there would be a kick back so to speak, on the arm of the operator. With the utilization of the blade anvil, this impact merely tends to expand the space 7, or push the blade anvil and the body of the machine away from each other; thus the blade anvil and the body of the machine entirely overcome the impact and the same is not delivered to the arm of the operator. In short, it is not necessary for the operator to overcome the force required in driving the stitch through the fibre board parts, or the force required in clenching the legs of the stitch.

Suitable means are provided for operating the stitcher head. This means in the present instance takes the form of a small electric motor 10 mounted upon the machine so as to be portable therewith, and the same is connected to the stitching head through a suitable train of gears 11, as shown in Fig. 3. Shaft 12 is the operating shaft for the stitcher head and it is operably connected with the train of gears 11 through a clutch construction now to be described. The motor may be a relatively small and light one to facilitate the portability of the machine, and preferably it is of the so-called universal type, and capable of use with the direct current, and alternating current of varying cycles.

It is desirable under many circumstances of operation, although not necessarily all circumstances, to intermittently operate the motor with the operations of the stitcher head, rather than have the motor run continuously, for in many places where a machine of this character is used, the stitching operations are not continuous; in this regard, a controlling means is provided wherein there is a two-stage action under the control of the operator; by this we mean that when a stitching machine is set in operation, the motor is first started so that it picks up considerable momentum and then the clutch is thrown in by the time the motor has attained sufficient momentum to operate the stitcher head.

Such a construction, as shown in Figs. 2 and 3, wherein a suitable controlling thumb piece, as shown at 15, and supported by a coil spring 16 so that the same may be depressed by a thumb of the operator. A suitable yoke 17 connects the thumb piece with a suitable bolt 18 which has a part 19 preferably of non-conducting material for operating a suitable switch for the motor. The switch, as shown, comprises a spring member 20 and a spring member 21, which are connected to suitable electric terminals (not shown) and which, when brought into contacting relation makes the circuit for operating the motor. The spring member 20, may have a contact portion 22 designed for direct contact with spring 21.

The bolt 18 also operates the clutch. One end of the shaft 12 may be somewhat enlarged, and the gear 25, which is in mesh with the gears 11, is freely rotatable thereon. The gear 25 constitutes a clutch member with teeth 26, which may be integral with the gear or provided on a separate piece. A second clutch member 27 is keyed to the shaft by keys 28, and arranged to slide lengthwise thereof. The clutch member 27 is urged normally toward the member 26 by a suitable spring 29 backed by a collar 30. Thus the normal position of the clutch is the engaged position, as shown in Fig. 3.

The clutch member 27 carries a collar, or partial collar, 31 provided with a cam surface 32. The bolt 18 lies in the path of this collar member 31 and the two cooperate in the control of the clutch.

When the machine is idle, the clutch is thrown out and the circuit to the motor is broken. The clutch is at this time in the position shown in Fig. 4, wherein the bolt 18 engages the collar 31 and holds the same against the compression of the spring 29, with the clutch members disengaged. To set the machine in operation, the operator presses the controlling thumb piece 15; the first thing that happens is the making of the circuit for the motor; thus the motor starts operating. However, the motor is running idle because the clutch remains disengaged, and thus it picks up considerable momentum. As the thumb piece is further depressed, the bolt 18 moves beyond the outer edge of the collar 31 and the spring 29 pushes the clutch member 27 from left to right, as viewed in Fig. 4, engaging the clutch and setting the machine in operation.

As long as the thumb piece is held depressed, the operation will continue and a number of stitches may be taken. Upon release of the thumb piece, however, the machine comes to a stop but there is an important function of the controlling mechanism at this time. As viewed in Fig. 2, the shaft 12 and other associated parts are designed to rotate in a counter-clockwise direction, and when the thumb piece is released, the bolt 18 may rise to the position in Fig. 2; thus the current of the motor is cut off. The momentum of the motor, however, together with the momentum of the other parts, carry the shaft 12 around, and the cam surface 32 strikes bolt 18 and shifts the clutch member 27 to disengage the clutch as is illustrated in Fig. 4.

It may happen that when the thumb piece

is released, the bolt will not assume the position shown in Fig. 2, but may strike anywhere on the outer surface of the collar 31. In this event, the machine continues operation and the circuit to the motor is not broken until the bolt 18 drops off the end 32*a* of the partial collar 31, whereupon the circuit is broken and the clutch is eventually thrown out, as above described. It will be seen from this that although the thumb piece 15 may be released at various times, with relation to the position of the collar 31, yet the machine always comes to a stop at the same place. This is at the time when the stitching mechanism of the stitcher head is withdrawn within the head, as is well known to those skilled in the wire stitching art.

The arrangement of the clutch control and the circuit controlling switch, as shown herein, is more or less in a diagrammatic form; it is within the invention to employ any suitable electrical switch construction or to provide variations in the clutch structure, as may be elected. The blade anvil shown is one of relatively great length, extending the entire length of the portable tool, but it is within the invention to place shorter anvils on the machine if the same is desirable. The long anvil provides for a deep space 7, and this may be used where the stitches are a relatively great distance from the edge of the parts to be stitched together. In the event that the stitches are to be very close to the edge of the material, a shorter anvil can be provided.

We claim:

1. A portable wire stitching machine comprising, a body including a stitching head of the type designed to utilize wire stitch stock from a continuous length supply, means carried by the body for holding such supply of wire, an anvil supported by the body and having a stitch clinching part spaced from the stitching head, power means including a driving element carried entirely by the body for actuating the stitching head, and a manually controlled clutch carried by the body and operable to engage and disengage the driving element and stitching head.

2. A portable wire stitching machine comprising, a body including a stitching head of the type designed to utilize wire stitch stock from a continuous length supply, means carried by the body for holding such supply of wire, an anvil supported by the body and having a stitch clinching part spaced from the stitching head, a motor carried by the body, a clutch disposed between the motor and stitcher head, and a manually controlled element for controlling the action of the clutch.

3. A portable wire stitching machine comprising, a body including a stitching head at one end, of the type designed to utilize wire stitch stock from a continuous supply, means for holding such supply of wire, means for operating the stitching head, manually operable controlling means therefor, and a blade anvil rigidly connected to the end to said body opposite the stitching head and being spaced from said body, said anvil having a stitch clinching portion in alignment with an spaced from the stitching head, said blade anvil being secured to the end of the body opposite that of the stitching head, and a hand grip on the body positioned so that the body may hang therefrom with its two ends approximately in the same horizontal plane.

4. A portable wire stitching machine comprising, a body in the form of a housing, a stitcher head at one end of the housing of the type for driving wire stitches, an electric motor on the opposite end of the housing for operating the stitcher head, a handle above a body by means of which the machine may be manipulated, said housing, stitcher head and motor being adapted to depend when supported by the handle with the housing, stitcher head and motor disposed substantially horizontally, and a blade anvil disposed on the opposite side of the housing from the handle, means rigidly securing said blade anvil to the machine at a point located substantially below the motor, said blade anvil extending in spaced relation to the housing to a point underneath the stitcher head, and said blade anvil having a stitch clinching portion disposed in alignment with said stitcher head.

In testimony whereof we affix our signatures.

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