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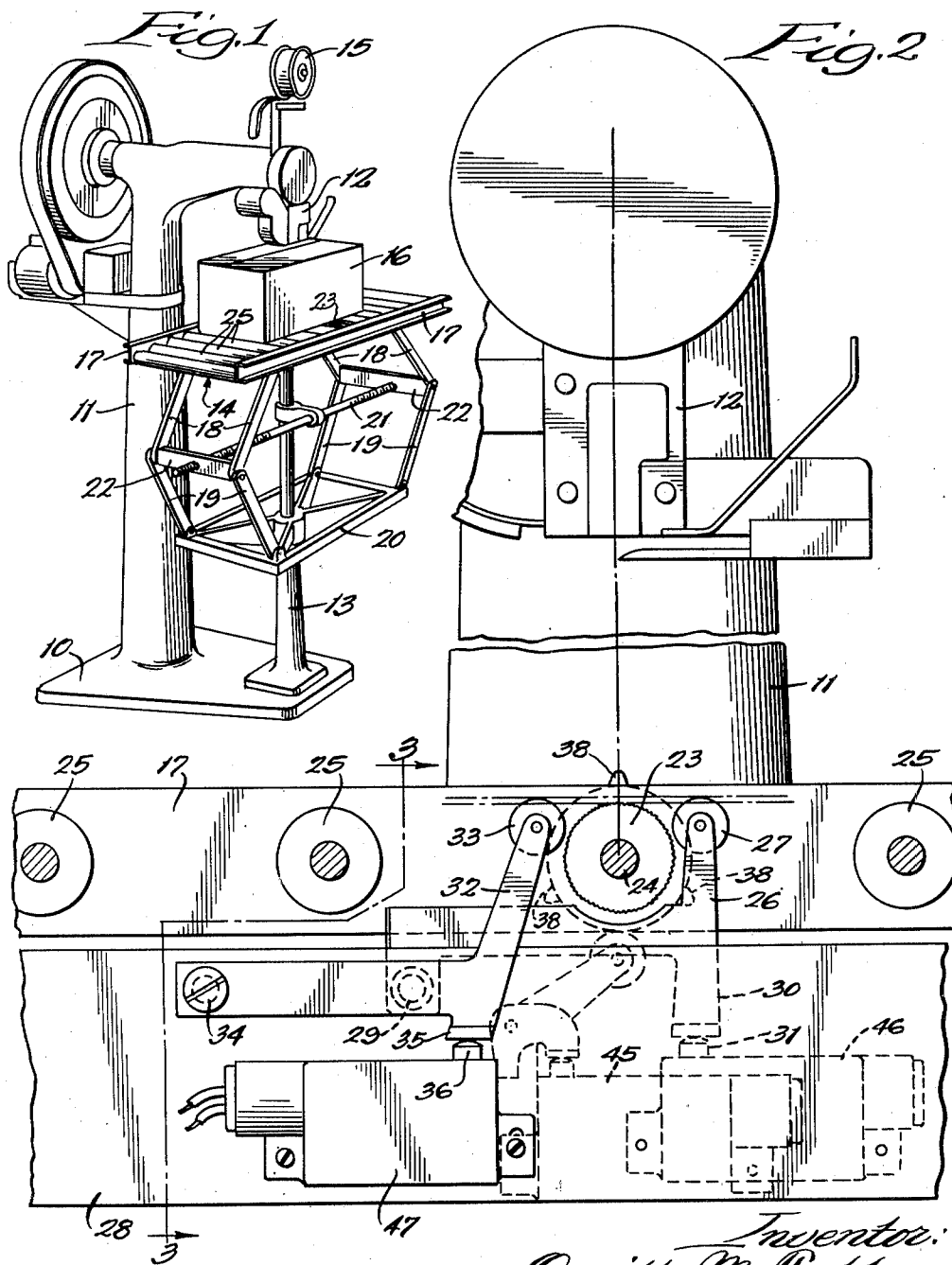
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WIRE STITCHING APPARATUS AND CONTROL MECHANISM

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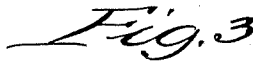


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2 Sheets-Sheet 2



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WIRE STITCHING APPARATUS AND
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12 Claims. (Cl. 1-11)

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This invention relates to wire-stitching apparatus and control mechanism. The invention is particularly useful in connection with apparatus which staples the top or sides of a carton together while the carton is passed under the stapling head of the machine. In the stapling or stitching of cartons, etc. by means of an electrically-operating stitcher head, it is customary to pass the carton over a series of rollers under the head. One difficulty is that the stitches are not evenly-spaced and very often occur at the very ends of the carton where an unsightly and unsatisfactory stapling occurs.

An object of the present invention is to provide a control mechanism which will accurately space the staples from each end of the carton as it is passed under the stapling head. Yet another object is to provide mechanism for controlling the stapling action of the machine to provide evenly spaced staples in the box or carton. A further object is to provide mechanism for spacing the staples from the ends of the carton, while also controlling the spacing of the staples across the top or sides of the carton, irrespective of the speed of movement of the carton across the roller bed. A still further object is to provide novel control structure for controlling the speed of operation of the stitching head of a wire-stitching machine, etc., and for other uses. Other specific objects and advantages will appear as the specification proceeds.

The invention is illustrated, in preferred embodiments, by the accompanying drawings, in which—

Figure 1 is a perspective view of apparatus embodying my invention; Fig. 2, a broken and greatly enlarged view in side elevation, the roller conveyor portion of the apparatus being shown in longitudinal section; Fig. 3, a broken vertical sectional view, the section being taken as indicated at line 3 of Fig. 2; and Fig. 4, a diagrammatic view of the wiring layout.

In the illustration given, 10 designates a base equipped with a standard 11 for supporting a wire-stapling machine, the machine being equipped with the usual stapling head 12. The base 10 also supports a standard 13 upon which is adjustably mounted a roller bed 14.

The wire-stitching or wire-stapling machine illustrated is of well-known construction and need not be described in detail. Wire is fed from a spool 15 into the stapling head 12, where staples are formed and pressed through and clinched within the carton 16. Since such structure is

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well known, a detailed description herein is believed unnecessary.

The adjustably-supported roller bed 14 is also of well-known construction, and it is believed unnecessary to describe it in detail herein, except as the bed is altered by the incorporation therein of the present invention.

As illustrated, the roller bed 14 is formed of a plurality of rollers, having their ends rotatably secured within the side rails 17. The rails 17 are supported upon the arms 18 pivoted to a lower set of arms 19. The lower set of arms 19 are pivotally supported upon the frame 20. A rod 21 threadedly engages threaded recesses in the cross-arms 22 so as to separate the arms 22, or to draw them closer together, in order to effect lowering or raising of the platform 14. Such lifting structure is well known, and it will be understood that any suitable means for raising or lowering the platform 14 may be employed. If desired, the platform 14 may be permanently supported at a fixed level, and means may be provided for raising or lowering the stitching head 12.

In the structure shown in Figs. 2 and 3, I provide a knurled roller 23, having reduced ends 24 journaled in the rails 17. Aside from the knurling or roughening of the roller 23, the roller is substantially the same as the adjacent rollers 25 which, together with the roller 23, make up the roller bed 14.

At the forward side of the roller 23, I provide a switch arm 26 equipped with a roller 27 adapted to be engaged by a carton passed along the roller bed 14. The switch arm 26 is pivoted to a frame plate 28 by means of a threaded bolt 29, and the arm has a depending leg 30 adapted to engage a switch plunger 31.

On the other side of the roller 23 is a switch arm 32 equipped, at its top, with a roller 33 adapted to be engaged and depressed by the carton passing thereover. The switch-actuating arm 32 is pivotally supported upon the plate 28 by the threaded bolt 34. The arm 32 is provided with a depending leg 35 adapted to depress the switch plunger 36.

The switches, closed by the depressing of plungers 31 and 36, may be arranged in series with the electric circuit of the motor for the stitching machine or with a solenoid clutch therein, so that when a carton depresses switch arm 26, nothing occurs until the second switch arm 32 is depressed. The closing of both of these switches in series will render the electric circuit effective for actuating the solenoid clutch or starting the motor of the stitching machine. If desired, the

machine may be operated with the two switches, in series, as described, and with no other controls, the two switches being effective for spacing the staples from either end of the carton.

In the usual wire-stitching operations, some operators pass the cartons over the roller bed at different speeds, the machine being operated at substantially a constant speed. The result is that the cartons are stitched with the staples located at irregular spaces, or with widely varying distances between the staples. To overcome this difficulty and to insure that the carton will receive its full quota of staples and with the desired regular spacing thereof and irrespective of the speed at which the carton is manually pushed along the roller bed, I provide the following mechanism:

The roller 23 is equipped, at one end, with a timer head 37. The head 37 is provided with three equally-spaced knobs or projections 38. Beneath the head 37 and in a position to be engaged by the knobs 38, is a roller 39 mounted upon the shaft of lever 40. Lever 40 is fixed to a shaft 41 journaled in the bearings 42. Fixed to the shaft 41 is a cam 43. The cam 43 is equipped with an inclined face adapted to engage and depress a spring-urged switch plunger 44. Thus, when one of the knobs 38 strikes the roller 39, it oscillates the lever 40, bringing the cam 43 against the plunger 44 to depress it. Immediately after the knob 38 has cleared the roller 39, the plunger 44 is pressed upwardly again to swing the cam 43 back to its original position and to bring the roller 39 into its original position for engagement with the next knob 38. For the brief moment that the plunger 44 is in downward position, a contact is made which causes the machine to carry through one stapling operation. The release of the plunger 44, permitting it to again rise, breaks the electric circuit, and the machine waits until the switch is closed again by the depressing of plunger 44.

Roller 23 is preferably knurled or provided with spaced grooves, which insure the turning of the roller with the carton as the carton is advanced.

If desired, the roller control indicated may be used alone or in conjunction with the spaced switch members 32 and 26.

For some uses, it will be desired to have not only the spaced switches controlled by switch arms 26 and 32, but also the switch controlled by plunger 44 and actuated by the timer head 37 in operation. In this case, the three switches would be arranged in series, so that the electric circuit leading to the motor or to a clutch solenoid for the motor shaft will be rendered operative by the closing of all three switches and only while all three switches remain closed.

In the specific illustration given in Fig. 4, the switch closed by the plunger 44 is indicated by the numeral 45. The switch closed by the plunger 31 is indicated by the numeral 46, and the switch closed by the plunger 36 is indicated by the numeral 47. The three switches are arranged in series in the circuit 48 and disposed in the circuit is a solenoid winding 49 for actuating the solenoid plunger 50. The plunger 50 is connected to a clutch 51 for connecting the motor shaft or a driving part of the machine with a driven part. It will be understood that any structure may be provided, which will cause the motor to function, or a driven part of the machine to function, only when the circuit is closed by the closing of the three switches. If it is desired to operate the machine through the use of switches 46 and 47 only, switch 45 will be closed permanently rather than

being left open, as indicated in Fig. 4. If it is desired to operate the machine only through the use of the timer head 37 and the switch 45, the two switches 46 and 47 may be permanently closed. Where it is desired to employ all three switches in the control of the machine, the three switches will be left normally open, as indicated in the wiring layout shown in Fig. 4.

While, in the foregoing specification, I have set forth a preferred structure in considerable detail for the purpose of illustrating one embodiment of the invention, it will be understood that such details may be varied widely by those skilled in the art without departing from the spirit of my invention.

I claim:

1. In a wire-stitching machine equipped with a bed for supporting objects passed under the stitching head thereof, a pair of switches spaced longitudinally of said bed and adapted to be engaged and closed successively by objects passed over said bed, and an electric circuit controlling the operation of said stitching head and including said switches arranged in series.

2. In a wire-stitching machine equipped with a plurality of rollers, a pair of switches supported below said rollers, and switch arms extending upwardly between the rollers in spaced-apart relation and adapted to close said switches upon contact with an object passed over the rollers, said switches being arranged in series in the electric circuit controlling the operation of said stitching head.

3. In a wire-stitching machine having a roller-equipped bed for supporting objects passed under the stitching head, a pair of switches, and a pair of switch arms pivotally supported upon said bed and extending upwardly on opposite sides of a roller, said switch arms being adapted to close said switches when engaged by an object passed over the rollers, said switches being arranged in series in the electric circuit controlling the operation of said stitching head.

4. In a wire-stitching machine having a roller-equipped bed for supporting objects passed under the stitching head, a pair of switches, a pair of switch arms pivotally supported upon said bed and extending upwardly on opposite sides of a roller, said switch arms being adapted to close said switches when engaged by an object passed over the rollers, a solenoid clutch controlling the operation of said stitching head, and an electric circuit for said solenoid and switches, said switches being arranged in series.

5. In a stitching machine equipped with a bed below the stitching head of the machine, a roller mounted in said bed, spaced switches below said bed and having actuating members extending upwardly through said bed at spaced longitudinal distances and adapted to be closed by contact of an object moved over said bed, said roller being equipped with a timer head, and a switch adapted to be closed by said timer head upon the rotation of said head, said switches being arranged in series in an electric circuit controlling the operation of said stitching head.

6. In a stitching machine equipped with a bed below the stitching head of the machine, a roller mounted in said bed, spaced switches below said bed and having actuating members extending upwardly through said bed at spaced longitudinal distances and adapted to be closed by contact of an object moved over said bed, said roller being equipped with a timer head, and a switch adapted to be closed by said timer head upon the

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rotation of said head, said switches being arranged in series in an electric circuit controlling the operation of said stitching head, said timer head being provided with a plurality of projections for closing said switch repeatedly upon a single rotation of said head.

7. In a stitching machine equipped with a bed of rollers below the stitching head, spaced switches having actuating members extending between said rollers in longitudinally-spaced relation and adapted to be closed by contact with an object moved over said roller bed, at least one of said rollers being mounted for rotation by engagement with said object, a timer head carried by said roller, and a switch adapted to be actuated by said timer head upon rotation of the head, all of said switches being arranged in series in an electric circuit controlling the operation of the stitching head.

8. In a stitching machine of the character set forth, a bed equipped with a roller mounted for rotation upon contact with an object moved over said bed, said roller being provided with a head, a timer member on said head, and a normally-open switch arranged in series in an electric circuit controlling the operation of the stitching head and adapted to be closed momentarily by contact with the timer member of said head.

9. In a stitching machine of the character set forth, a bed equipped with a roller mounted for rotation upon contact with a carton moved over said bed, said roller being provided with a head having a plurality of spaced knobs, and a normally-open spring switch arranged in series in an

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electric circuit controlling the operation of the stitching head, said switch being adapted to be closed momentarily by contact with the knobs of the timer head.

5 10. In a stitching machine equipped with a bed to carry objects to be stitched, switches spaced longitudinally of said bed and adapted to be actuated by said objects as they traverse said bed, a roller adapted to be engaged by said objects as they traverse said bed, a switch actuated by rotation of said roller, and means responsive to the simultaneous actuation of said switches to control operation of the stitching head.

15 11. In a stitching machine adapted to stitch objects as they traverse a predetermined path, switches spaced longitudinally of said path and adapted to be actuated by said objects as they traverse said path, a roller adapted to be engaged by said objects as they traverse said path, a switch actuated by rotation of said roller, and means responsive to the simultaneous actuation of said switches to control operation of the stitching head.

20 12. In a stitching machine adapted to stitch objects as they traverse a predetermined path, switches spaced longitudinally of said path and adapted to be actuated by said objects as they traverse said path, and means responsive to the simultaneous actuation of said switches to control operation of the stitching head.

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No references cited.