

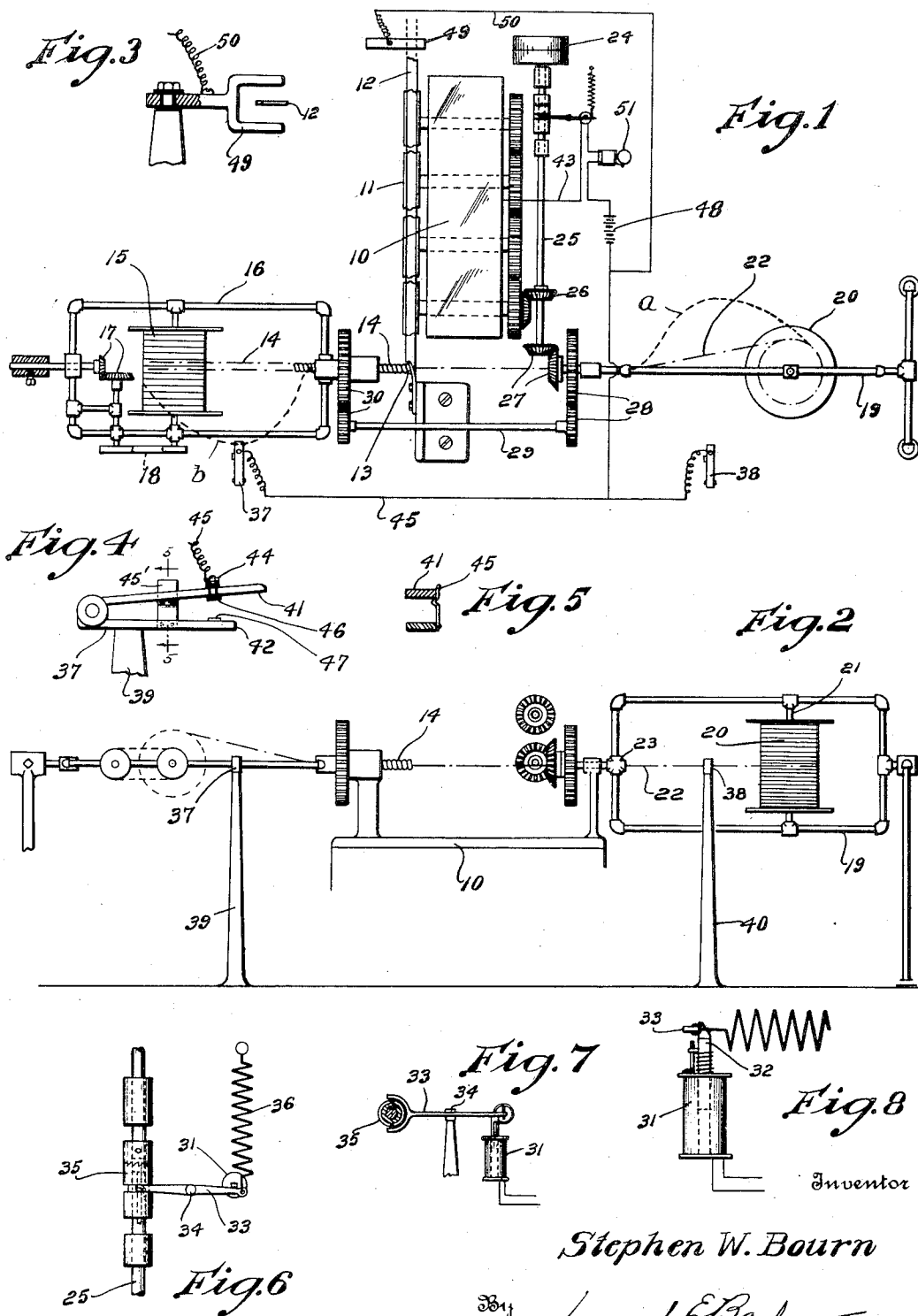
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STOP MOTION FOR FLEXIBLE TUBE MAKING MACHINES

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STOP MOTION FOR FLEXIBLE-TUBE-MAKING MACHINES.

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To all whom it may concern:

Be it known that I, STEPHEN W. BOURN, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Stop Motions for Flexible-Tube-Making Machines, of which the following is a specification.

This invention relates to an improvement in machines for making flexible conduit such as that used for covering wires or cables or for other purposes, and the object of this invention is to provide an electric stop motion for such a machine so that if any of the parts of the work such as the core, the strip of metal which is wound into tubular form about the core, the tube itself, or the frame carrying the same should by the action of the machine be thrown, or caused to move, out of its normal line of travel an electrical connection will be automatically made to stop the machine.

The nature and advantages of the invention will be better understood when the following detailed description is taken in connection with the accompanying drawings, the invention residing in the combination and arrangement of parts as claimed.

In the drawings forming part of this specification, like numerals of reference indicate similar parts in the several views and wherein:—

Figure 1 is a plan view of my improved armor tube forming machine showing the electric circuit, and the arrangement of the circuit closure adapted to be operated when the parts move from their normal line of travel.

Figure 2 is a side elevation of the machine.

Figure 3 is a detail showing the fork form of circuit enclosing member through which the electric circuit is completed when the strip moves from its normal line of travel while being fed to the winding point.

Figure 4 shows one of the contact members adapted to be moved to close the circuit when engaged by the core or its covering when they are loosened up and thrown from their normal line of travel during the revolving action of their respective reels.

Figure 5 is a section of line 5—5 of Figure 4.

Figure 6 is a top view showing the clutch

as mounted on a portion of the main drive shaft.

Figure 7 is an elevation showing the pivoted clutch operating arm as holding the clutch in operating position being locked by the core of a solenoid magnet against the pull of a spring.

Figure 8 is a side elevation showing the core of the magnet as retaining the clutch arm against the pull of the spring.

It is found in practice in the operation of machines of this character that often the take-up reel for the tubing fails to operate at the proper speed, or for other reasons, the tubing becomes slack and while being revolved rapidly in a loop form as illustrated in dotted lines in Figure 1 it is apt to strike the attendant, or strike portions of the machine and injure the tubing, or the machine, or in other cases, for certain reasons the wire at the opposite end of the machine also sometimes becomes loosened or looped; also the strip upon being improperly fed to the machine sometimes becomes caught and is caused to loop or buckle out of its normal line of travel, and in all or any of these cases it is found of advantage to provide means for stopping the machine until the difficulty has been straightened out by the attendant, and the following is a detailed description of one means by which this result is accomplished.

With reference to the drawings, 10 designates the frame of the machine in part of which a set of strip feeding and grooving rolls 11 are rotatably mounted for feeding the strip 12 to the point 13 where it is continuously wound into a tubular conduit or covering 14. The tube thus formed is taken up or wound upon the reel 15, which is mounted to rotate upon its axes in the frame 16, being driven through the gears 17, and belt 18, and this frame 16 is caused to revolve by means presently described to rotate the reel and end over end to accommodate the twist or rotation of the tube as formed.

At the right of this machine is mounted a rotatable frame 19, on which is mounted the core supply reel 20, the same being adapted to rotate on the shaft 21, and to carry the wire 22 that is fed therefrom through the guides 23 into the tube 14, which is being wound about this wire core.

The strip feeding and shaping rolls 11 and

these revolving frames 16 and 19 are driven in unison from the pulley 24, through the main shaft 25 through the clutch 35, by gears 26, 27, 28, jack shaft 29 and gears 30, and if for any reason either the feed of the strip 12, the feed of the wire core, or the forming and feed of the tubing 14 should get out of time with each other, then one or the other is likely to become slack and buckle up into loop form as illustrated in dotted lines at *a* or *b* in Figure 1, and when such a condition occurs the machine should be stopped until the difficulty has been remedied by the attendant.

To accomplish this stopping of the machine in a simple and practical way, I have included the machine in a normally open electric circuit, and in this circuit I have connected a solenoid magnet 31. The core 32 of this magnet is caused to engage the rear outer end of the clutch operating arm 33, which is pivoted at 34 to hold its sliding member in operating engagement with the opposite member thereof against the tension of the spring 36, so that when the solenoid is energized the core is withdrawn from the arm 33 permitting spring 36 to act and separate the clutch members, thereby disconnecting the driving shaft and stopping the machine.

In order to close this circuit to energize this magnet, I have mounted circuit closing switches 37 and 38 upon standards 39 and 40 respectively, which switches as shown in Figures 4 and 5 are provided with an upper arm 41 and a lower arm 42, the latter being normally in circuit with the machine through which wire 43 of the circuit is grounded. The contact 44, carried in the upper arm of this switch is insulated therefrom and is connected to the main circuit through wire 45, and when the cable 14 or the core wire 22 becomes slack and is thrown out into loop form beyond the revolving frame as illustrated at either *a* or *b* in Figure 1, then they will engage the arm 41 of the contact member, which is normally held open by means of spring 45', and drive it down so that the two contacts 46 and 47 will be in engagement, which will complete the circuit through the machine and through the battery 48 or other sources of power to energize the solenoid and release the clutch to be moved into inoperative position and so stop the machine.

Instead of providing a contact member as illustrated in Figure 4 for the strip 12, I have provided a fork-shaped contact member 49, which is insulated from the machine and when the strip 12, which is normally in circuit when the machine moves sufficiently out of its normal line of travel to engage either of the arms of the fork 49 the circuit is closed through a wire 50 to

energize the solenoid and so stop the machine.

In some instances it is found of advantage to provide an alarm for audibly indicating that the machine is stopped. Therefore, to accomplish this I have mounted in the electric circuit a bell 51 which when the circuit is closed, will ring and so indicate to the attendant that the machine is stopped and requires attention.

My improved mechanism for automatically stopping the machine when the parts of the machine or of the work are thrown from their normal line of travel, enables an attendant to operate a large number of such machines with the assurance that if the machine fails to operate properly the same will automatically stop and wait his attention to remedy the trouble.

The machine shown for closing the circuit and stopping the machine is only one form of many that might be employed for this purpose and yet fall within the spirit of this invention.

The foregoing description is directed solely towards the construction illustrated, but I desire it to be understood that I reserve the privilege of resorting to all the mechanical changes to which the device is susceptible, the invention being defined and limited only by the terms of the appended claims.

I claim:

1. In a flexible conduit making machine, means for winding a strip of metal into tubular form, means for feeding the strip to the point of winding, means for advancing the tube as wound and means for automatically stopping the machine if the strip or tube move from their normal line of travel.

2. In a flexible conduit making machine, means for winding a strip of metal into tubular form about a core, means for feeding the strip to the point of winding, means for advancing the core and its tubular covering as wound, and electrically actuated means for automatically stopping the machine when the core, the strip or tubular covering is caused to move from their normal line of travel.

3. In a flexible conduit making machine, means for winding a strip of metal into tubular form about a core means for feeding the strip to the point of winding, means for advancing the core and its tubular covering as wound, an electric circuit, a motor controlled stop motion for said machine in said circuit, and means whereby said motor is caused to operate its stop motion to stop the machine when the core, strip or covering moves a predetermined amount from its normal line of travel.

4. In a flexible conduit making machine means for winding a strip of metal into tu-

bular form, means for feeding the strip to the point of winding, means for advancing the tube as formed, an electric circuit, a motor in said circuit and means whereby said motor is energized and caused to stop said machine when said strip or tube is moved out of its normal line of travel.

5. In a flexible conduit making machine, means for winding a strip of metal into tubu-

lar form, means for feeding the strip to the point of winding, a rotatable frame, a reel mounted in said frame for taking up the tube as formed, and an electric contact adjacent the frame adapted to close the circuit to stop the machine when engaged by said rotating parts. 10 15

In testimony whereof I affix my signature.
STEPHEN W. BOURN.