Nov. 27, 1945. F. LAMBACH ET AL 2,389,625

DROP NEEDLE CONTROL AND AN ELECTRICALLY OPERATED STOP MOTION FOR WARPING OR BEAMING PLANTS

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Fig: 1.

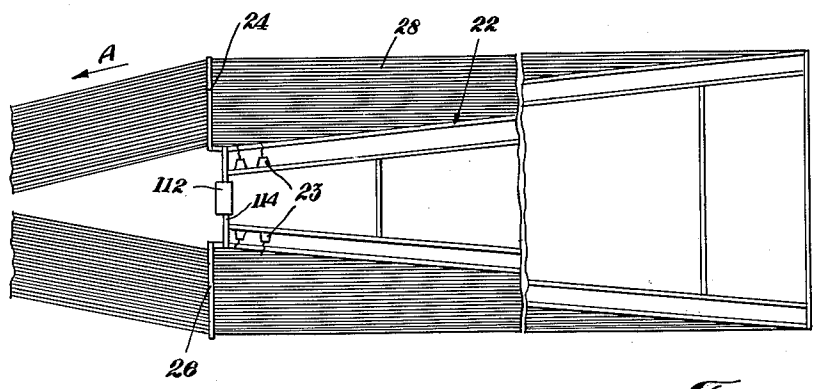


Fig: 9.

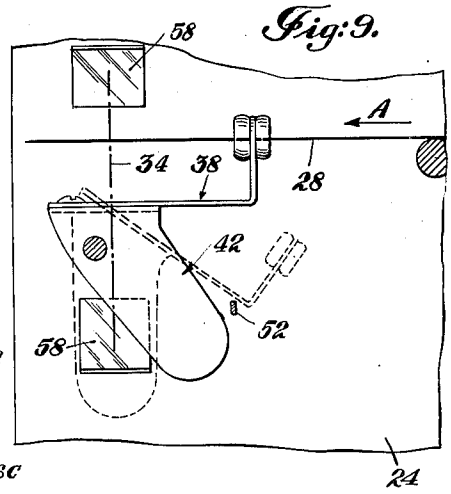
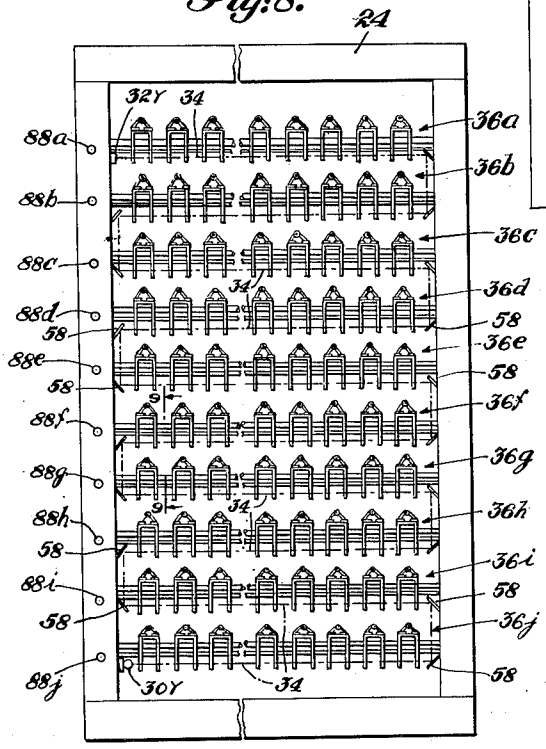


Fig: 8.



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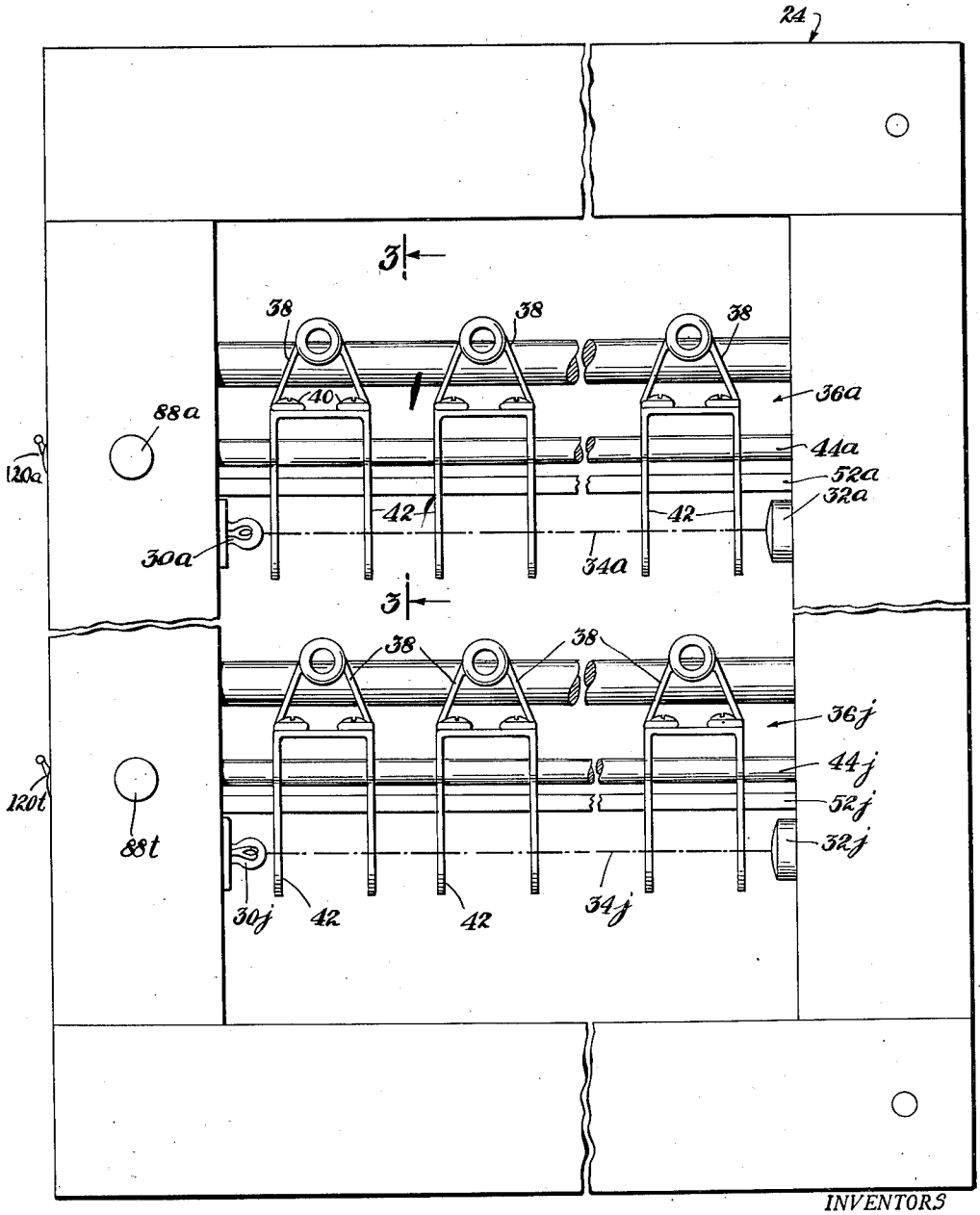
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Fig. 2.



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Fig. 3

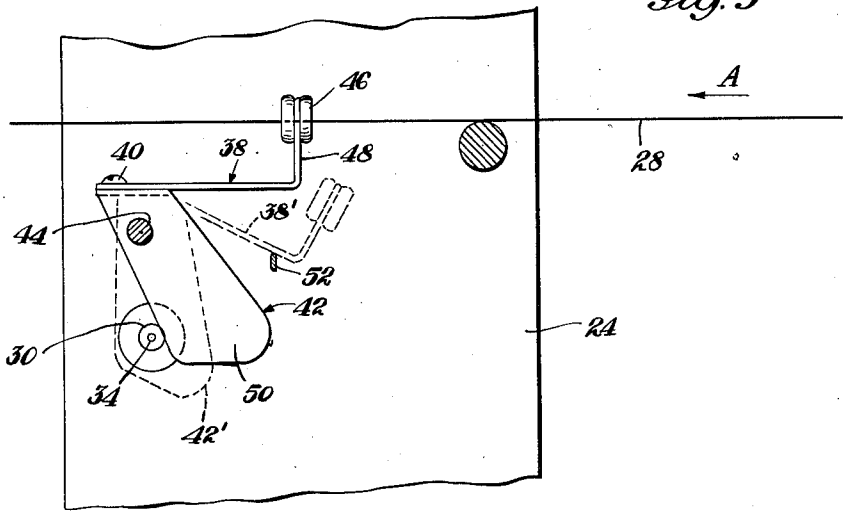


Fig: 10.

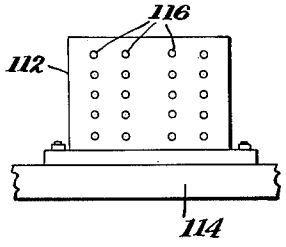
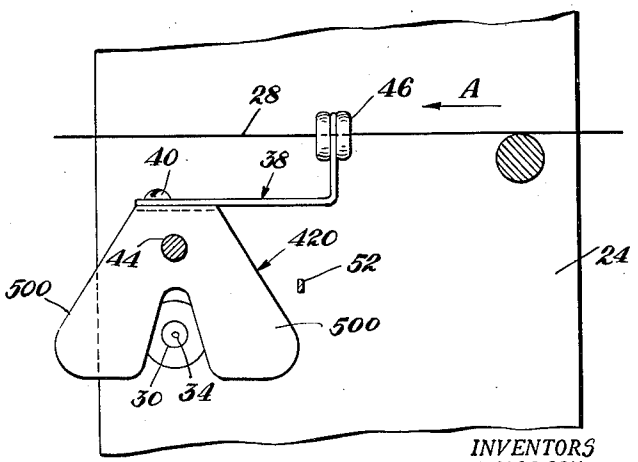


Fig: 4.



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Fig:6.

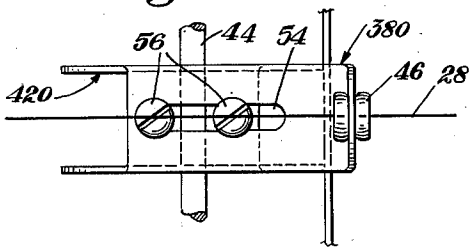


Fig:5.

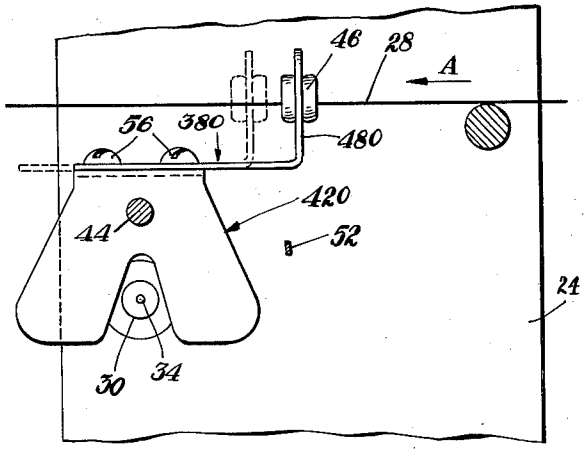
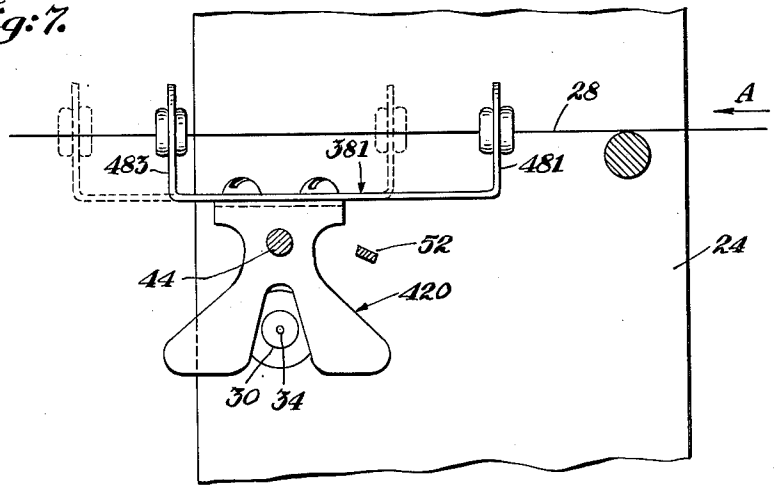


Fig:7.



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Fig. 11

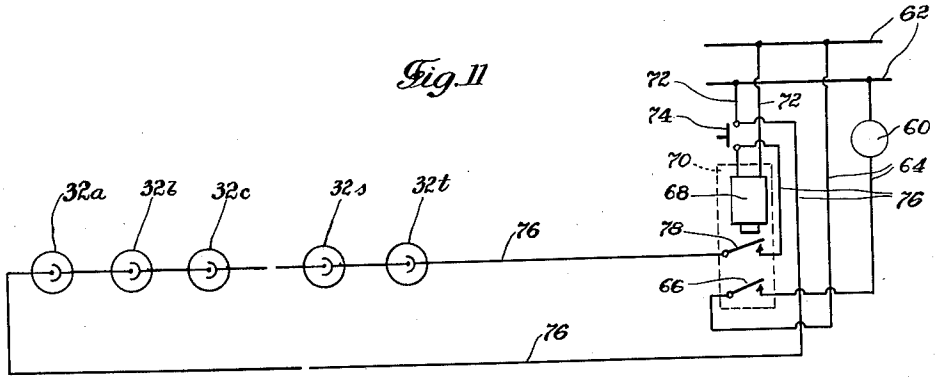


Fig. 12

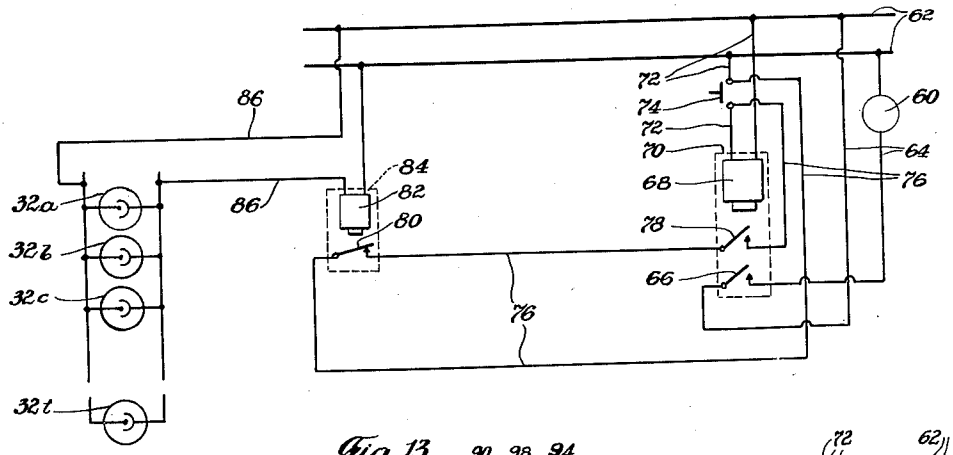
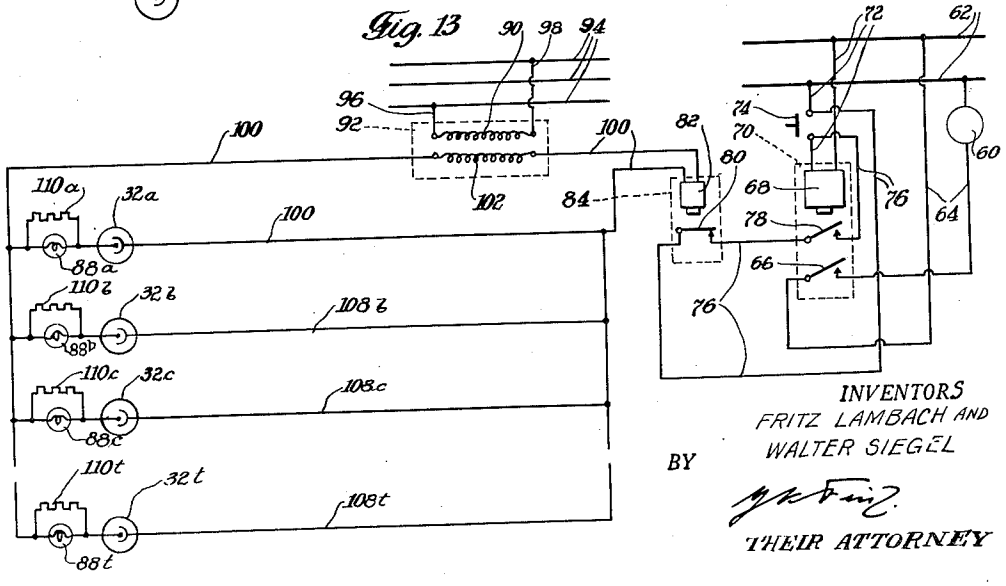


Fig. 13



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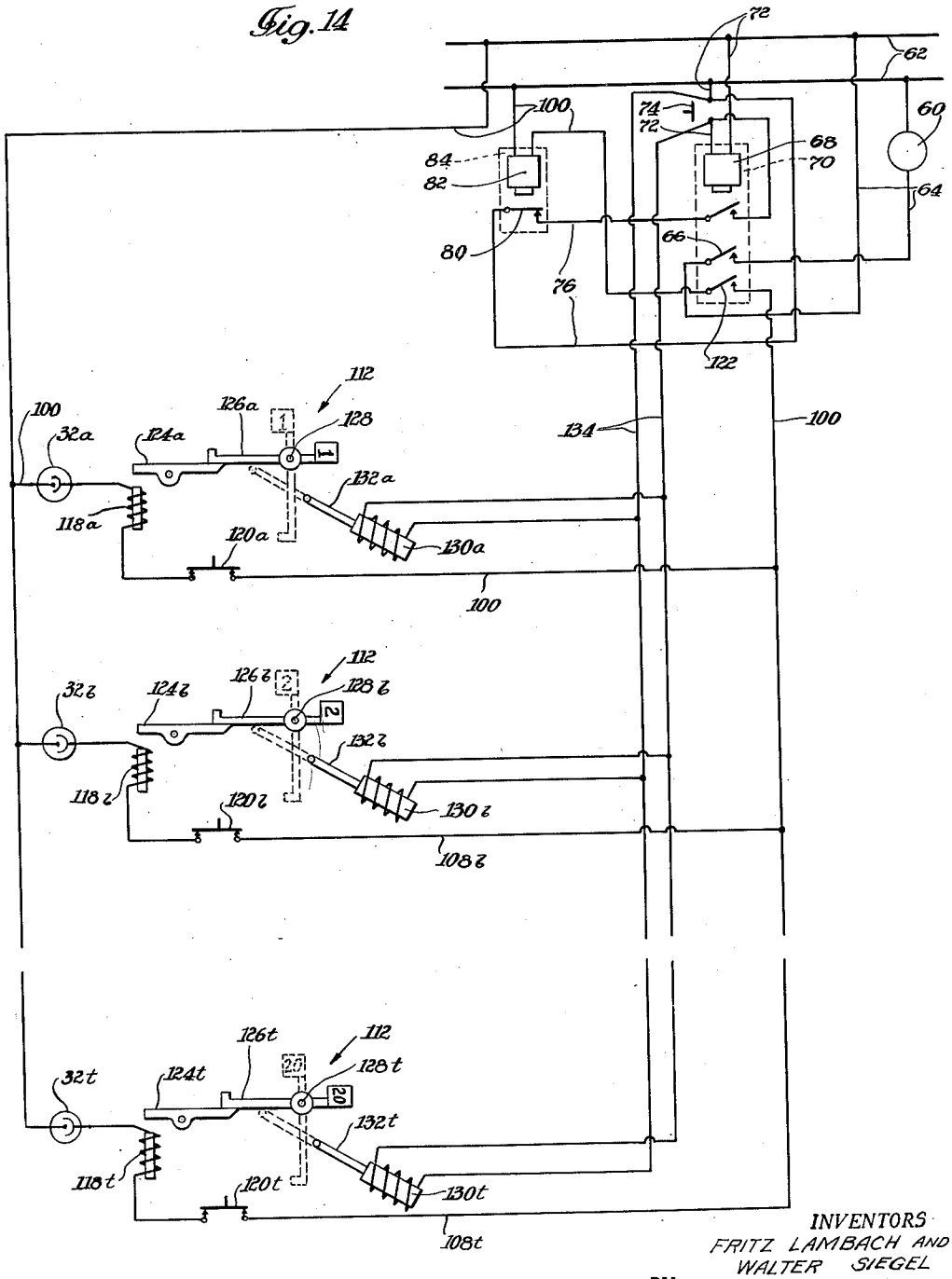
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Fig. 14



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Fig. 15.

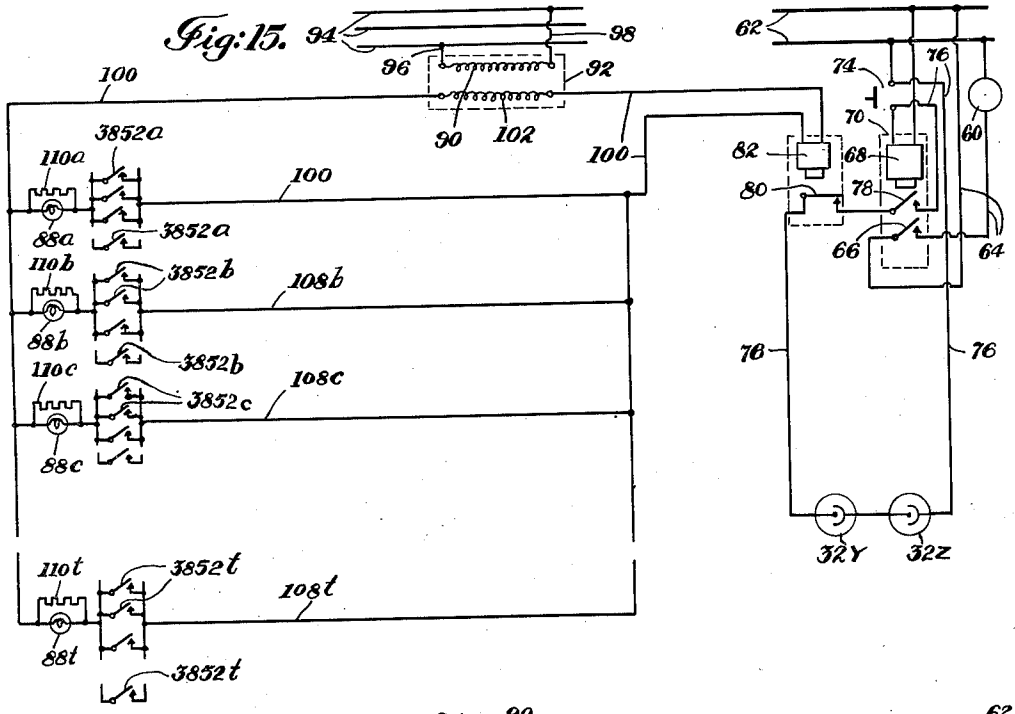
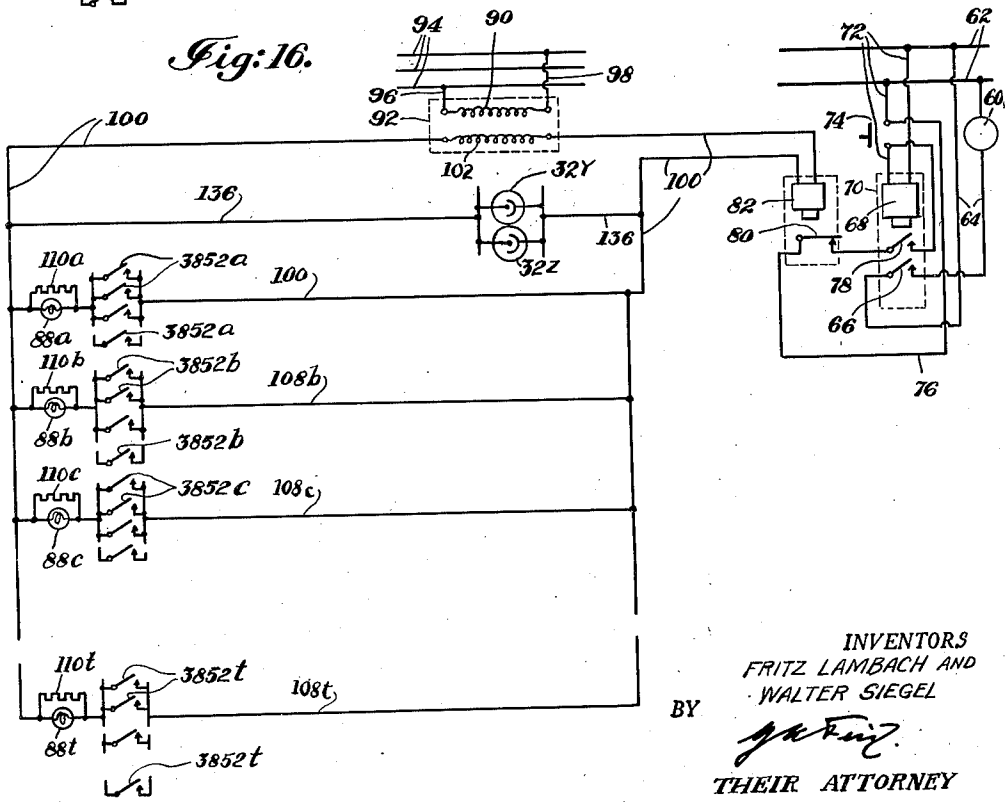


Fig. 16.



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Patented Nov. 27, 1945 2,389,625

UNITED STATES PATENT OFFICE

2,389,625

DROP NEEDLE CONTROL AND AN ELECTRICALLY OPERATED STOP MOTION FOR WARPING OR BEAMING PLANTS

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Application May 12, 1943, Serial No. 486,650

7 Claims. (Cl. 28—51)

Our invention relates to textile machines, and more particularly to a drop needle control for an electrically operated stop motion for a warping or beaming plant.

One object of our invention is to improve upon the drop needle controls and electrically operated stop motions for warping or beaming plants as now ordinarily made. Another object of our invention is to provide a drop needle control which is more sensitive to a breakage of warp yarn than the drop needle controls hitherto used in the art.

Our invention consists in certain novel features of a drop needle control and an electrically operated stop motion for a warping or beaming plant as will be fully described hereinafter.

Further objects and advantages of the invention will be apparent from the following disclosure of several embodiments thereof.

In the accompanying drawings are:

Fig. 1, a more or less diagrammatical top plan view of a creel with two frames for the support of the control means of the drop needle control for the electrically operated stop motion,

Fig. 2, a front elevational view of a frame of the creel carrying a plurality of photo-electrical means and a plurality of rows of control means, each photo-electrical means being controlled by one of the rows of control means,

Fig. 3, a fragmentary sectional view of the frame taken on line 3—3 of Fig. 2, illustrating a control member with a control finger of our drop needle control,

Fig. 4, a view similar to that shown in Fig. 3, illustrating, however, a different embodiment of the control member,

Fig. 5, a view similar to that shown in Fig. 4, illustrating, however, an adjustable connection between the control finger and the control member,

Fig. 6, a top plan view of the control means shown in Fig. 5,

Fig. 7, a view similar to that shown in Fig. 5, illustrating, however, a control finger having two opposite arms for engagement with the warp yarn,

Fig. 8, a front elevational view of a frame of the creel with a different embodiment of our drop needle control, wherein a single photo-electrical means is controlled by the control members of several rows of control means,

Fig. 9, in an enlarged scale, a fragmentary sectional view of the frame shown in Fig. 8 taken on line 9—9 of said Fig. 8, illustrating a control member with a control finger and mirrors for directing the path of the light rays,

Fig. 10, an elevational view of an annunciator for indicating the row or rows wherein a drop needle caused an actuation of the stop motion, and

Figs. 11–16, various embodiments of circuit diagrams of an electrically operated stop motion equipped with a drop needle control according to our invention, wherein the switches are shown in their normal positions when the relays are deenergized.

Referring now to Fig. 1, 22 generally indicates a creel carrying a plurality of bobbins 23, only a portion of said bobbins being shown in the drawings. The creel 22 is equipped with two frames 24 and 26 carrying the drop needle control to be described hereinafter. The control means of the drop needle control are engaged with the warp yarns 28 travelling from the bobbins 23 in the direction of the arrow A to a beam driven by the motor of a warper or beamer (not shown).

As the arrangement of the drop needle control is substantially the same in each of the frames 24 and 26, it is sufficient to describe in detail only the frame 24 with its drop needle control.

As best shown in Fig. 2, the frame 24 carries a plurality of photo-electric means, for example ten, each of said photo-electric means comprising a source of light or bulb 30*a*, 30*b*, . . . 30*j* and a photo-electric element 32*a*, 32*b*, . . . 32*j* for electrical connection with the stop motion. Each source of light is arranged for projecting a beam of light rays 34*a*, 34*b*, . . . 34*j* upon the associated photo-electric element. Furthermore, the frame 24 carries a plurality of rows of control means or control units generally indicated by 36*a*, 36*b*, . . . 36*j*, for example ten rows of control means. Each row of control means or control units is associated with one of said photo-electric means to control the passage of light rays between the source of light and the photo-electric element. Each row of control means or control units comprises a series of control fingers 38 immovably connected by screws 40 with a series of control members 42 swingably mounted on a rod 44*a*, 44*b*, . . . 44*j* respectively. As best shown in Fig. 3, the warp yarn 28 passes through an eyelet 46 arranged in an upwardly extending arm 48 of the control finger 38 made of a wire bent in suitable manner. During the normal operation of the warping or beaming plant, the control means or control unit 38, 42 is in the inactive position shown in full lines in Fig. 3. The wing 50 of the control member 42 is of such a shape that the control member is out of the

path of the beam 34 of light rays emanating from the bulb 30 in above described inactive position. Upon breakage of warp yarn, however, the control means or control unit drops by its own weight into the active position 38', 42' shown in dash lines in Fig. 3, wherein the wing 50 of the control member comes into the path of the beam of light rays 34 causing a change in the condition of the photo-electric element which, in turn, causes an actuation of the stop motion as will be described hereinafter. The active position 38', 42' of the control means or control unit is limited by a limiting member 52 forming an abutment for the control finger.

The control means or control unit for controlling the passage of light rays between the source of light and the photo-electric element of the photo-electric means may be of various constructions.

According to Fig. 4, for example, the control finger 38 is immovably connected with the control member 420 having two wings 500, one on each side of the rod 44. Thus, the control member 420 per se is mounted on the supporting rod 44 in a balanced condition. Upon yarn failure, such as breakage of warp yarn a change in the position of the control member 420 is caused by the load of the control finger 38 eccentrically mounted on the control member 420.

Obviously, the more the end of the control finger projects from the control member the faster the reaction of the control member, and, the less the control finger projects from the control member the slower the reaction of the control member. Figs. 5 and 6 illustrate a different embodiment of the control means or control unit according to which the control finger 380 may be adjusted in various positions relative to the control member 420 for an adjustment of the reaction of the control member in accordance with the requirements of the warp yarn 28 to be wound. The control finger 380 is made of sheet metal having a slot 54 through which the screws 56 pass. Said screws 56 are screwed into the body of the control member 420 and serve to hold the control finger 380 in its adjusted position. The control finger 380 has an upwardly extending arm 480 with an opening for the reception of the eyelet 46. It will be readily understood that the reaction of the control member 420 is faster if the control finger 380 is in the position shown in full lines than if the control finger 380 is in the position shown in dash lines.

Fig. 7 illustrates still another embodiment of the control means or control unit. The control finger 381 adjustably mounted on the control member 420 by means of a slot and screw connection has two opposite arms 481 and 483, each of which being provided with an eyelet for the passage of warp yarn 28. If the control finger 381 is in the position shown in full lines, the control member 420 will turn in clockwise direction upon breakage of warp yarn, and if the control finger 381 is in the position shown in dash lines, the control member 420 will turn in counterclockwise direction upon breakage of warp yarn.

In the embodiments of the control means shown in Figs. 2–7, the control member is out of the path of the light rays during the normal operation of the warping or beaming plant and controls the photo-electric means by interrupting the path of light rays upon breakage of warp yarn.

According to the arrangement of the drop needle control shown in Fig. 2, one photo-electric means 30*a*, 32*a*, 30*b*, 32*b*, . . . 30*j*, 32*j* is provided for each row of control means 36*a*, 36*b*, . . . 36*j*. As shown in Fig. 8, however, a single photo-electric means 30Y, 32Y may be used for all of the ten rows of control means or control units 36*a*, 36*b*, . . . 36*j*. The control means shown in Fig. 8 correspond to the control means shown in Fig. 2, and one of said control means is shown in detail in Fig. 9. A plurality of optical means or mirrors 58 is mounted on the frame 24 in such a way as to direct the light rays 34 emanating from the bulb 30Y through spaces controlled by the plurality of rows of control means 36*a*, 36*b*, . . . 36*j*. During the normal operation of the warping plant each control means comprising the control finger 38 and the control member 42 is in the position shown in full lines in Fig. 9. Upon breakage of warp yarn the control means 38, 42 drops into the position shown in dash lines in Fig. 9 so that it comes into the path of the light rays 34 reflected by a mirror 58, whereby the path of light rays is interrupted and the photo-electric element is actuated for a control of the stop motion connected with the control switch of the photo-electric element.

As pointed out above, the creel 22 has two frames 24 and 26 equipped with photo-electric means controlled by rows of control means or control units. Accordingly, in the case of the arrangement shown in Fig. 2, ten photo-electric elements 32*a*, 32*b*, . . . 32*j* arranged on the frame 24 and ten photo-electric elements 32*k*, 32*l*, . . . 32*t* arranged on the frame 26 have to be connected with the electrically operated stop motion for the warping or beaming plant. Figs. 11–14 illustrate various circuit diagrams for use of such twenty photo-electric elements 32*a*, 32*b*, . . . 32*t*. In case of the arrangement shown in Fig. 8, the frame 24 has only one photo-electric element 32Y; likewise the frame 26 (not shown in detail) has also only one photo-electric element. Figs. 15 and 16 illustrate two examples of the circuit diagrams for the use of such two photo-electric elements, in said Figs. 15 and 16 the photo-electric element of the frame 24 is indicated by 32Y and the photo-electric element of the frame 26 is indicated by 32Z.

Referring now to Fig. 11, the motor 60 of the warper or beamer is connected with the direct current supply line 62 by a circuit 64 including a motor control switch 66 controlled by the electromagnet 68 of a main motor control relay 70. The electromagnet 68 of the main motor control relay 70 is connected with the D. C. supply line 62 by the motor start circuit 72 including a main start switch 74 normally held in open position by a spring (not shown). A motor start holding circuit 76 including the holding switch 78 controlled by the electromagnet 68 of the main motor control relay 70 and including the twenty photo-electric elements 32*a*, 32*b*, . . . 32*t* in series is connected with the terminals of the main start switch 74. When the warp yarns are in proper warping condition, the motor start holding circuit 76 is closed at each of the twenty photo-electric elements 32*a*, 32*b*, . . . 32*t*. Prior to the start of the warping operation the electromagnet 68 is deenergized so that the motor control 66 and the holding switch 78 are in open condition, as shown in said Fig. 11. As soon as the main motor start switch 74 is closed against the action of its spring, the electromagnet 68 is energized, whereby the motor control

switch 66 is closed for an operation of the motor 60. At the same time the holding switch 78 is closed so that upon a release of the main start switch 74 the motor 60 continues to operate. As soon as one or more of the photo-electric elements 32a, 32b, . . . 32t are rendered effective by the dropping of a control unit 38, 42 into the active position shown in dash lines in Fig. 3 for causing an interruption of the motor start holding circuit 76, a stoppage of the motor 60 occurs.

Fig. 11 illustrates the arrangement in series of the photo-electric elements 32a, 32b, . . . 32t in a holding circuit 76. If, however, the electrical system does not provide for a motor start holding circuit, the photo-electric elements may be arranged in series in another suitable motor control circuit connected with the motor of the warping or beaming plant.

In the embodiment shown in Fig. 12, the motor 60 and the electromagnet 68 of the main motor control relay 70 are connected with the D. C. supply line 62 in the same manner as shown in Fig. 11. The motor start holding circuit 76, however, includes a stopping switch 80 instead of the photo-electric elements. Said stopping switch 80 is controlled by the electromagnet 82 of the stop control relay 84. The electromagnet 82 is connected with the D. C. supply line 62 by a needle control circuit 86 wherein the twenty photo-electric elements 32a, 32b, . . . 32t are arranged in parallel. When the warp yarn is in proper condition for the warping operation, the needle control circuit 86 is interrupted at each of the twenty photo-electric elements 32a, 32b, . . . 32t so that the electro-magnet 82 of the stop control relay 84 is deenergized and the stopping switch 80 is in closed condition. As soon as, during the warping operation, one or more of the photo-electric elements 32a, 32b, . . . 32t are rendered effective by the dropping of control means 38, 42 into the active position upon breakage of warp yarn for causing a closing of the needle control circuit 86, the electromagnet 82 is energized for causing an opening of the stopping switch 80 resulting in an actuation of the stop motion by an interruption of the motor start holding circuit 76.

The stop motions shown in Figs. 11 and 12 do not provide for row indicating means, for example control lamps mounted on the frames 24 and 26, which light up to indicate the row of control means wherein one or more control means dropped into the active position upon breakage of warp yarn.

Fig. 13 illustrates the arrangement of the twenty photo-electric elements 32a, 32b, . . . 32t in a stop motion having twenty control lamps 88a, 88b, . . . 88t. The connection of the motor 60 and the electromagnet 68 of the main motor control relay 70 with the D. C. supply line 62 is the same as shown in Fig. 12. Furthermore, the arrangement of the stopping switch 80 in the motor start holding circuit 76 corresponds to the showing of Fig. 12. The electromagnet 82 of the stop control relay 84 controlling the stopping switch 80, however, is arranged in a different circuit. According to Fig. 13, the primary winding 90 of a low voltage transformer 92 is connected with an alternating current supply line 94 by lines 96 and 98. The electromagnet 82 of the stop control relay 84 is arranged in a main needle control circuit 100 including the secondary winding 102 of the transformer 92, the control lamp 88a of the first row of control means, and the photo-electric element 32a of the first row of control means. The photo-electric element 32b of the second row and the control lamp 88b of the second row are arranged in an additional needle control circuit 108b. Likewise, the remaining photo-electric elements 32c, 32d, . . . 32t and the control lamps 88c, 88d, . . . 88t of the remaining rows are arranged in additional needle control circuits 108c, 108d, . . . 108t. Said additional needle control circuits 108b, 108c, . . . 108t are connected with the main needle control circuit 100 in parallel. As will be apparent from above description, the rendering effective of one or more photo-electric elements 32a, 32b, . . . 32t upon breaking of warp yarn for closing a needle control circuit causes a lighting up of the control lamp 88a, or 88b, . . . or 88t arranged in the respective needle control circuit and an energization of the electromagnet 82 of the stop control relay 84 causing an actuation of the stop motion by an opening of the stopping switch 80. The resistors 110a, 110b, . . . 110t arranged in parallel to the control lamps 88a, 88b, . . . 88t serve to permit an operation of the stop motion if one or more of the control lamps should be burnt out.

In the embodiment shown in Fig. 14, the photo-electric drop needle control is used in combination with an annunciator 112 for indicating the row containing the control means rendered active by a broken warp yarn. The annunciator 112 shown in Fig. 10 may be mounted on a member 114 of the creel 22 as shown in Fig. 1. The annunciator has twenty windows 116, wherein numerals 1, 2, 3, . . . 20 indicating a certain row appear as soon as a control means of such an indicated row caused an actuation of the stop motion. According to Fig. 14, the motor 60 of the warping or beaming plant and the electromagnet 68 of the main motor control relay 70 are connected with the D. C. supply line 62 in the same manner as shown in Fig. 13, for example. The motor start holding circuit 76 includes the stopping switch 80 controlled by the electromagnet 82 of the stop control relay 84. The electromagnet 82 of the stop control relay 84 is connected with the D. C. supply line 62 by the main needle control circuit 100 including the photo-electric element 32a associated with the first row of control means or control units, a release magnet 118a associated with the indicating means for the first row of the annunciator 112, a circuit closing switch 120a and a circuit breaking switch 122. The additional needle control circuits 108b, 108c, . . . 108t connected in parallel with said main needle control circuit 100 include the photo-electric element 32b, 32c, . . . 32t, the release magnet 118b, 118c, . . . 118t and the closing switch 120b, 120c, . . . 120t respectively. Each of the release magnets 118a, 118b, . . . 118t cooperates with a catching member 124a, 124b, . . . 124t, which in turn cooperates with an indicating member 126a, 126b, . . . 126t swingably mounted at 128a, 128b, . . . 128t. Said indicating members 126a, 126b, . . . 126t carry the numerals 1, 2, 3, . . . 20 at their free ends. If, upon breakage of warp yarn, a photo-electric element 32a, 32b, . . . 32t is rendered effective for closing the line wherein it is arranged, the main needle control circuit 100 or an additional needle control circuit 108b, 108c, . . . 108t is closed, as the circuit breaking switch 122 controlled by the electromagnet 68 of the main motor control relay 70 is in closed position. Said closing of a needle control circuit causes an opening of the stopping switch

80 by the electromagnet 82 for a stoppage of the motor 60 and an energization of the release magnet 118a, 118b, . . . 118t arranged in the needle control circuit containing the closed control switch of the photo-electric element. The thus described energization of a release magnet 118a, 118b, . . . 118t causes a rotation of the associated catching member 124a, 124b, . . . 124t in counterclockwise direction as viewed in Fig. 14, whereby the indicating member 126a, 126b, . . . 126t is released, so that the latter swings into the position shown in dash lines, wherein the numeral carried by the indicating member becomes visible in the window of the annunciator. Reset rod magnets 130a, 130b, . . . 130t carrying reset rods 132a, 132b, . . . 132t arranged in a resetting circuit 134 connected with the main start switch 74 serve to reset the indicating members 126a, 126b, . . . 126t with the numerals 1, 2, 3, . . . 20 of the annunciator 112 into their invisible position upon a restarting of the warping or beaming plant by a closing of the main start switch 74. It may be mentioned that the circuit breaking switch 122 is opened as soon as the electromagnet 68 of the main motor control relay 70 is deenergized by an interruption of the motor start holding circuit 76 upon breakage of warp yarn causing an energization of the electromagnet 82 of the stop control relay 84. Therefore, if, for example, the photo-electric element 32a caused an actuation of the stop motion, a subsequent rendering effective of any one of the remaining photo-electric elements 32b, 32c, . . . 32t by a slackening of warp yarns cannot cause an energization of a release magnet 118b, 118c, . . . 118t resulting in an indication of a row by any one of the remaining indicating members 126b, 126c, . . . 126t. The manual circuit closing switches 120a, 120b, . . . 120t are arranged on the frame carrying the control means and serve to connect as many photo-electric means with the circuits of the stop motion as necessary in dependence on the amount of warp yarns drawn from the creel.

The circuit diagrams described above are for the electrical connection of a photo-electric drop needle control as shown in Fig. 2 with the stop control of the stop motion, i. e. a photo-electric drop needle control wherein a photo-electric element is arranged for each row of control means. The circuits shown in Figs. 11 and 12 may also be used for a photo-electric drop needle control as shown in Fig. 8, i. e. a photo-electric drop needle control wherein in each frame only one photo-electric element is arranged for the plurality of rows of control means. In such a case the twenty photo-electric elements arranged in series in Fig. 11 are replaced by the two photo-electric elements of said two frames arranged in series in the motor start holding circuit 76, or the twenty photo-electric elements 32a, 32b, . . . 32t shown in Fig. 12 are replaced by the two photo-electric elements of the two frames connected in parallel with each other in the needle control circuit 86.

If, however, the photo-electric drop needle control shown in Fig. 8 with only one photo-electric element for ten rows of control means or control units shall be used for a stop motion having row indicating means, a circuit arrangement as shown in Figs. 15 and 16 should be used instead of the circuit arrangement shown in Figs. 13 and 14. In such a case the photo-electric element 32Y, for example, is rendered effective by the dropping of a control means or control unit of either one of the rows into the active position. Therefore, the photo-electric element may be used only for the actuation of the stop motion, but not for the operation of the indicating means. Additional control elements associated with the control members 42 (see Fig. 9) of the rows of control means or control units should be provided for the operation of the row indicating means. Such additional control elements may readily be obtained by having the control fingers 38 and the limiting member 52 made of electrically conducting material and electrically connecting same in a suitable manner with the row indicating means. If, in such a case, the control means or control unit 38, 42 comes into the position shown in dash lines in Fig. 9, the control finger 38 contacts the limiting member 52 and closes the circuit connected with the row indicating means, as will be described hereinafter. As will be readily understood, the additional control elements 38, 52 will always cause the indication of the row wherein a breakage of warp yarn caused an actuation of the stop motion through the photo-electric element. Figs. 15 and 16 illustrate two examples of a circuit arrangement for a photo-electric drop needle control according to Fig. 8 in combination with additional control elements as described above.

Referring to Fig. 15, the motor 60 of the warper or beamer and the electromagnet 68 of the main motor control relay 70 are connected with the D. C. supply line 62 in the same manner as shown in Fig. 13. The motor start holding circuit 76 includes the stopping switch 80 controlled by the electromagnet 82 of the stop control relay 84 and the two photo-electric elements 32Y and 32Z arranged in series with each other. During the normal operation of the warping or beaming plant the motor start holding circuit 76 is closed at the stopping switch 80 and the photo-electric elements 32Y and 32Z. The electromagnet 82 of the stop control relay 84 is arranged in the main needle control circuit 100 including the secondary winding 102 of the transformer 92 and the control lamp 88a. Furthermore, the control elements 3852a associated with the first row of control means are arranged in said main needle control circuit 100. Additional needle control circuits 108b, 108c, . . . 108t including the control lamps 88b, 88c, . . . 88t and the control elements 3852b, 3852c, . . . 3852t of the second, third, . . . twentieth row are connected in parallel with the main needle control circuit 100. As shown in Fig. 15, the control elements 3852a, 3852b, . . . 3852t of each row are electrically connected with each other in parallel. As will be readily understood, the rendering effective of the photo-electric element 32Y or 32Z upon breakage of warp yarn for interrupting the line 76 causes an actuation of the stop motion by an interruption of the motor start holding circuit 76. Furthermore, the closing of a control element 3852a, 3852b, . . . 3852t upon breakage of warp yarn causes a lighting up of the control lamp 88a, 88b, . . . 88t associated with the row of control elements containing the control element rendered active by a breakage of warp yarn. Moreover, the closing of such a control element may cause an actuation the stop motion by an energization of the electromagnet 82 resulting in an opening of the stopping switch 80, if the rendering effective of the photo-electric element 32Y or 32Z should have been delayed for any reason whatsoever.

The circuits shown in Fig. 16 substantially correspond to the circuits shown in Fig. 15 with the exception of the arrangement of the photo-elec-

tric elements 32Y and 32Z. In this embodiment said two photo-electric elements are not arranged in the motor start holding circuit 76. The photo-electric elements 32Y and 32Z are, however, electrically connected with each other in parallel and are connected in parallel with the main needle control circuit 100 by the lines 136. In this embodiment a rendering effective of the photo-electric element 32Y or 32Z for closing the line 136 causes an actuation of the stop motion by an energization of the electromagnet 82 of the stop control relay 84, and the control elements 3852*a*, 3852*b*, . . . 3852*t* operate in the same manner as described above in connection with the circuits shown in Fig. 15.

Figs. 11–16 illustrate certain embodiments of an electric stop control. It is understood, however, that any other embodiment of a stop control may be used in combination with the various circuits of our stop motion. For example, our stop motion may be used in combination with the electrical control system for a warping or beaming plant, disclosed in the U. S. Patent #2,324,611, issued July 20, 1943, of one of the co-inventors. In said patent, for example, the stop motion applies the brakes of the warper in addition to the stoppage of the motor of the warper.

We have described preferred embodiments of our invention, but it is clear that numerous changes and omissions may be made without departing from the spirit of our invention.

What we claim is:

1. A drop needle control for an electrically operated stop motion for a warping or beaming plant comprising: a plurality of supports, a plurality of rows of control means swingably mounted on said supports, a photo-electric element arranged for electrical connection with the stop motion, a source of light arranged for projecting light rays upon said photo-electric element, and optical means arranged in the path of said light rays for directing same through spaces controlled by said plurality of rows of control means, each swingable control means being arranged for cooperation with warp yarn to be wound and for control of the passage of the light rays between said source of light and said photo-electric element by a change in its position in dependence on the condition of the warp yarn.

2. A drop needle control for an electrically operated stop motion with row indicating means for a warping or beaming plant comprising: a plurality of supports, a plurality of rows of control means swingably mounted on said supports, a plurality of control elements for electrical connection with said row indicating means, each control means being operatively connected with one of said control elements, a photo-electric element arranged for electrical connection with the stop motion, a source of light arranged for projecting light rays upon said photo-electric element, and optical means arranged in the path of said light rays for directing same through spaces controlled by said plurality of rows of control means, each swingable control means being arranged for cooperation with warp yarn to be wound and for control of the passage of the light rays between said source of light and said photo-electric element by a change in its position in dependence on the condition of the warp yarn.

3. A drop needle control for an electrically operated stop motion with row indicating means for a warping or beaming plant comprising: a plurality of supports, a plurality of rows of control members swingably mounted on said supports, a photo-electric element arranged for electrical connection with the stop motion, a source of light arranged for projecting light rays upon said photo-electric element, optical means arranged in the path of said light rays for directing same through spaces controlled by said plurality of rows of control members, a plurality of control fingers arranged for an engagement with warp yarn to be wound, each control member being connected with one of said control fingers and being arranged for control of the passage of the light rays between said source of light and said photo-electric element by a change in its position in dependence on the condition of the warp yarn, and limiting means associated with each row of control members for limiting an extreme position of the control members by engagement with the control fingers, said limiting means in combination with said control fingers forming electrical control elements for electrical connection with said row indicating means.

4. An electrically operated stop motion for the motor of a warping or beaming plant comprising: a number of photo-electric control means responsive to breakage of warp yarn, a motor control circuit connected with the motor of the warping or beaming plant, said photo-electric control means being arranged in said motor control circuit, a number of rows of control elements responsive to breakage of warp yarn, said number of control elements being larger than the number of photo-electric control means, the control elements of each row being electrically connected with each other in parallel, and a number of electrical indicating means equal to the number of rows of control elements, each of said rows of control elements being in circuit with an electrical indicating means.

5. An electrically operated stop motion for the motor of a warping or beaming plant comprising: a main motor control relay, a motor start holding circuit connected with said main motor control relay, a stop control relay including an electromagnet and a stopping switch controlled by said electromagnet, photo-electric control means responsive to breakage of warp yarn, said photo-electric control means and said stopping switch being arranged in said motor start holding circuit, a plurality of rows of control elements responsive to breakage of warp yarn, the control elements of each row being electrically connected with each other in parallel, a plurality of electrical indicating means, a main needle control circuit including said electromagnet one of said rows of control elements and one of said electrical indicating means, and a plurality of additional needle control circuits, each of said additional needle control circuits including another of said rows of control elements and another of said electrical indicating means, and each of said additional needle control circuits being electrically connected in parallel with said main needle control circuit.

6. An electrically operated stop motion for a warping or beaming plant comprising: a number of rows of control elements responsive to breakage of warp yarn, the control elements of each row being electrically connected with each other in parallel, a number of electrical indicating means equal to the number of rows of control elements, an electrical stop control, a main needle control circuit including said electrical stop control one of said rows of control elements

and one of said electrical indicating means, a plurality of additional needle control circuits, each of said additional needle control circuits including another of said rows of control elements and another of said electrical indicating means, each of said additional needle control circuits being electrically connected in parallel with said main needle control circuit, and a number of photo-electric control means responsive to breakage of warp yarn, the number of photo-electric control means being smaller than the number of rows of control elements, said photo-electric control means being electrically connected in parallel with said main needle control circuit.

7. A drop needle control for an electrically operated stop motion with row indicating means for a warping or beaming plant comprising: supporting means, a row of control units, each of said control units including a control member and a control finger mounted on said control member, the control members of said row of control units being swingably mounted on said supporting means, a photo-electric element arranged for electrical connection with the stop motion, a source of light arranged for projecting light rays upon said photo-electric element, the control fingers of said row of control units being arranged to be engaged by warp yarn so as to hold the control units with the control members in an inactive position, each of said swingable control units being shaped to be swung by its own weight into an active position upon yarn failure so as to control the passage of the light rays between said source of light and said photo-electric element for an actuation of the stop motion, and limiting means associated with the row of control units for limiting the extreme active position of the control units by engagement of said limiting means with said control fingers, said limiting means in combination with said control fingers forming electrical control elements for electrical connection with said row indicating means.

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