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LIGHT SENSITIVE CONTROL FOR SETTING-UP MACHINES

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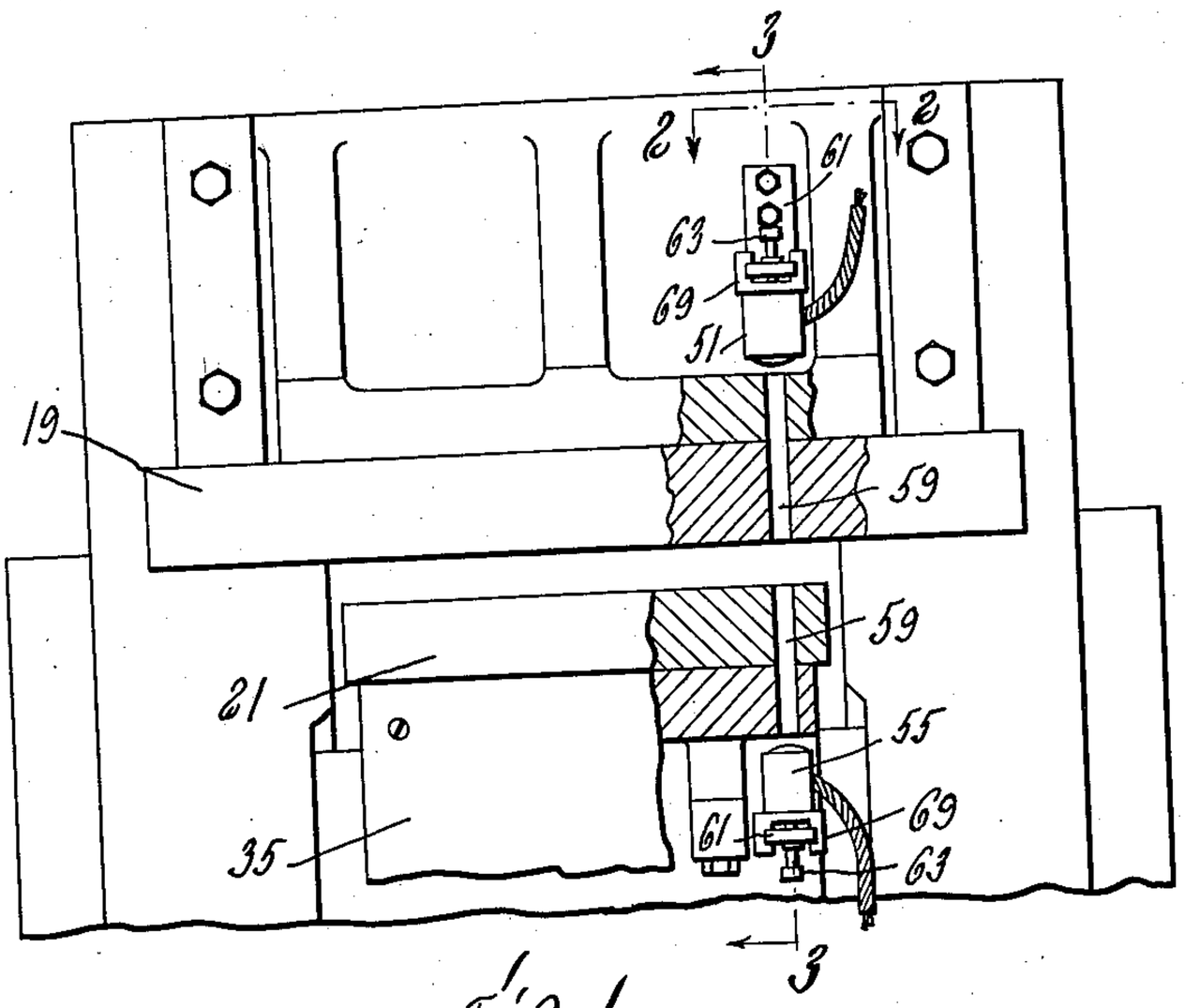

Fig. 1.

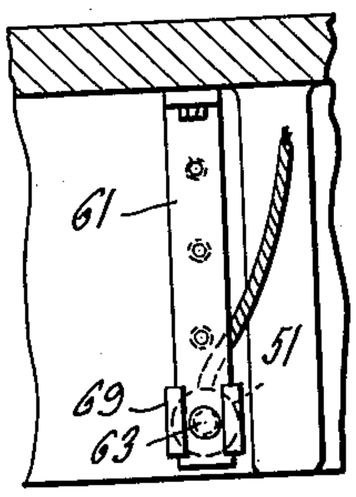

Fig. 2.

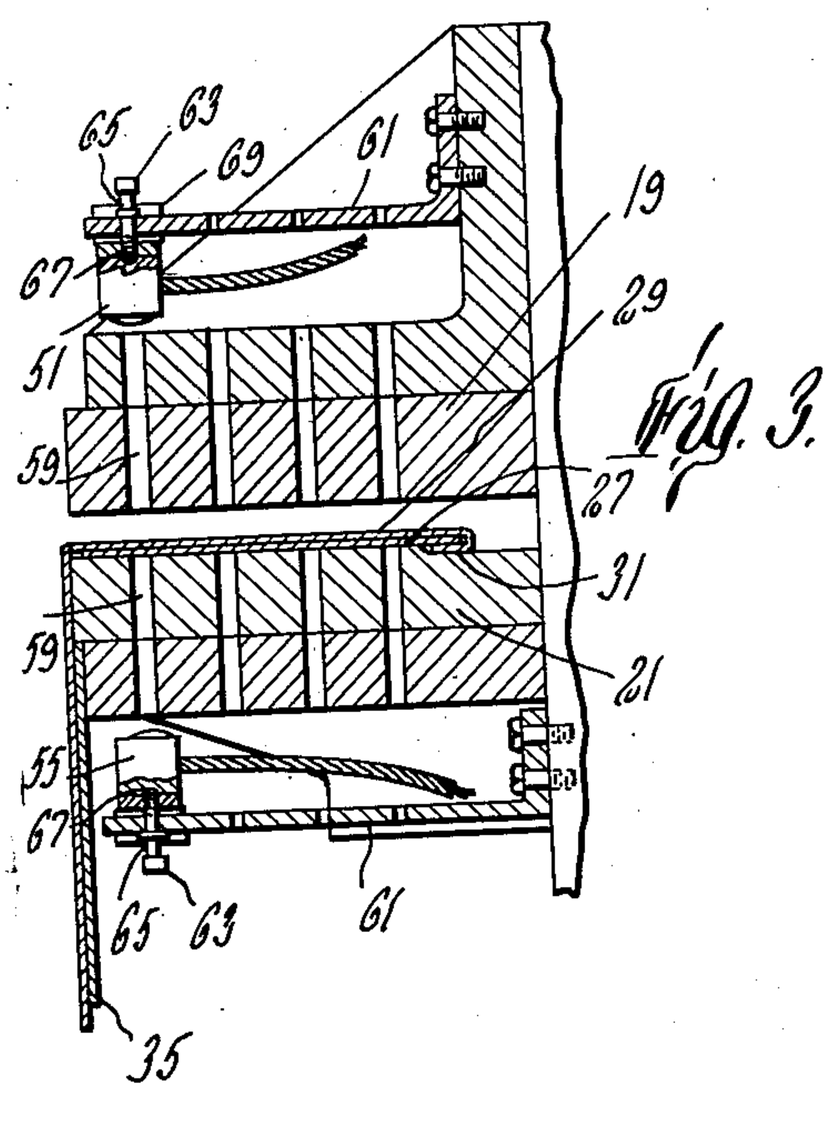

Fig. 3.

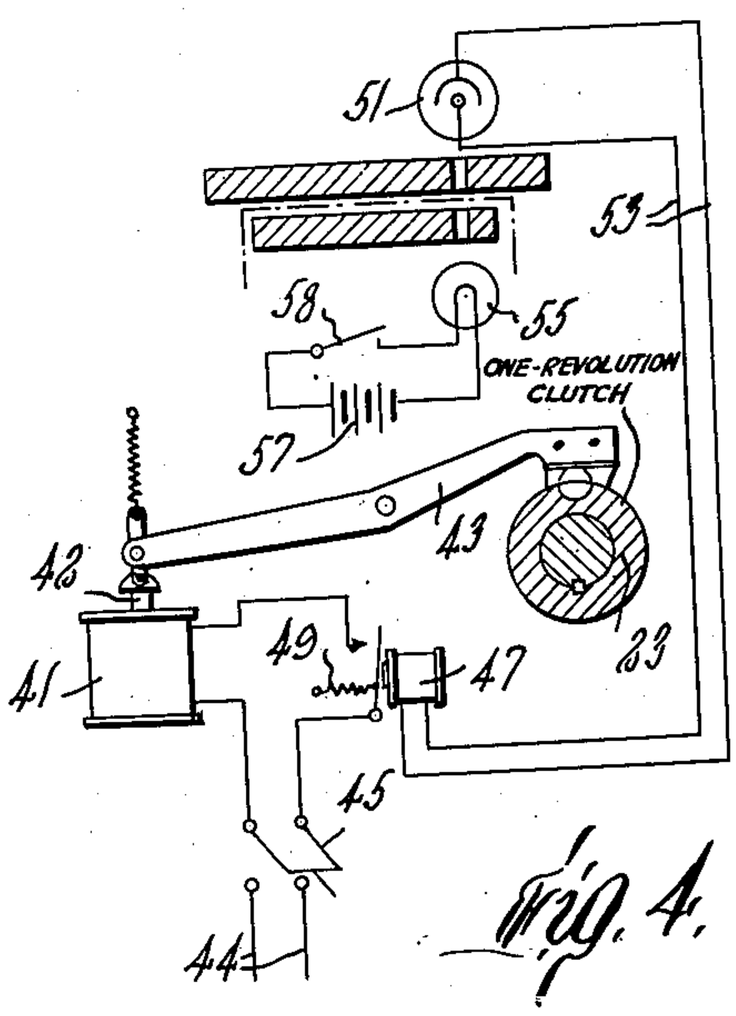

Fig. 4.

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LIGHT SENSITIVE CONTROL FOR SETTING-UP MACHINES

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5 Claims. (Cl. 93—36.3)

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The present invention relates to setting-up machines for setting up or assembling boxes from a blank of cardboard or other suitable material, and more particularly to control mechanism for controlling the operation of the pressure members of such machines.

The object of the present invention is to provide a control mechanism for such machines which shall comprise electrical devices and operate electrically, which shall be simple in construction, certain in operation, and require a minimum of maintenance and repair.

A further object of the present invention is to provide such a control mechanism which shall be automatic in operation, easily adjustable to suit the speed and dexterity of the individual machine operator, and positioned on the machine to avoid all possibility of interference with the operator, or the latter's clear view, at all times, of the machine and of the box being set up.

With these objects in view the present invention comprises a photo-electric cell and a source of light therefor positioned on opposite sides of the path of movement of the box being set up, with suitable electrical connections for rendering the pressure members operative when the advancing box intercepts the beam of light from the light source to the cell.

The invention further consists in the adjustable mounting of the cell and source of light upon the pressure members of the machine to position the beam of light nearer to or further from the final position of the box between the pressure members to vary the time the pressure members are rendered operative with respect to the movement of the box toward final position between the pressure members.

In the accompanying drawings, which show the present invention as applied to a well known type of setting-up machine, such, for example, as that shown in our pending application filed February 26, 1947, Serial Number 731,064, Fig. 1 is a front view, partly in section, of the top portion of the setting-up machine showing the pressure members and the photo-electric cell and source of light carried thereby, and Fig. 2 is a fragmentary top plan view, partly in section, of the means for adjustably supporting the photo-electric cell on the upper or stationary member; Fig. 3 is a vertical section on line 3—3 of Fig. 1, showing the upper and lower pressure members and the series of pairs of aligned light passages therethrough and the adjustably mounted photo-electric cell and source of light positioned opposite one such pair; and Fig. 4 is a diagrammatic view showing the electrical devices and connections of the control mechanism.

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The machine parts shown in the drawing are portions of a setting-up machine of the general types shown in United States Patent No. 710,930, G. R. Wyman, dated October 11, 1904, and more specifically shown in our said application, with a top or stationary platen 19, and a lower vertically movable platen 21. The latter is vertically reciprocated by a rotary crank or cam, driven from a power shaft through an intermediate one-revolution clutch, indicated diagrammatically at 23, all of which is the common arrangement in this type of machine.

Fixed to the front of the movable platen 21 and extending downwardly, is the wiper plate 35 against which the operator presses the end wing 29 of the blank to bring it into contact with the inturned corner tabs 27 or side wing extensions of the box blank, and thereafter folding the end wing extension 31 inwardly into the box into the position shown in Fig. 3 as the box end is pressed downwardly between the pressure members. By the time the box end has reached the position shown in Fig. 3, the one-revolution clutch will have been tripped, and the lower platen is about to be raised to press the box momentarily against the upper stationary platen, thereby causing the adhesively coated end wing and extension to unite firmly with the inturned side wing extensions or corner tabs.

The devices for releasing the one-revolution clutch 23 comprise the electric solenoid 41, with movable core 42 connected to the end of tripping lever 43. The solenoid is energized by current supplied from an outside source through wires 44 with intermediate hand switch 45, which will be opened, as shown in Fig. 4, when the machine is not in use, but closed when the machine is being operated.

The supply of electric current to the solenoid 41 is further controlled by the relay 47, which is normally energized to maintain the circuit open, as shown in Fig. 4, a spring 49 closing the circuit when the relay 47 is de-energized.

The current for the relay is supplied by the photo-electric cell 51 through wires 53, and the source of light for energizing the small electric lamp 55, connected with any suitable source of electric energy, such as a battery 57, as shown in Fig. 4, through hand switch 58.

The stationary or movable platens, as shown in Fig. 3, are provided with the aligned pairs of light passages 59, a series of four pairs being shown extending from the front of the members

inwardly. The photo-electric cell 51 and the electric lamp 55 are mounted, the former upon the stationary platen 19 and the latter upon the movable platen 21 so that the beam of light from the lamp will pass through the light passage in the lower platen, across the path of advance of the end of the box blank, and through the aligned light passage in the upper platen, and finally onto the photo-electric cell when there is no interception of the light beam by the box end. When the lower end of the box in its advance to final position between the pressure members intercepts the beam of light from the lamp, the photo-electric cell ceases to energize the relay 47, whereupon the spring 49 closes the circuit through the wires 44 and the solenoid 41, the lever 43 is actuated and the one-revolution clutch is tripped to render the pressure members operative.

The photo-electric cell and the lamp are mounted upon brackets 61 fixed upon the upper and the lower platens respectively. The cell and lamp are mounted to slide along the brackets so that they may be positioned opposite one or another of the light passages 59, being locked in position on the brackets by means of the pins 63 having threaded ends 67 which screw into the faces or mountings 69 of the cell and lamp. Thus by unscrewing and removing the pins 63 the cell and lamp may be adjusted to any desired position along the brackets 61, the pins re-inserted, and screwed up to clamp the parts fixedly in position.

The purpose of the series of light passages is to enable the operator to time the actuation of the tripping devices of one-revolution clutch to suit her own skill and speed, thus avoiding the waste of the time lag between the final positioning of the end of the box between the pressure members and the pressure stroke of the lower or movable platen.

For the fastest operators, the cell and lamp will be positioned opposite the left hand pair of passages, as viewed in Fig. 3. For the slowest operators the cell and lamp will be positioned opposite the right hand pair of passages. With other operators they will be positioned in one or the other of the intermediate pairs of blanks according to the speed of the operator.

The operation of the control mechanism shown in the drawings and heretofore described, is as follows:

The operator first adjusts the position of the photo-electric cell and the lamp upon their supports, in accordance with her skill and speed in presenting the folded boxes to the pressure members. The faster operators set these parts opposite the left hand pair of passages, as shown in Fig. 3; less speedy operators will place them opposite the next pair to the right, and so on, the slowest operator setting them opposite the right hand passages, as viewed in said figure.

The operator next closes the lamp switch 53, causing the lamp to glow and the photo-electric cell to actuate the relay to open the circuit through the solenoid. The main switch 45 is next closed, but as the circuit is open at the relay the one-revolution clutch remains inoperative.

The operator next takes a box blank and manipulates it to fold the blank into box form, with adhesive applied to the appropriate parts. The folded end of the box is then presented to the movable platen and pushed inwardly between the pressure members; when its advancing edge reaches the light passages through which the beam of light from the lamp is thrown onto

the photo-electric cell, such beam is cut off and the electric current from the cell through the relay stops, whereupon the spring closes the circuit through the solenoid, energizing the same and tripping the one-revolution clutch.

By the time the movable platen has begun its upward or pressure stroke, the end of the box has reached its final position on the lower platen, as shown in Fig. 3, and as the platen rises, the box parts are pressed forcibly together momentarily and the adhesively coated parts of the end of the box are permanently united.

The platen then descends, the clutch is thrown out, the operator withdraws the box, turns it end to end, and manipulates it to fold the parts and apply adhesive, and then presents that end to the movable platen as above described.

It will be noted that the cell and lamp of the controlling devices are positioned back of the front face of the platens and inwardly from one side, so that they are not only out of the way of the box and also of the hands of the operator, but they are incapable of interfering with the clear view by the operator of the box end as it is positioned between the pressure members. No additional effort is required by the operator to throw the control devices into operation, as no parts are touched or actuated by either the operator or the box.

While the present invention has been shown and described as embodied in a specific construction, it is to be understood that other forms and arrangements of the various parts may be employed within the scope of the language of the appended claims.

Having thus described the invention, what is claimed is:

1. Control mechanism for the pressure members of a box setting-up machine having a pair of aligned light passages through the pressure members, a one-revolution clutch, and a tripping device therefor, said mechanism comprising a photo-electric cell opposite the outer end of one passage in one member, and a source of light opposite the outer end of the passage in the other member to direct a beam of light through said passages onto the cell and across the path of movement of the work as it is advanced to final position between the pressure members.

2. Control mechanism for a box setting-up machine having a pair of pressure members provided with a series of aligned pairs of light passages through said members, a one-revolution clutch, and a tripping device therefor, said mechanism comprising a photo-electric cell opposite the outer end of one passage of an aligned pair, a source of light opposite the outer end of the other passage of such aligned pair to direct a beam of light through said passages across the path of movement of the work to final position between the pressure members and onto the cell, and means for adjustably supporting said cell and source of light opposite one or another of said pairs of aligned passages.

3. Control mechanism for a box setting-up machine having a pair of pressure members provided with a series of aligned pairs of light passages through said members, a one-revolution clutch, and a tripping device therefor, said mechanism comprising a photo-electric cell opposite the outer end of one of the passages of an aligned pair, a source of light opposite the outer end of the other passage of such aligned pair to direct a beam of light through said passages onto the cell and across the path of movement of the work

towards final position between the pressure members, and means for adjustably supporting said cell and source of light opposite one or another of said pairs of aligned passages, the supporting means comprising a pair of brackets, one fixed upon one pressure member and the other bracket fixed upon the other member, the brackets having a supporting bar extending parallel to the line of the series of passages, recesses in the bars spaced to correspond with the position of the aligned pairs of passages, supports for the cell and source of light slidingly mounted on the bars, and locking means projecting from the bases and engaging one or another of the recesses to position the cell and light source accurately opposite a pair of passages.

4. Control mechanism for a box setting-up machine having a pair of pressure members provided with aligned light passages therethrough spaced in the direction of the path of movement of the work, a one-revolution clutch, and a tripping device therefor, said mechanism comprising a photo-electric cell, mounted upon one of the members, and a source of light mounted upon the other member, the cell and source of light being aligned with one another and with the light passages, to direct a beam of light through said passages and across the path of movement of the work, the mountings for the cell and source of light being adjustable in a direction parallel to the path of movement of the work to vary the time of actuation of the tripping device with respect to the positioning of the work between the pressure members.

5. A box setting-up machine having a pair of pressure members relatively movable toward and from each other, each of said pressure members having a light passage therethrough with the light passages being in alignment transversely to the path of movement of the work toward pressing position between the pressure members, power means for moving said pressure members relatively toward each other, and control mechanism for said power means, said control mechanism comprising a source of light at the outer end of the light passage in one of said members, a light sensitive cell at the outer end of the light passage in the other of said members to receive a beam of light through said passages from said light source while no work is between said pressure members, said light beam being intercepted by the work as it advances toward final position between the pressure members.

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