

June 1, 1943.

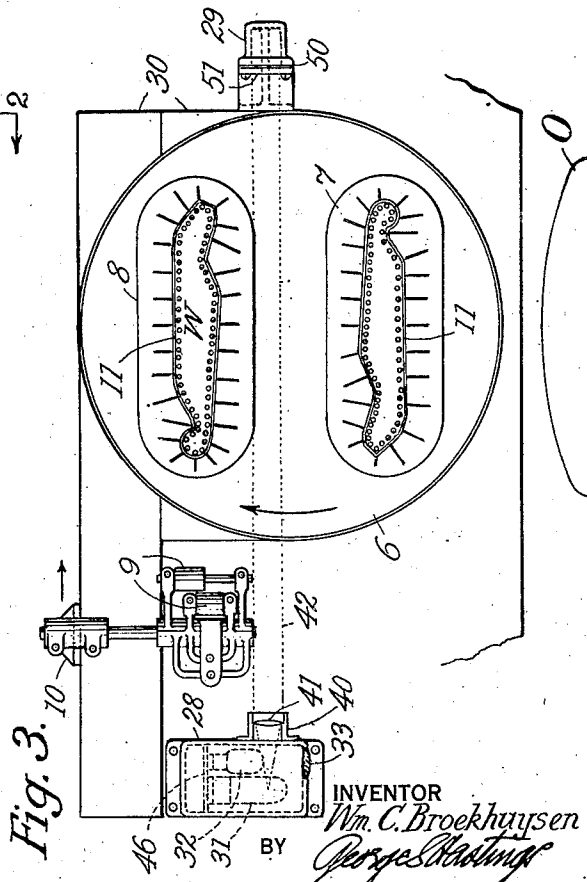
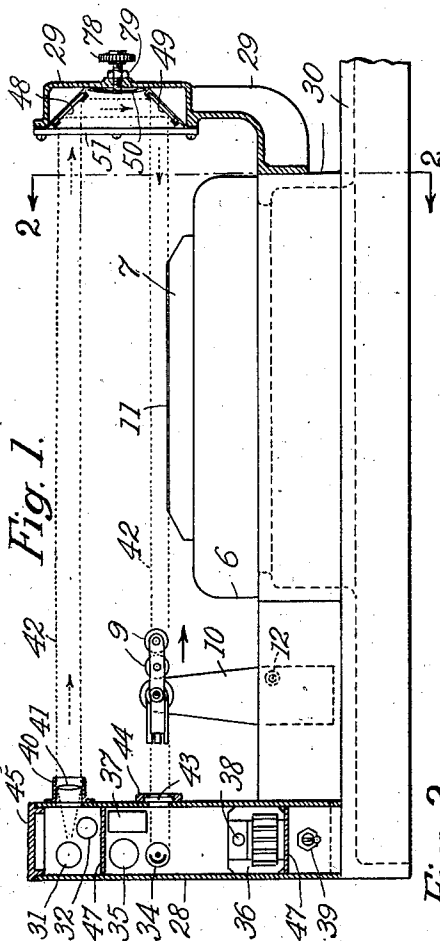
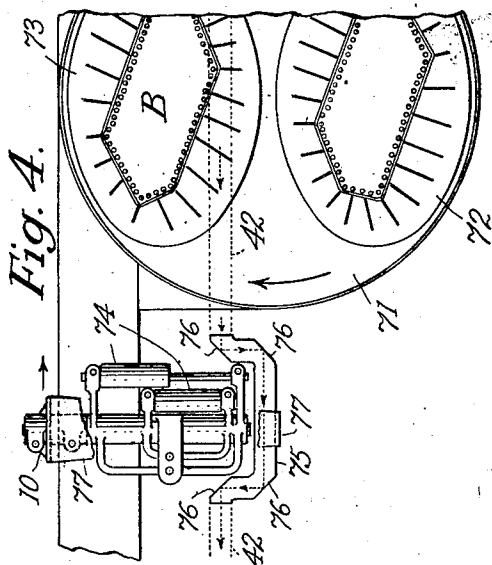
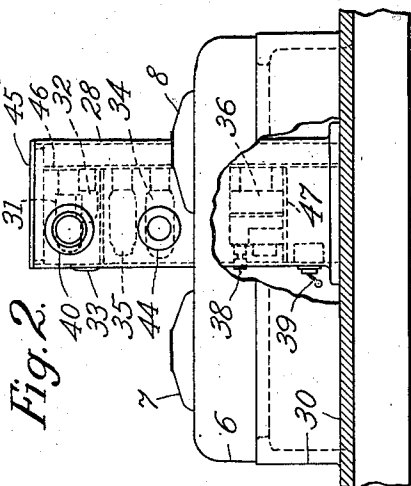
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2,320,346

PHOTO-ELECTRIC DEVICE FOR CIGAR MACHINES

Filed Dec. 16, 1939

4 Sheets-Sheet 1



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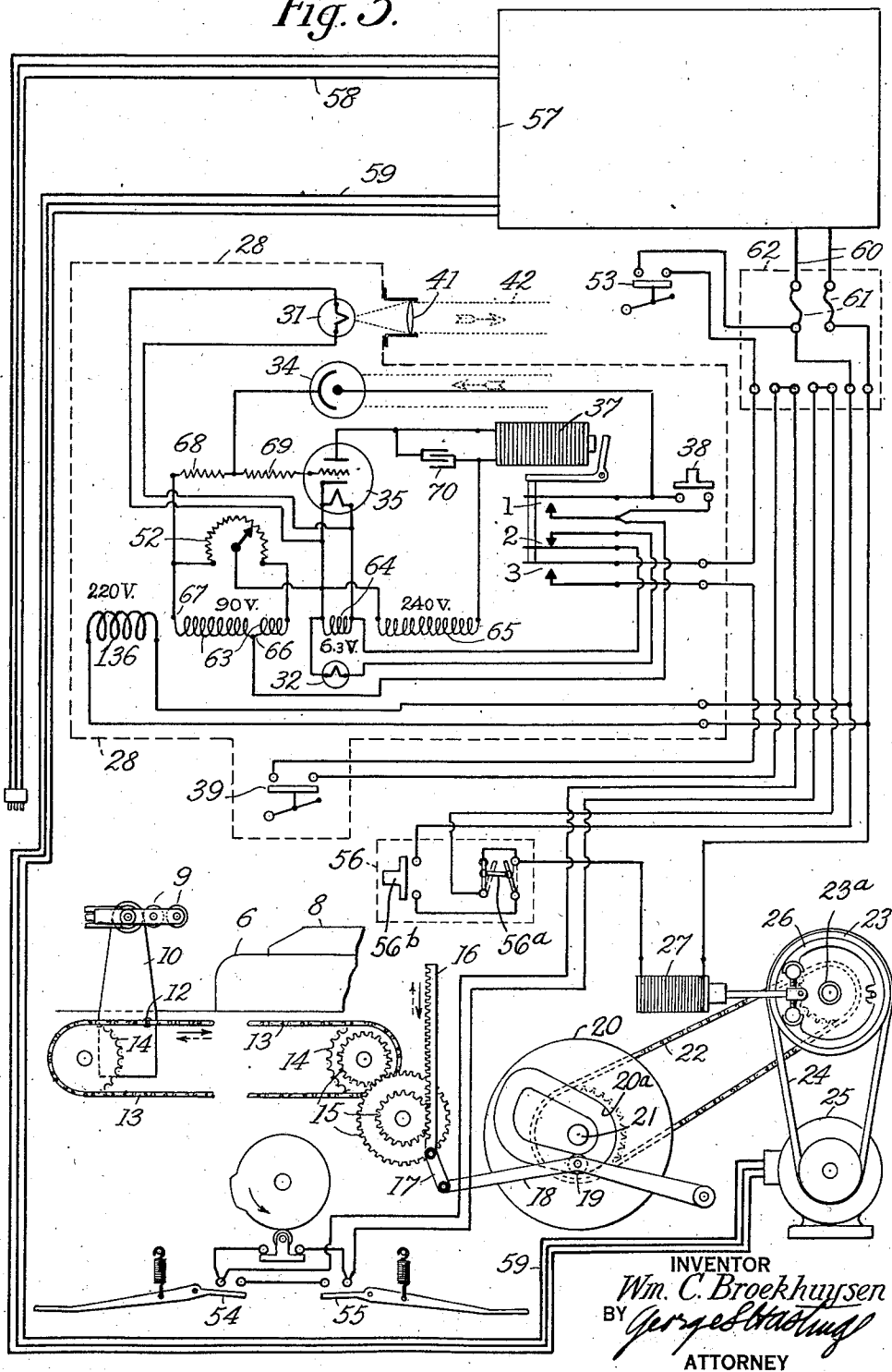
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PHOTO-ELECTRIC DEVICE FOR CIGAR MACHINES

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Fig. 5.



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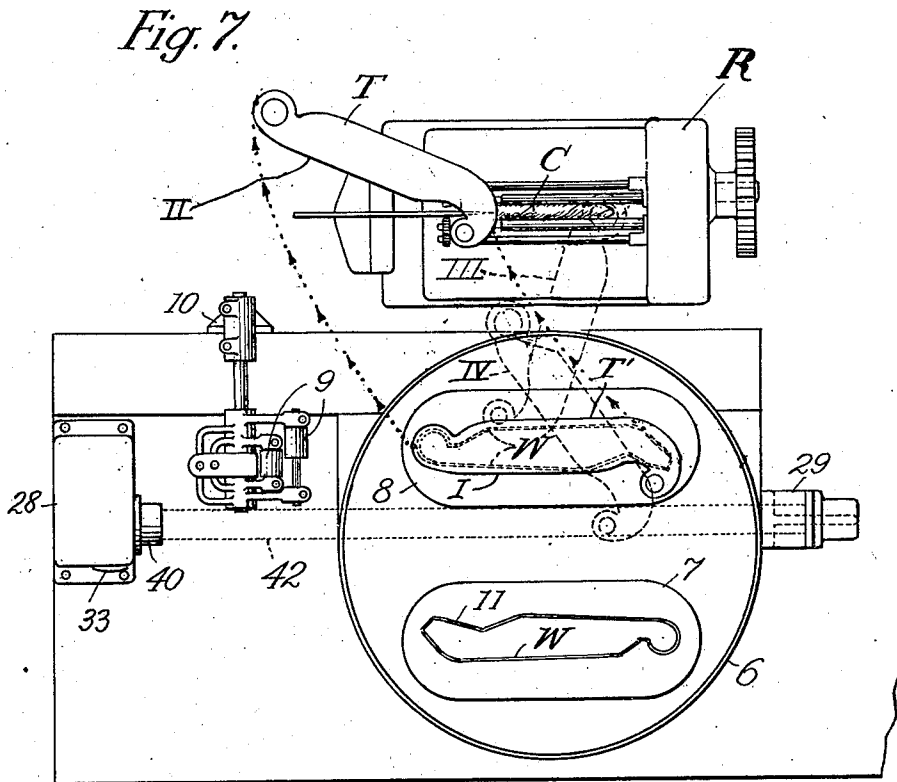
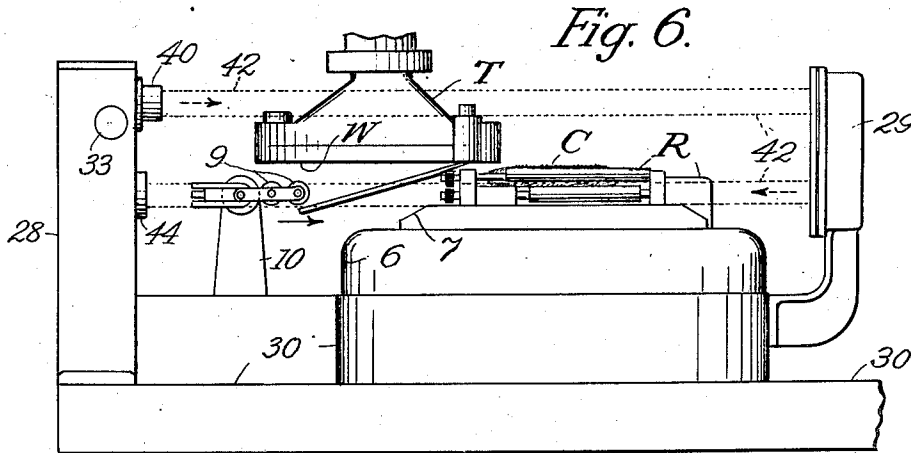
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4 Sheets-Sheet 3



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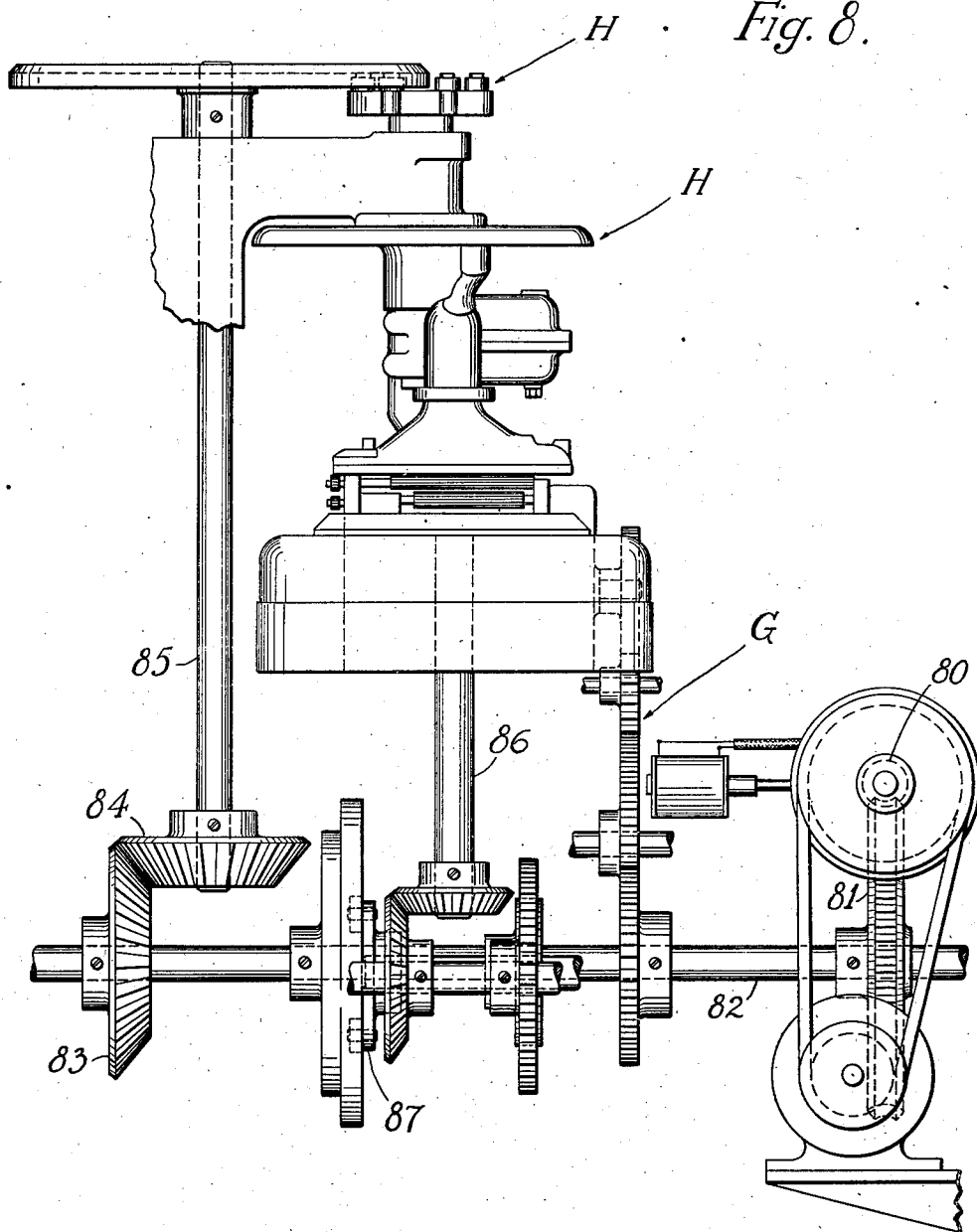
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4 Sheets-Sheet 4

Fig. 8.



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2,320,346

PHOTOELECTRIC DEVICE FOR CIGAR MACHINES

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Application December 16, 1939, Serial No. 309,508
23 Claims. (Cl. 131—21)

This invention relates to safety devices for wrapper and binder dies and for other associated operating mechanism of cigar machines involving danger to a member of the operator's body, usually a hand or arm thereof, especially to safety devices employing an optical control beam, and particularly to such devices when utilized in electrically controlled cigar machines, the primary object of the invention being to protect the operator's hands from injury during the manipulation of the wrapper or binder leaf on a cutting die, or due to overseeing such other mechanisms as a wrapper-applying mechanism, by automatically stopping the machine in case of danger.

In previous photo-electric devices for this purpose, it has been necessary to cut out the safety device during certain operations in each cycle of the machine, and it is an object of the present invention to obviate suppression of the photo-electric control at any time.

A further object of the invention is to provide for its use in conjunction with an intermittently rotating duplex turret, in a cigar machine having a front and a rear die on the turret, without interfering with the movement of the turret or of the cutter head, or with the swing of the wrapper carrier in taking off the cut wrapper from the die.

In pursuance of this object, a further object of the invention is to provide a novel system of reflecting devices by means of which two light-beams, one above the other, are maintained, immediately in front of the rear die of a duplex turret where cutting and transferring of one wrapper takes place while the operator is laying the leaf for the next wrapper on the front die close to her. As long as the operator's hands remain in front of these beams, the machine will continue to operate, but interception of either beam when the operator accidentally reaches into the path of moving mechanisms, actuates a relay and immediately stops the machine.

A further object of the invention is to provide a control beam so disposed that if the operator reaches over the die turret to intervene in the otherwise automatic operation of a wrapping or other mechanism disposed toward the rear of the machine, thus exposing a hand or arm to injury by a moving part of the mechanism, the safety device will operate as already indicated.

Bearing the above objects in mind, the invention consists in the provision of a light source and a photo-electric relay mounted as one unit in a housing at one side of the turret, and of two superimposed 45° mirrors in a bracket attached to the machine table at the other side of the

turret. The beam from the light source, which is placed some distance above the photo-cell, passes across the dies, is reflected by the upper to the lower mirror, and from the latter returns to the source housing, energizing the photo-cell therein. The lower beam is maintained just above the dies, so as to protect the operator against catching her hand between the die and the cutter rollers, or between the die and the wrapper carrier. An interruption of the upper beam stops the machine if she should attempt to reach into other parts, such as the rolling unit, while the machine is in operation.

When the beam is interrupted, the photo-electric relay becomes de-energized and thus opens a contact in the control circuit of the machine, thereby stopping the same. The electrical connections are arranged in such a manner that the clutch control circuit is broken upon momentary interruption of the light beam and remains open, even after restoration of the beam, until the operator positively recloses the same by pushing a reset button.

With these and other objects not specifically mentioned in view, the invention consists in certain combinations and constructions which will be hereinafter fully described, and then specifically pointed out in the claims hereunto appended.

In the accompanying drawings which form a part of this specification, and in which like characters of reference indicate the same or like parts:

Fig. 1 is a side elevation of the improved photo-electric safety device;

Fig. 2 is an end elevation of the same, from line 2—2 of Fig. 1;

Fig. 3 is a top view of the same;

Fig. 4 is a top view showing the use of a bypass bridge for deflecting and re-reflecting the light beam;

Fig. 5 is a diagram of the electrical connections;

Fig. 6 is a side elevation of a portion of a cigar machine, showing the location of the photo-electric safety device in relation to other parts of the machine;

Fig. 7 is a plan view of Fig. 6; and

Fig. 8 is a side elevation of a portion of the cigar machine showing the driving means for the wrapper transfer, the wrapper applying rollers, and the turret.

Referring to Figs. 1-3, 6 and 7 of the drawings, 6 is the intermittently revolving duplex wrapper die turret of an electrically controlled cigar machine, such as that disclosed in co-pending ap-

plication, Serial No. 183,405, filed January 5, 1938 by H. H. Wheeler, this turret carrying two suction headed wrapper dies 7 and 8, on one of which a tobacco leaf is served by an operator while the wrapper W is cut, and picked up by a carrier, on the other. The cutting of the wrapper is performed by rollers 9, carried on a movable bracket 10, which sweeps over a raised knife-edge 11 on the die. It is mainly against the danger of injury from these cutting members that the herein disclosed safety device is to protect the hands of the die operator. The slide bracket 10, by means of a bolt 12, is attached to an endless chain 13 (Figure 5) running over sprockets 14 one of which, through gears 15, is driven by a rack 16. The latter is attached by a link 17 to a lever 18 having a roller 19 controlled by a cam 20 having a cam track 23a on a shaft 21 which is driven by a chain 22 from the main clutch of the machine, one member 23 of which is continuously driven by a belt 24 from a motor 25, while the other member 26 is electrically controlled by a solenoid 27.

When the solenoid 27 is energized, it will actuate the member 26 which in turn will cause the hollow drive shaft 23a to commence rotating in a manner similar to that shown in co-pending application, Ser. No. 183,405, mentioned above. The various parts of the cigar machine, such as the wrapper applying rollers R and the wrapper carrier T, are driven through suitable connecting mechanism by the main hollow drive shaft 23a (Fig. 5), and said connecting mechanism may be of a type such as that shown in the aforementioned application of Wheeler. From this it follows that when the solenoid 27 operates to disengage the member 26 from member 23 of the main clutch, the hollow drive shaft 23a will be stopped, thereby stopping the entire machine.

The main hollow drive shaft 23a has a worm 80 (Fig. 8) mounted thereon which drives the worm wheel 81. The worm wheel 81 is fixedly mounted on the main shaft 82 which through suitable connecting mechanism imparts operating movement to the wrapper carrier T, the turret 6, and the wrapper applying rollers R. On shaft 82 is mounted a bevel gear 83 which through bevel gear 84 imparts rotary movement to the drive shaft 85 of the wrapper carrier. The shaft 85 causes the operating head of the carrier, designated generally by the letter H, to impart the desired intermittent gyrations to wrapper carrier T.

The turret 6 is intermittently rotated by shaft 86 which in turn is intermittently driven by an indexing device 87. Said indexing device is driven from the main shaft 82. Wrapper applying rollers R are driven through a suitable chain of gears, designated generally by the letter G, from the main shaft 82. When shaft 82 is stopped, wrapper applying rollers R, wrapper transfer T, and turret 6 will automatically come to a stop.

For further description of the aforementioned operating mechanism, reference may be had to U. S. Patent No. 2,215,490 and to the Wheeler copending application Serial No. 183,405.

The photo-electric safety device is contained in two housings, 28 and 29, (see Figure 1) mounted on the base 30 of the machine, one on each side of the turret 6, so as to include the danger space in which the operator manipulates the tobacco leaf in serving the die.

The housing 28 contains a light source 31, an indicator lamp 32 illuminating a bull's eye 33 75

(Figure 3) a photo-cell 34, an amplifier tube 35, a transformer 36, a sensitive relay 37, a reset push button 38, a hand control switch 39, and other auxiliaries shown in the wiring diagram (Figure 5). In line with the light source 31, the housing 28 is provided with a tube 40 carrying a double convex lens 41 to concentrate the light of the lamp 31 into a beam 42. The opening in front of the photo-cell 34 is closed by a glass cover 43 attached by a holder 44. The housing 28 has a cover 45 and, for convenience in mounting and wiring the various parts, is provided with a vertical partition 46 and with horizontal shelves 47. The upper shelf 47 prevents direct illumination of the photo-cell 34 by the light source 31 and the indicator lamp 32.

In housing 29 are mounted two mirrors 48 and 49, set at 45° one above the other in a holder 50, so that the horizontal beam 42 received by the upper mirror 48 is reflected downwardly to the lower mirror 49, and from the latter horizontally back to the photo-cell 34 in housing 28. The front of housing 29 is covered by a glass plate 51.

The photo-electric relay circuit includes, as shown in Figure 5, the photo-cell 34, the amplifier tube 35, the transformer 36, the sensitive relay 37 connected in the plate circuit of the amplifier 35, and a potentiometer 52 (see Figure 5) for adjustment of the sensitivity. The relay 37 operates three contacts 1, 2 and 3. Under normal operating conditions, the light from the source 31 falls on the photo-cell 34, and the relay 37 is energized, holding contacts 1 and 3 closed, and contact 2 open. As soon as the light beam is interrupted, the relay becomes deenergized, opening contacts 1 and 3, and closing contact 2. Contact 1 is connected in the grid circuit of the amplifier 35 in such a way that the relay remains de-energized, even though the light beam is restored, until contact 1 is momentarily short circuited by closing the reset push button 38. Contact 2 is connected in series with the indicator lamp 32, and contact 3 is connected in series with the manual control switches 54 and 53, with the foot control switches 54 and 55, and with the jogging switch unit 56 in the clutch control circuit to the solenoid 27. Therefore, as soon as the beam of light is interrupted, the clutch solenoid 27 is de-energized, thereby disengaging clutch member 26 from the continuously driven member 23 and thus stopping the machine which cannot start up again until the operator pushes the reset button 38. On the other hand, the photo-electric device is cut out of circuit when, in adjusting the machine, the mechanic turns the jogging switch 56a to the inching position, and is automatically restored when he turns this switch back to the running position. The indicator lamp 32 is dark when the relay contacts are in operating position, and lights up when the relay is de-energized as in Figure 5.

In the jogging switch unit 56, there are two individually operated switches 56a and 56b. When 56a is in the position shown, 56b is inoperative. When switch 56a is pushed into the opposite position, shown in dotted lines, the switch mechanism 56b can be used to "jog" or "inch" the machine along. The control circuit then remains open until the mechanic pushes the switch button 56b and keeps his finger on it, which closes the control circuit and allows the machine to continue running as long as the mechanic continues to press the switch button 56b.

The hand control switches 39 and 53 are provided for the binder laying operator and the wrapper laying operator so they may stop the machine at any point in the machine cycle and keep the machine stopped until the operator is ready to have the same resume operation.

The foot control switches 54 and 55 are provided for the binder and wrapper laying operators. These foot control switches control the clutch only when the machine is in zero position. When the machine reaches zero position, it will automatically come to a stop until both switches 54 and 55 are closed. If the operators continue to keep their feet upon the foot control switches 54 and 55, the machine will operate continuously.

A more complete description has been dispensed with in this case for the sake of brevity because the same can be found in co-pending application of H. H. Wheeler, Ser. No. 183,405, filed January 5, 1938, before referred to.

In the wiring diagram, 57 is the main starting switch of the machine which by the plug cord 58 is connected to the line socket of the power line, and from which a cable 59 leads to the motor 25. Wires 60 connect the starting switch 57 to fuses 61 in the connecting box 62, from which wires lead to the photo-electric apparatus contained in housing 28 and to the clutch control circuit of the machine. In the photo-electric arrangement shown, the transformer is provided with one primary (220-volt) winding 136 and with three secondary windings 63, 64 and 65, having potentials of 90, 6.3 and 240 volts, respectively. The 6.3 volt secondary 64 supplies power to the cathode of the amplifier 35, to the light source 31, which in this case is a 6-8 V. 21 C. P. automobile lamp, and to the indicator lamp 32. The 240 V. secondary 65 furnishes the plate potential, and the 90-V. secondary 63 supplies the grid potential, for the amplifier 35. When contact 1 of the relay, or the push-button 38, is closed, the photo-cell 34 is connected between a tap 66 on the 90 V. secondary 63 and its terminal 67, in series with a high resistance 68 of 20 megohms. The grid of the amplifier 35 is connected to the plate of the photo-cell 34 through a resistance 69 of 2 megohms. A condenser 70 is connected across the terminals of the relay coil 37. The polarity of the transformer windings is such that during the half-wave in which the plate potential is positive, the grid potential is negative. The potentiometer 52, connected across the 90 V. secondary 63, is adjusted in the counter-clockwise direction, while the operator holds the reset button 38 closed until the relay just pulls in.

When the light beam is interrupted, the current through photo-cell 34 and resistance 68 is reduced and the grid of amplifier 35 becomes more negative thereby decreasing the plate current and causing the relay 37 to become inactive. The consequent opening of relay contact 1 disconnects the photo-cell 34 from tap 66 on the 90 V. secondary 63, and thereby makes the grid even more negative so that the plate current is reduced to zero and the relay remains inactive until the reset button 38 is pressed.

This "lock-out" feature may be obtained in several other ways, well known in the art, and the arrangement described above is not intended to limit the claims to this exact construction.

The binder B usually being much wider than the wrapper W of a cigar on the binder die turret 71 (Figure 4) the space between the dies 72 and

73 is so small that the operator could not properly manipulate the leaf without interrupting the light beam if the latter were placed outside the path of the much longer binder cutting rollers 74. To overcome this difficulty, the light beam 42 is placed a sufficient distance away from the operator, (whose seat is indicated at O in Figure 3) and within the path of the cutting rollers, and a U-shaped by-pass bridge 75 having four coacting 45° mirror surfaces 76 in the path of the light beam is attached at the proper height to the roller slide 10, as by a bracket 77, and moves with it, so as to deflect the light around the cutting rollers. This by-pass bridge may be made of glass, or preferably of a clear molded material with a high refractive index such as that known as "Lucite." With this material, which is considerably lighter than glass and has excellent machining properties, polished surfaces at a 45° angle to incident light from the inside are almost totally reflecting, while polished surfaces perpendicular to incident light are transparent, and hence practically no light is lost. The light beam 42, with this arrangement, or by the use of an equivalent compound total reflecting prism or of mirrors, is reflected four times, as shown by the arrows, and emerges substantially in line with the incident beam. Movement of the cutter bracket does not intercept the beam, and protection in front and behind the bracket is maintained at all times.

In like fashion, as illustrated in Figures 6 and 7, the invention provides for incapacitation of other operating mechanisms, such as the conventionally shown wrapper-applying rolls R, when an operator undertakes to intervene in the otherwise automatic operation of said rolls, as for example, in an effort to rectify improper passage of a leaf or wrapper element W which has been transferred to the wrapper rolls R after having been cut on one of the dies W and then picked up by the carrier head T, which follows a path indicated by dotted lines and arrows in Fig. 7 from wrapper-receiving position I to position II and returns by a different return path to position I, positions III and IV (Fig. 7) indicating successive locations of carrier T along said return path.

Fig. 7 illustrates four different locations of the wrapper carrier in its gyratory operation. Reference character I shows the carrier over the cutting die; II shows the transfer about to commence feeding the wrapper to the cigar bunch; III shows the transfer after having fed the entire wrapper to the bunch; and IV shows the transfer returning to its starting position. In returning to its starting position, one end of the carrier travels between the upper and lower light beams to avoid interrupting the continuity of the beam.

In cigar machines, constructed as in the Wheeler patent Serial No. Re. 19,677, granted August 20, 1935, having a duplex turret as 6, the timing of the transfer operation and the orbit traversed by the transfer head T preparatory to, and after completion of, the operation of picking up the cut wrapper T (Figure 7), is preferably such that as the transfer head T assumes its several gyratory positions indicated, for proper transfer of the cut wrapper element T to the set of wrapping rolls R the head T will at no time intrude upon the path of the optical control beam 42.

Accordingly, the lower ray of the beam 42 will serve its intended purpose of guarding the cut-

ting dies 11 in both of their positions 7 and 8, against undesirable intervention which endangers the operator's hand or arm, etc., and the upper ray of the beam will similarly guard the set R of wrapping rolls against like dangerous intervention by a member of the operator's body.

The transfer head T, however, in performing its necessary and intended functions, operates in an orbit free of the several beam portions, and the wrapping roll set R is free to accomplish its conventional function, as above indicated, while the beam 42 remains on guard at all times, and acts to incapacitate each working element of the machine when the safety of an operator is endangered in any way, it being understood that the various devices shown and the particular operations described by way of example, are merely illustrative and are not intended to exclude the coordination of such an optical control beam as that exemplified with any working device in connection with which the incapacitating devices of the present invention may be embodied.

As a desirable arrangement for varying the angle of the mirrors 48 and 49, provision may be made of a set-screw 78, transfixing the back of the housing 29 and bearing against the holder 50, which takes the form of a bent strap of metal in the instance illustrated. A lock-nut 79 serves to maintain the adjusted position of the set screw, and very delicate and accurate calibration of the beam may be effected by this means.

The invention above described may be varied in construction within the scope of the claims, for the particular device, selected to illustrate the invention, is but one of many possible concrete embodiments of the same. It is not, therefore, to be restricted to the precise details of the structure shown and described.

What is claimed is:

1. In a cigar machine having a tobacco leaf cutting die and a roller element movable relatively to said die to cut a leaf on said die, means to incapacitate said roller element when an obstruction is in the path thereof, said incapacitating means comprising devices for maintaining an optical control beam in said path and suitably disposed to guard a part of an operator from injury by said roller element or die at all times when in the path of said beam, while said roller travels in either direction along said path, and means operative at all times during operation of the cigar machine and sensitive to obstruction of said beam, for effecting said incapacitation.

2. In a cigar machine having a tobacco leaf cutting die and a roller element movable relatively to said die to cut a leaf on said die, means to incapacitate said roller element when an obstruction is in the zone of operation thereof, said incapacitating means comprising devices for maintaining an optical control beam in said zone of operation wherein the presence of a member of the operator's body is dangerous, and connections, responsive to obstruction of said beam by said member's presence in said zone, constructed and arranged to effect said incapacitation, said connections being operative at all times during operation of the cigar machine.

3. In a cigar machine having mechanism for applying a tobacco leaf to a bunch, means to incapacitate said mechanism when a member of the operator's body is in danger of injury by said mechanism, said incapacitating means comprising devices for maintaining at all times during the working of said machine a plurality of optical control beams in a path suitably disposed

to guard the member of an operator from injury from said mechanism, while permitting operating movement of said mechanism, and means sensitive to obstruction of said beams by said member for effecting said incapacitation.

4. In a cigar machine having a tobacco leaf cutting die, and a set of roller elements disposed rearwardly of said die to receive from the die and apply to a cigar bunch a wrapper which has been cut on said die, means to incapacitate said roller elements when a member of the operator's body is in danger of injury by said set of roller elements, said incapacitating means comprising devices for maintaining a plurality of optical control beams in a path suitably disposed to guard the member of an operator against injury from said set at all times while permitting normal operating movement of said roller elements, and means sensitive to obstruction of said beams by said member for effecting said incapacitation.

5. In a cigar machine having a tobacco leaf cutting die and a working element movable relatively to said die to operate upon a cigar component associated with said die, means to incapacitate said working element when an obstruction is in the path thereof, said incapacitating means comprising devices for maintaining at all times during operation of the cigar machine an optical control beam in a path suitably disposed to guard a member of an operator from injury by said working element or die, while permitting operating movement of said working element, and means sensitive to obstruction of said beam by said member for effecting said incapacitation.

6. In a cigar machine having operating mechanisms including a plurality of movable devices working in a zone of operation wherein the presence of a member of the operator's body is dangerous to the operator, actuating mechanism to move said respective working devices in predetermined mechanical cycles within said zone, without manual intervention; means to control said actuating mechanism manually; means traversing a predetermined space and operating without the volitional control of the operator to incapacitate said actuating mechanism and thereby interrupt the working movements of said devices whenever a member of the operator's body is extended transversely in and across said space into said zone, said last-named means being operative at all times during operation of the cigar machine, and means to maintain said actuating mechanism in said incapacitated state until it is restarted manually by the operator.

7. In a cigar machine having operating mechanism including a plurality of movable devices each working in a zone of operation wherein the presence of a member of the operator's body is dangerous to the operator at times; actuating mechanism to move said respective working devices in predetermined mechanical cycles within said zones, without manual intervention; means to control said actuating mechanism manually; and means operating apart from volitional control of the operator to incapacitate said actuating mechanism and thereby interrupt the working movement of said devices whenever a member of the operator's body is extended in and across said incapacitating means into danger zones, said incapacitating means including optical instrumentalities adapted to maintain an optical control beam in each of said danger zones normally at all times, and connections respon-

sive to interruption of said beam by the presence of said body member in said beam, constructed and arranged to cause said optical instrumentalities to render said working devices inactive, and means to maintain said working devices inactive until they are restarted manually by the operator.

8. In a cigar machine having operating mechanism including a plurality of movable devices each working in a zone of operation wherein the presence of an operator's hand is dangerous to the operator at times; actuating mechanism to move said respective working devices in predetermined mechanical cycles through said danger zones, without manual intervention; means to control said actuating mechanism manually; and means, operating without the volitional control of the operator, to incapacitate said actuating mechanism and thereby interrupt the movements of said devices whenever a member of the operator's body is extended in and across said incapacitating means into one of said danger zones, said incapacitating means including optical instrumentalities adapted to maintain an optical control beam in each of said danger zones normally at all times, and connections, responsive to interruption of said beam by the presence of a member of the operator's body in said beam, constructed and arranged to cause said optical instrumentalities to render said dangerous working devices inactive and to maintain them inactive until the time they are reset manually by the operator, the beam in one zone being remote from the beam in another zone, to provide a space in which a working device may function without interruption of the beam.

9. In a cigar machine having a plurality of working devices operating in zones open to entry by a member of an operator's body, one of said devices working in a zone relatively near to the operator, and another in a zone more remote from the operator, safety mechanism traversing a predetermined space and constructed and arranged to incapacitate said devices when said member of the operator's body is in danger while extending in and across said space and maintain said devices in an incapacitated condition until manually restarted by the operator, said mechanism including optical instrumentalities constructed and arranged to maintain an optical control beam at one level in one zone and at a higher level in another zone.

10. A cigar machine having the features claimed in claim 6, wherein said optical instrumentalities include a set of reflecting devices constructed and arranged to deflect a control beam in such a manner that one portion thereof traverses one zone at a higher level than another portion, and thereby the same beam serves to protect the operator at different levels in the zones.

11. In a machine having a working device movable in a predetermined path within a zone, whose path is traversed by the path of an optical control beam, means carried by said movable device to preserve the continuity of said control beam where the path of said device traverses the path of said beam.

12. A machine having the features claimed in claim 11, in which said beam continuity is preserved by a system of reflectors movable with said device.

13. In a cigar machine having operating mechanisms including a movable wrapper cutting head, a movable wrapper transfer head, and a

pair of wrapper cutting dies on a turret rotatable in a zone of operation wherein the presence of a hand of the operator in the path of a moving head is dangerous to the operator at times, actuating mechanism to operate said respective operating mechanisms intermittently in predetermined mechanical cycles, without manual intervention, means to control said actuating mechanism manually, and optical control means operable independently of volitional control by the operator to incapacitate said actuating mechanism whenever a member of the operator's body is extended in and across said optical control means into said danger zone, said means maintaining said actuating mechanism incapacitated until started by the volitional control of the operator.

14. In a cigar machine having operating mechanisms including a movable wrapper cutting head, a movable wrapper transfer head, and a pair of wrapper cutting dies on a turret all of said mechanisms operating substantially in a zone wherein the presence of a hand of the operator in the path of a moving head is dangerous to the operator at times, actuating mechanism to operate said respective operating mechanism intermittently in predetermined mechanical cycles, without manual intervention, means to control said actuating mechanism manually, and optical control means operable independently of volitional control by the operator to incapacitate said actuating mechanism whenever a member of the operator's body is extended in and across said optical control means into said zone of danger, said incapacitating means including optical instrumentalities adapted to maintain an optical control beam in said zone of danger normally at all times to guard said member against injury, and connections responsive to interruption of said beam by the presence of said member of the operator's body in said zone of danger, to cause said optical instrumentalities to render said actuating means inactive and to maintain said actuating means inactive until restarted manually by the operator.

15. An optical control system of a cigar machine having a rotary duplex turret, with front and rear dies and mechanism to rotate said turret intermittently, and having a moving cutter roller and a carrier to transfer a cut element from said turret, said system comprising a light source and a photo-electric relay mounted in a housing at one side of the turret, a reflecting device mounted at the other side of said turret, whereby a portion of an optical beam from said light source is maintained across said dies at one elevation, and another portion is maintained by said reflecting device at another elevation, so as to guard the operator against catching a hand between one of said dies and the cutter roller and between one of the dies and the carrier, said beams being so disposed as to permit non-interfering working movements of said operating elements, and means for maintaining the machine in a non-operative condition until restarted manually by the operator after the machine has been automatically stopped by a member interrupting the continuity of the optic beam.

16. In a cigar machine having a binder cutting die, a roller cutter head mounted to move across said die and means to cause intermittent reciprocation of said cutter head through its zone of operative movement, means to maintain an optical control beam traversing the path of said head, and a U-shaped system of reflectors constructed

and arranged to traverse the path of said beam with said head, and adapted to maintain the continuity of said beam.

17. In a cigar machine having potentially dangerous operating mechanism, a safety device for incapacitating said mechanism when a member of the operator's body is in danger of injury by said mechanism and to maintain it in said incapacitated state until manually started again by the operator, said safety device comprising devices for maintaining an optical control beam in a path suitably disposed to guard said member of the operator's body from injury by said mechanism, while permitting operating movement of said mechanism, and means operative at all times during operation of the cigar machine, sensitive to obstruction of said beam by said member, for effecting said incapacitation.

18. In a cigar machine having a set of roller elements for applying a wrapper to a cigar bunch, mechanism for transferring said wrapper to said set of roller elements, means traversing a predetermined space to incapacitate said roller elements when a member of the operator's body extends in and across said space and is in danger of injury by operation of said roller elements, and means to continue maintaining the roller elements in an incapacitated condition until restarted manually by the operator.

19. In a cigar machine having a set of roller elements for applying a wrapper to a cigar bunch, and mechanism for transferring said wrapper to said set of roller elements, means traversing a predetermined space and ready at all times for operation to incapacitate said roller elements when a member of the operator's body extends in and across said space and is in danger of injury by operation of said roller elements, said means being constructed and arranged to permit operating movement of said transfer mechanism without setting said incapacitating means in operation and separate means to maintain the roller elements stationary once they have been incapacitated until such time as the roller elements are, by the volition of the operator, set into operation again.

20. In a cigar machine having a set of roller elements for applying a wrapper to a cigar bunch, and mechanism for transferring said wrapper to said set of roller elements, means to incapacitate said roller elements when a member of the operator's body is in danger of injury by operation of said roller elements, said means being constructed and arranged to permit operating movement of said transfer mechanism without setting said incapacitating means in operation, said incapacitating means comprising devices for maintaining an optical control beam in a path suitably disposed to guard said member against injury by said roller elements, and removed from the path of said transfer mechanism, and means sensitive to obstruction of said beam by said member for

effecting said incapacitation, and continuing said incapacitation until such time as the operator terminates manually said incapacitation.

21. In a cigar machine having working devices and means to move said devices operatively in a plurality of paths within the limits of said machine, said working devices including a cutting die, a mechanism for applying a wrapper to a cigar element, and means for transferring from said die to said wrapper-applying mechanism a wrapping element formed on said die, and means to incapacitate said working devices when a member of the operator's body is in danger of injury by any of said working devices while operating in their respective paths, said incapacitating means being maintained at all times in condition for operation, and including an optical control beam in position to be intercepted by said member of the operator's body, said beam having spaced apart beam portions, between which said transferring means is free to move in its normal path without intercepting either of said beam portions, and means sensitive to obstruction of either of said beam portions for effecting said incapacitation.

22. In a machine having a moving part, the combination of a continuous safety beam of radiant energy which is operative at all times in front of said moving part, means for receiving material from an operator while said means is in front of said safety beam and for transferring said material to a position in back of said safety beam with respect to said operator where the moving part operates upon said material, and means responsive to an interception of said beam of said radiant energy for arresting the movement of the moving part.

23. In a cigar machine having working devices and means to move said devices operatively in a plurality of paths within the limits of said machine, said working devices including a cutting die, a mechanism for applying a wrapper to a cigar element, and means for transferring from said die to said wrapper-applying mechanism a wrapping element formed on said die, and means to incapacitate said working devices when a member of the operator's body is in danger of injury by any of said working devices while operating in their respective paths, said incapacitating means being maintained at all times in condition for operation, and including an optical control beam in position to be intercepted by said member of the operator's body, said beam having spaced apart beam portions, between which said transferring means is free to move in its normal path without intercepting either of said beam portions, and means sensitive to obstruction of either of said beam portions for effecting and continuing said incapacitation until such time as the operator terminates manually said incapacitation.

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