M. PARIDON.

AUTOMATIC STOPPING AND STARTING MECHANISM FOR MATCH PACKING MACHINES.

APPLICATION FILED MAR. 14, 1916.

1,203,906.

Patented Nov. 7, 1916.

2 SHEETS—SHEET 1.

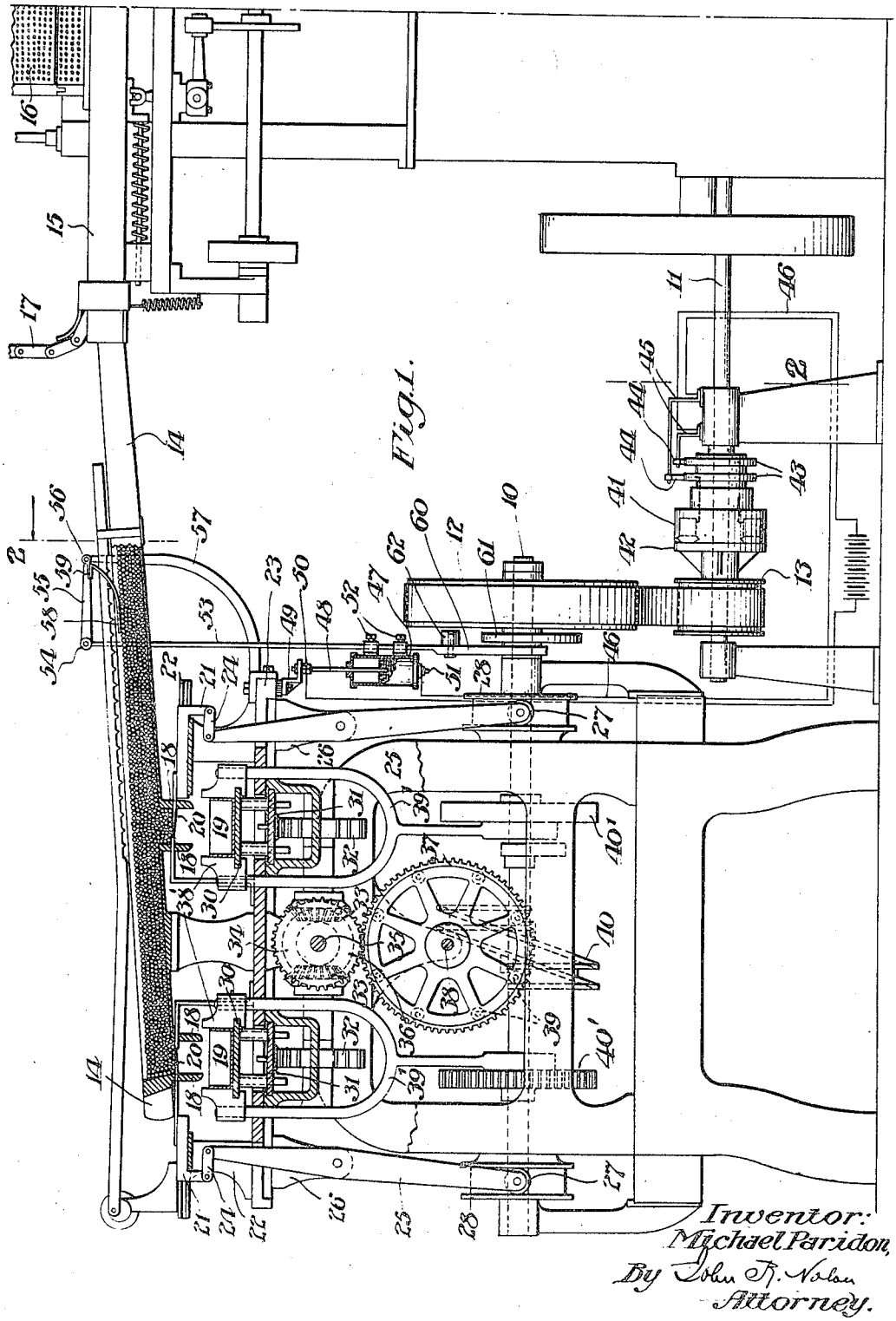


Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 2.

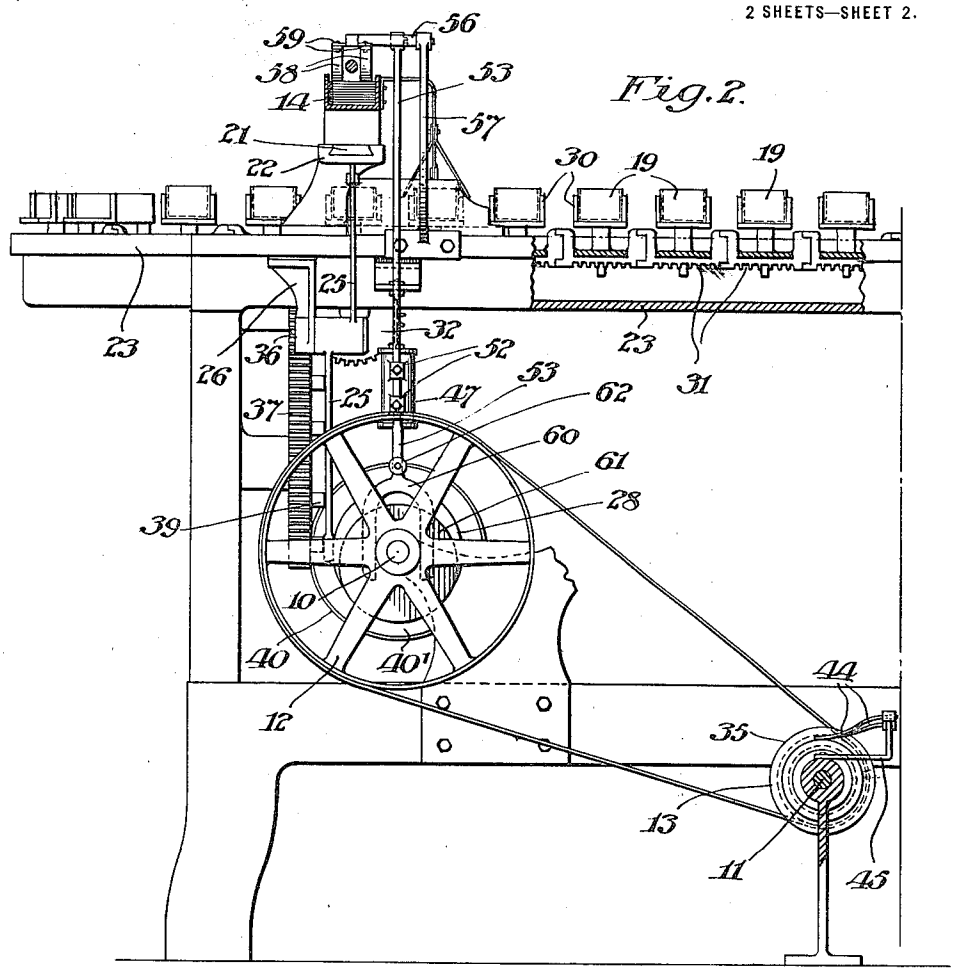


Fig. 4.

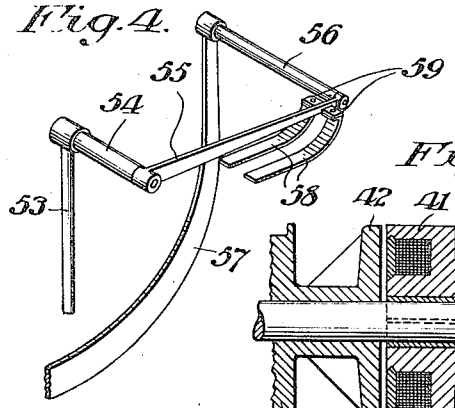


Fig. 3.

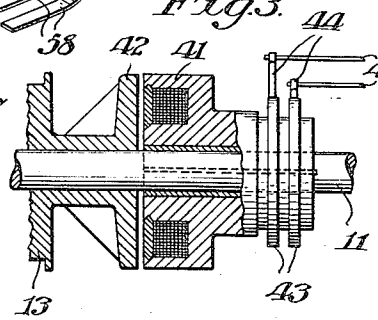
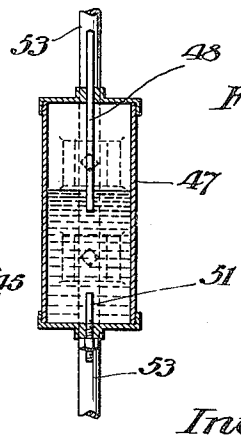


Fig. 5.



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UNITED STATES PATENT OFFICE.

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AUTOMATIC STOPPING AND STARTING MECHANISM FOR MATCH-PACKING MACHINES.

1,203,906. Specification of Letters Patent. Patented Nov. 7, 1916.

Application filed March 14, 1916. Serial No. 84,023.

To all whom it may concern:

Be it known that I, MICHAEL PARIDON, a citizen of the United States, and resident of Barberton, in the county of Summit and State of Ohio, have invented certain new and useful Improvements in Automatic Stopping and Starting Mechanisms for Match-Packing Machines, of which the following is a specification.

This invention relates to automatic stopping and starting mechanism for match-packing machines, more especially, packing machines which are associated with match making apparatus, such, for example, as illustrated in Letters Patent of the United States No. 1,016,436, dated February 6, 1912. By reference to the said patent it will be seen that the packing machine therein illustrated includes a trough-like hopper into which the matches are progressively delivered and thence fed in an orderly manner to appropriate discharge portions having suitable cut-off devices which are timely actuated to permit measured quantities of matches to pass to match-box trays which are successively positioned beneath the respective openings.

The principal object of my present invention is to accomplish the automatic stopping of the packing machine when the contents of the hopper, or other match feeder, falls below a certain level, and the similar starting of the machine when the contents of the hopper or feeder have been replenished; thereby insuring the delivery of an adequate quantity of matches to the individual box-trays or other receptacles.

Another object of my invention is to effect and insure the stopping of the packing machine when the cut-off is closed, and thus obviate liability of an oversupply of matches to trays or other receptacles which are being filled at the time the operation of the machine is suspended.

With these and other objects in view, my invention, generally stated, comprises a match packing machine equipped with stopping and starting mechanism under the influence of the matches in the hopper or feeder.

The invention also comprises such a machine in which the stopping and starting mechanism includes an electro-magnetic clutch and circuit making and breaking devices therefor under the influence of the matches in the hopper or feeder.

The invention also comprises such a machine in which the stopping and starting mechanism includes instrumentalities which limit the stopping operation to periods when communication between the match-trays and the match delivery means therefor is cut off.

The invention also comprises an organization of match making and packing machines, including a feeder for transferring the matches from the former to the latter machine, and drive mechanism for concertedly actuating the two machines, said mechanism including means under the influence of the matches in the feeder, operative to stop and start the packing machines.

The invention also comprises novel features of construction and combinations of parts, which will be hereinafter described and claimed.

In the drawings—Figure 1 is a front elevation, partly in section, of a match packing machine equipped with a preferred form of my invention, a portion of a typical match-making machine being illustrated. Fig. 2 is a partial end and sectional view of the packing machine, the section being on a plane through the hopper and the main drive shaft, as on the line 2—2 of Fig. 1. Fig. 3 is a sectional elevation of the electromagnetic clutch on the drive shaft. Fig. 4 is a detail, in perspective, of match-controlled devices for a making and breaking device which is included within the electric circuit of the electro-magnetic clutch. Fig. 5 is a vertical section through the said circuit making and breaking device.

Referring to the drawings, 10 designates the main shaft of a match-packing machine, and 11 a drive shaft with which it is operatively connected. The shaft 11 may be and preferably is the main shaft of a match-making machine with which the packer is associated. As in the patent above mentioned the shaft 10 is provided with a fast pulley 12 which is belted with a loose pulley 13 on the shaft 11; but instead of the latter pulley being rendered fast and loose on its shaft by a hand-operated clutch as illustrated in said patent, the condition of the pulley 13 is automatically determined by an electro-magnetic clutch which is included in an electric circuit under the efficient con-

trol of the matches in the inclined trough-like hopper 14 of the packing machine, as will presently appear This hopper, which is an efficient form of match feeder, is supplied with matches from the usual horizontal trough 15 at the discharging end of the match making machine. The trough receives the matches row by row as they are discharged from the match carrier 16, and an endless conveyer 17 traveling within the trough advances the matches to the hopper 14, which constitutes, in effect, an extension of the trough. The hopper 14 is provided at or near its lower end with spaced discharge openings having depending side walls 18 which are constructed and arranged to co-act with underlying match trays, as 19, and form therewith measuring chambers for the matches supplied to the trays, each of the openings being provided with a suitable cut-off gate 20 whereby the quantity of matches delivered to the individual trays can be controlled. Each gate is affixed to a slide 21 which is mounted in guide-ways in a suitably-disposed bracket 22 on the table 23 of the packer. This slide is connected by means of a link 24 with the upper arm of a vertical lever 25 which is fulcrumed on a bracket 26 depending from the table. The lower end of this lever is provided with a stud or roller 27 which enters the peripheral groove of a cam 28 on the main shaft 10 of the packing machine; the contour of the cam being such as to effect the timely oscillation of the lever and the requisite operation of the cut-off gate.

The match trays are supported by vertically-movable holders 30 which are mounted on an intermittently-movable horizontal conveyer 31 which is appropriately geared with and driven from the main shaft 10. The gearing includes spaced gear wheels 32 which mesh with gear teeth formed on the under side of the conveyer. The shafts of the wheels 32 bear bevel wheels 33 in mesh with a bevel wheel 34 on a shaft 35, and the latter shaft bears a pinion 36 in mesh with a spur wheel 37 on a shaft 38. This spur wheel is provided with laterally-projecting spaced pins 39 with which co-acts a cam 40 on the main shaft 10; the parts being so co-related that the spur wheel 37 is rotated to effect through the gearing described the intermittent movement of the conveyer in such a manner as to advance the tray-holders successively under the discharge openings of the hopper. (See Fig. 1). During each dwell of the conveyer the tray holders directly beneath the openings are raised and lowered, the means for this purpose including lifters 38′ which are borne by vertically-reciprocating frames 39′ under the control of appropriate face cams 40′ on the main shaft 10; one of the cams being conveniently formed in the face of a gear wheel on said shaft. When the tray holders are in elevated position, the trays supported thereby receive the depending walls of the proximate measuring chambers; and the slides are then retracted to permit a quantity of matches to fall from the hopper into each of the measuring chambers and are then moved inward to cut off the feed. This being done the tray holders are lowered to permit the contents of the measuring chambers to be freely discharged into the underlying trays.

The mechanism above described, excepting the clutch connection referred to, is or may be similar in construction and operation to the corresponding mechanism illustrated in Patent No. 1,016,436 aforesaid.

Referring now to the automatic stopping and starting mechanism herein illustrated, 41, 42 designate driving and driven clutch elements which are affixed to the shafts 11 and the pulley 13 respectively. In the present instance a well-known type of electro-magnetic clutch is illustrated, the magnet 41 of which is secured to the drive shaft 11 and the armature 42 to the loose pulley; whereby when the magnet is energized the pulley is temporarily locked to the shaft and the motion is, perforce, transmitted to the main shaft of the packing machine. On the hub of the magnet body are the usual contact rings 43 with which contact the brushes 44 carried by terminal brackets 45 which are included within the electric circuit comprising the wires 46. In this circuit is included a suitable circuit making and breaking device, which, in its preferred construction, embodies a vertically-movable mercury-container 47 of hard rubber or other suitable non-conducting material. Depending freely through a central orifice in the top of the container is a metal contact rod 48 the upper end of which is affixed to a terminal bracket 49 which is secured to, but insulated from, the table 23 of the packing machine. One of the circuit wires 46 is secured to the terminal bracket at 50. A metal contact pin 51, which extends into and is secured to the bottom of the container, constitutes the terminal for the other wire of the circuit.

The parts just described are so relatively disposed that when the container is raised the mercury therein receives the lower end of the upper contact pin and thus completes the electric circuit; and when the container is lowered to remove the mercury contact from such pin the circuit is broken. The container is secured, as by set screws 52, to a vertical rod 53 of light material, such as hard wood or aluminum, which extends adjacent to and above one side of the hopper 14. The upper end of the rod has affixed thereto a horizontal stud 54 which overhangs the hopper and pivotally connects the

rod with one end of a rocker arm 55. The other end of this arm is fulcrumed on a stud 56 projecting from the upper end of a bracket arm 57 rising from the table of the packing machine. Affixed to the rocker-arm, at or near its fulcrum, is a depending member 58 which is so formed and disposed as to lie within the hopper and rest lightly upon the matches therein, as seen in Fig. 1. This member, in the present instance, is a light metal structure comprising two bearing fingers which are secured to lugs 59 on the rocker-arm. The matches passing under the bearing member limit its descent and thus determine (excepting as hereinafter described) the vertical position of the rocker arm, the rod 53 and the mercury container. The lower end of the rod 53 is bifurcated, as at 60, slidingly to embrace the shaft 10 and be vertically guided thereby. The several parts just described are so relatively adjusted that when the hopper 14 contains a proper supply of matches the bearing member 58 is positioned by the matches to maintain the container in raised position and complete the electric circuit, but when the stream of matches in the hopper falls below a certain level the said member sinks therewith, and the container, descending, interrupts the electric circuit. In the latter case the electro-magnetic clutch being deënergized releases the pulley 13 and the operation of the packing machine is suspended. The match machine continues its operation and supplies the matches to the hopper, and as soon as the contents of the hopper reach a prescribed level the bearing member is raised and the circuit reëstablished, thereby throwing the packing machine into operation.

From the foregoing it will be seen that the efficient making and breaking of the electric connection is determined by the quantity of matches in the hopper, and that thereby the operation of the electro-magnetic clutch is automatically controlled to effect the requisite stopping and starting of the packing machine.

In the type of packing machine herein illustrated as equipped with my invention, it is desirable that the operation of the machine be stopped when the match discharge openings from the hopper are closed, as otherwise the boxes thereunder will receive an oversupply of matches. I, therefore, provide a means whereby the bearing member is free to gravitate upon the matches in the hopper only during the downward movements of the box-trays after the cut-off gates have been moved to close the discharge openings. This means, in a simple and efficient form, includes an eccentric 61 which is affixed to the main shaft 10 of the packing machine, and a roller 62 which is mounted on the lower portion of the rod 53 so as to lie in the peripheral path of the eccentric. The eccentric is so disposed in relation to the cams for operating the cut-off gates and the tray-lifters that the highest part of the eccentric is up when the gates are open and the tray-lifters raised; and, hence, even though at this time the matches in the hopper shall be below the prescribed level the descent of the rod will be prevented. But when the gates are closed and the tray-lifters lowered, the position of the eccentric is such as to permit the descent of the bearing member upon the underlying matches. If at that juncture the contents of the hopper be below a certain level the electric circuit will be broken and the packing machine thrown out of operation as above described.

While I have herein illustrated my invention as embodied in the match packing machine of Patent No. 1,016,436 aforesaid, it is to be understood that the invention is applicable to other types of so-called continuous match packing or filling machines, whether the trays or match receptacles are formed on or are separable from the carrier; also that the mechanisms herein shown and described to exemplify my invention may be modified in many respects without departing from the spirit of the invention.

I claim—

1. The combination with a match-packing machine having a tray carrier and a feeder for progressively delivering matches to the trays on the carrier, of mechanism, including a power-driven element, for actuating the carrier, and means, including a member under the influence of the matches in the feeder, for rendering said element inactive when the contents of the feeder fall to or below a certain level.

2. The combination with a match-packing machine having a tray carrier and a feeder for progressively delivering matches to the trays on the carrier, of mechanism, including a power-driven element, for actuating the carrier, and means, including a member under the influence of the matches in the feeder, for rendering said element inactive when the contents of the feeder fall to or below a certain level, and for rendering said element active when the contents of the feeder rise to or above said level.

3. The combination with a match making machine and a match packing machine associated therewith, including means for feeding the matches from the match making machine to the match packing machine, of drive mechanism for the two machines, including an element operative to stop the packing machine independently of the match making machine, and means, including a member under the influence of the matches in the feeder, for determining the operation of said element.

4. The combination with a match making machine and a match packing machine asso-

ciated therewith, including means for feeding the matches from the match making machine to the match packing machine, of drive mechanism for the two machines, including an element operative to stop and start the packing machine, and means, including a member under the influence of the matches in the feeder for actuating said element to stop the packing machine when the contents of the feeder fall below a certain level and to start the packing machine when the contents of the feeder rise to or above said level.

5. The combination with a match packing machine having a tray carrier and a trough-like hopper for delivering matches to the trays on the carrier, of mechanism, including a power-driven element, for actuating the carrier, and means, including a member under the influence of the matches in the hopper, for rendering said element inactive when the contents of the hopper fall to or below a certain level.

6. The combination with a match packing machine having a tray carrier, and a trough-like hopper for delivering matches to the trays on the carrier, of mechanism including a power driven element, for actuating the carrier, and means, including a member under the influence of the matches in the hopper, for rendering said element inactive when the contents of the hopper fall to or below a certain level, and for rendering said element active when the contents of the hopper rise to or above said level.

7. The combination with a match packing machine having a tray carrier and a match feeder for delivering matches to the trays on the carrier, of mechanism, including a power-driven electro-magnetic clutch, for actuating said carrier, and means for controlling the operation of said clutch, said means including circuit making and breaking devices under the influence of the contents of the feeder.

8. In a match packing machine comprising a hopper having a discharge portion, a periodically-operating cut-off therefor, and a tray-carrier for advancing trays to said discharge portion, of mechanism, including a power-driven element, for actuating the machine, means under the influence of the matches in the hopper for controlling the operation of said element, said means including a member which is vertically-movable within the hopper, being in raised position when said element is active, and devices whereby said member is positively raised when the cut-off is open irrespective of the level of the matches in the hopper.

9. In a match packing machine comprising a hopper having a discharge portion, a periodically-operating cut-off therefor, and a tray-carrier for advancing trays to said discharge portion, of mechanism, including a power-driven electro-magnetic clutch, for actuating the machine, means under the influence of the matches in the hopper for controlling the operation of said clutch, said means including electric circuit making and breaking devices for said clutch under the influence of the contents of the hopper, and means whereby when the cut-off is open the electric circuit is complete irrespective of the level of the matches in the hopper.

10. In a match packing machine comprising a hopper having a discharge portion, a periodically-operating cut-off therefor, a carrier, holders thereon, and means for raising and lowering said holders in respect to the discharge portion of the hopper, of mechanism, including a power-driven element, for actuating the machine, means under the influence of the matches in the hopper for controlling the operation of said element, said means including a member which is vertically movable within the hopper, being in raised position when said element is active, and devices whereby said element is positively raised when the cut-off is open and the subjacent holder is elevated, irrespective of the level of the matches in the hopper.

11. In a match packing machine comprising a hopper having a discharge portion, a periodically-operating cut-off therefor, a carrier, holders thereon, and means for raising and lowering said holders in respect to the discharge portion of the hopper, of mechanism, including a power-driven electro-magnetic clutch, for actuating the machine, means under the influence of the matches in the hopper for controlling the operation of said clutch, said means including electric circuit making and breaking devices for said clutch under the influence of the contents of the hopper, and means whereby, when the cut-off is open and the subjacent tray-holder is raised, the electric circuit is complete irrespective of the level of the matches in the hopper.

12. The combination with a match packing machine having a tray carrier, and a feeder for delivering matches to the trays in the carrier, of mechanism, including an electro-magnetic clutch, for actuating said carrier, and means for controlling the operation of said clutch, said means including a mercury contact device within the electric circuit of the clutch, and connections for operating said device to make and break the circuit, said connections being under the influence of the contents of the feeder.

13. In a match packing machine comprising a hopper having a discharge portion, a periodically-operating cut-off therefor, and a tray-carrier for advancing trays to said discharge portion, of mechanism, including a power-driven electro-magnetic clutch, for actuating said machine, means for controlling the operation of said clutch,

said means including a mercury contact device within the electric circuit of the clutch, connections under the influence of the contents of the hopper for operating said device to make and break the circuit, and means whereby when the cut-off is open the said contact device is positioned to complete the circuit irrespective of the level of the matches in the hopper.

Signed at Barberton in the county of Summit and State of Ohio this 11th day of March A. D. 1916.

MICHAEL PARIDON.