Feb. 25, 1936. W. H. STILLING 2,032,189

AUTOMATIC TIME RELEASE DEVICE

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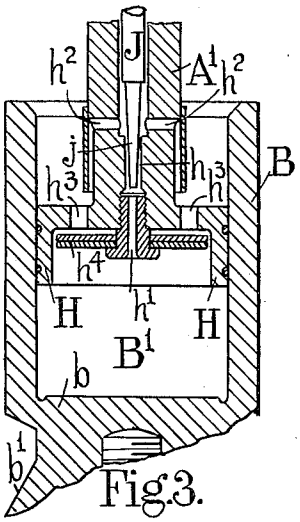


Fig.3.

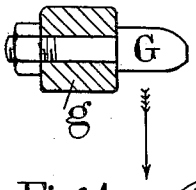
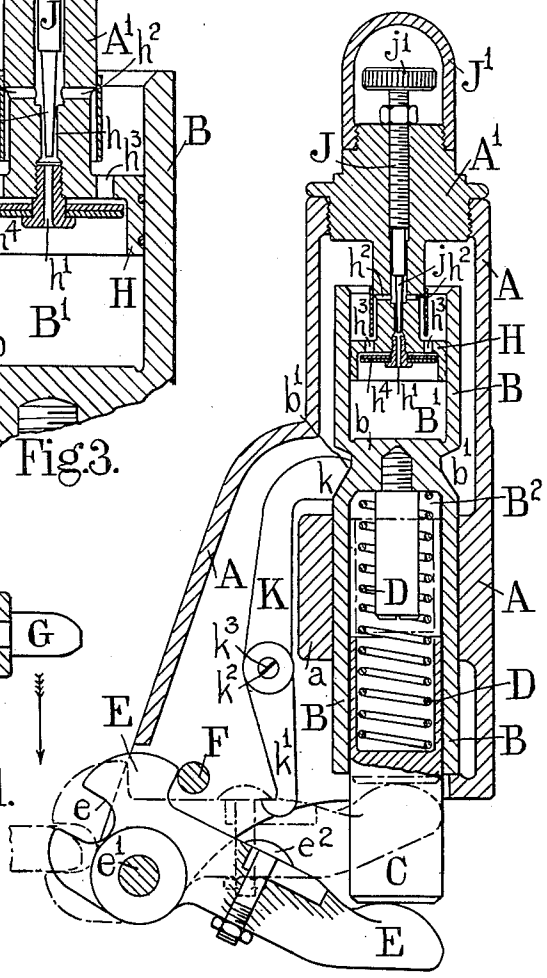


Fig.1.



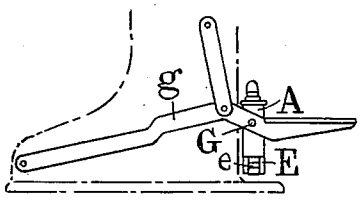


Fig.4.

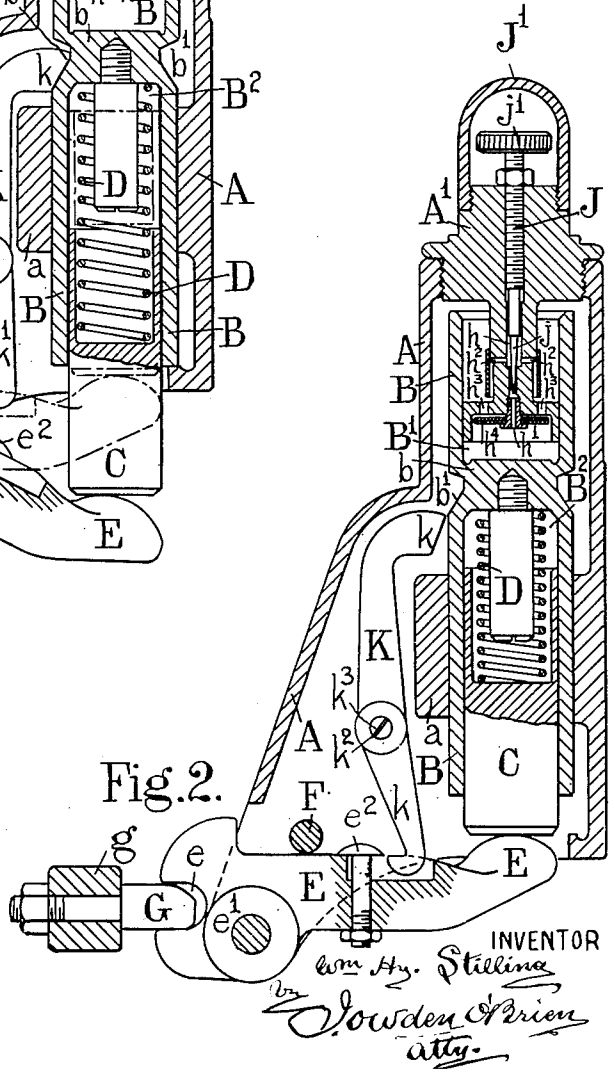


Fig.2.

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AUTOMATIC TIME RELEASE DEVICE

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7 Claims. (Cl. 161—1)

This invention relates to a device for locking a mechanism in an operative position and releasing it therefrom only at the end of a predetermined period of time.

Primarily the device is designed to release a clothes or garment pressing machine in a definite predetermined period of time after locking, but it may be applied to other mechanism where a similar duty is required.

The device according to the invention comprises an outer casing, a member or piston sliding therein, a plunger, acting in a chamber at one end of the piston and controlled by a spring therein, a stationary piston carried by the outer casing and situated in a second chamber at the other end of the piston whereby the sliding piston can slide over the stationary piston, an aperture in the stationary piston the effective size of which can be varied, to permit the escape of fluid from one side of the stationary piston to the other, a pivoted lever operated by the starting or operating device of the mechanism which on actuation of the latter to move the plunger against its controlling spring and thereby exert pressure on the sliding piston moves it slowly in a direction to expel the fluid from one side of the stationary piston to the other, the speed of movement depending on the effective size of the aperture through the stationary piston and a pivoted catch which when the starting or operating device of the mechanism has been moved will engage the pivoted lever actuated thereby and lock it in the operative position until the catch is released by the sliding piston reaching the end of its travel.

The invention will be described with reference to the accompanying drawing in which:—

Fig. 1 is a vertical section showing in full lines the position of the various parts of the device in their normal or unlocking position before it is operated to lock the mechanism and in dotted lines the position of such parts are moved by the mechanism when the latter is operated whereby the mechanism is locked in its operative position.

Fig. 2 is a vertical section showing the position of the various parts at the end of the predetermined locking period and immediately before they return to their original position to unlock the mechanism.

Fig. 3 is a vertical section on an enlarged scale of the part of the device controlling the unlocking mechanism at the end of the predetermined period of time.

Fig. 4 is a diagrammatic view showing the device applied to the operating treadle of a garment or similar pressing machine.

The device comprises a hollow outer casing A open at the lower end and closed at the upper end by a cap or cover A^1 screwed into the casing. The outer casing A is formed with a cylindrical portion a in which the cylindrical member or piston B can slide. The cylindrical member or piston B is formed with an upper hollow chamber B^1 and a lower hollow chamber B^2 separated by a wall b so that there is no communication between the two chambers. A rod or plunger C is adapted to slide in the lower chamber B^2 under the influence of a coil spring D normally tending to push the plunger C out of the piston B.

The lower end of the plunger C is engaged by one end of a pivoted lever E the other end of which is enlarged and formed with a recess e adapted to be engaged by a pin or projection G on a part of the setting on or operating mechanism of the machinery to be controlled.

In the case of a treadle operated pressing machine as shown in Fig. 4 the pin or projection G is mounted on the operating treadle g whereby when the latter is depressed the pin G will enter the recess e in the end of the lever E and cause the latter to move about its pivot e^1. For other machinery the pin G is carried by or suitably connected to the lever, treadle or other device controlling the starting of the machine. A stop F may be provided to limit the upward movement of the end of the lever E engaging the plunger C.

A stationary piston H carried on a rod depending from the cover A^1 is arranged in the upper chamber B^1 of the sliding member or piston B so that any movement of the member or piston B will cause it to slide over the fixed piston H.

The chamber B^1 is filled with oil and the stationary piston is formed with an aperture h which will permit oil to pass from the lower side of the piston up the central passage h^1 and through the lateral passages h^2 to the upper side of the piston. A sleeve h^5 extends downward from the cover A^1 to form an annular chamber closed at the top and open at the bottom through which oil passes from the passages h^2 and which prevents splashing of the oil in the chamber B^1. The piston H is also formed with a number of vertical passages h^3 covered by a flap valve h^4 through which the oil will return from the upper side of the piston to the lower side thereof.

The size of the aperture h is controlled by a needle valve j carried on the end of a screwed rod J passing through the cap A^1 and controlled by a knob j^1 outside the cap. The valve j can thus be adjusted to vary the effective size of the aperture h and so adjust the time the oil will take to pass from the lower side of the piston H to the upper side thereof. The adjusting knob j^1 is preferably covered by a cap J^1 screwed onto the cap A^1.

The sliding member or piston B is formed with a conical or inclined surface b^1 preferably in the neighborhood of the division between the upper

and lower chambers B^1 and B^2. This inclined surface b^1 is engaged by the upper end k of a pivoted catch lever K, the lower end k^1 of which normally lies in the path of the head of a projecting bolt e^2 carried by the lever E so that when the lever E is moved by the starting device of the mechanism from the position shown in full lines in Fig. 1 to the position shown in dotted lines the end k^1 of the pivoted catch lever K will be engaged under the head of the bolt e^2 and the lever E and consequently the starting mechanism will be locked until the catch K is released by the time operation of the device.

The operation of the device is as follows:—

When the treadle g or other starting device is operated the pin or stud G engages in the recess e in the pivoted lever E and causes the latter to oscillate about its pivot e^1 from the position shown in full lines in Fig. 1 to that shown in dotted lines. This movement of the lever E raises the plunger C in the chamber B^2 which movement compresses the spring D acting between the top of the plunger C and the transverse wall b separating the chambers B^1 and B^2. The compression of the spring D, since the lower end of the plunger C is held by the end of the lever E tends to move the member B upwards but such upward movement is restrained by the oil in the chamber B^1 between the under side of the stationary piston H and the bottom of the chamber. The oil in the lower part of the chamber B^1 will however slowly escape through the aperture h, the central passages h^1 and the lateral passages h^2 to the upper side of the piston H, the speed of escape of the oil being governed by the effective size of the aperture which is controlled by the needle valve j. The pressure of the oil below the piston H will force the flap valve h^4 against the under side of the piston thereby closing the vertical passages h^3.

The displacement of the oil from the underside to the top of the piston H allows the piston B to rise slowly until the latter reaches the end of its stroke i. e. the position shown in Fig. 2. The upward movement of the piston H causes the inclined portion b^1 on its outer surface to move the catch lever K about its pivot so that when the piston H has reached the end of its travel the upper end k of the catch lever K will have been moved into such a position that its lower end k^1 will be out of engagement with the head of the bolt e^2 on the lever E and the latter will be released.

Immediately the catch lever K is released from the bolt e^2 the pressure of the spring D on the plunger C will rock the lever E to release the pin or stud G and the lever E will return to its original position, i. e. the position shown in full lines in Fig. 1. The releasing of the lever E moving the pin or stud G upwards thereby unlocking the treadle g or other starting device of the mechanism.

After the catch lever K has been operated to release the lever E and the pressure on the under side of the plunger C has been removed, the piston B will fall gradually by its own weight overcoming any resistance of the spring D should the plunger C remain in contact with the lever E during the downward movement of the piston B and as the pressure on the under side of the flap valve h^4 is removed the oil will pass back through the vertical passages h^3 in the piston H to the under side of the latter. As the piston B moves downwards the upper end k of the catch lever K will move back into engagement with the inclined or conical surface b^1 of the piston and the lower end again assume a position in the path of the stud or pin e^2 on the lever E. When the piston B has reached its lowermost position the plunger C again rests on the end of the lever E.

As the time taken for the piston B to move from its lower to its upper position and consequently the period during which the lever E is locked by the catch lever K depends on the effective size of the aperture h in the stationary valve H, this period can be varied within wide limits by the adjustment of the needle valve j through the control knob j^1 on the upper end of the rod J.

A concealed method of releasing the mechanism at any time in case of necessity may be provided. This consisting in forming a screw driven slot k^3 on the end of the pin k^2 on which the catch lever K is mounted so that by inserting a screw driver in the slot k^3 and turning it to the left whilst at the same time applying pressure to the treadle g or other starting mechanism, the lever K will be moved to release its upper end from the inclined or conical surface b^1 of the piston B. It is evident that knowledge of such method of release should only be known by a responsible person and not known by the ordinary operator of the machine.

A time release device as hereinbefore described has many uses but is particularly applicable for garment or like pressing machines as it allows the pressing head of the machine to be brought into contact with the work for preliminary steaming without the device coming into operation, but once the press is locked it remains so until it is automatically released by the device when the head of the machine will automatically be opened ready for gloss removal and application of vacuum prior to removal of the garment and if the normal release treadle has been removed there is no means of opening the machine as the main treadle is held in the jaw ended lever until the mechanism automatically trips.

What I claim as my invention and desire to protect by Letters Patent is:—

1. A device for locking the control mechanism of a machine in an operative position and releasing it therefrom only at the end of a predetermined period of time comprising an outer casing, a piston sliding therein, a chamber at one end of the piston, a spring controlled plunger within the chamber, a fluid containing second chamber at the other end of the piston, a stationary apertured piston carried by the outer casing and situated within said second chamber whereby the sliding piston can slide over the stationary piston, means to vary the size of the aperture in the stationary piston so that the fluid may escape from one side thereof to the other at a variable rate of speed, a pivoted lever operated by the control mechanism to move the spring controlled plunger and exert pressure on the sliding piston to expel fluid from one side of the apertured piston to the other, a pivoted catch mounted on the outer casing which when the control mechanism has been moved will engage the said pivoted lever and lock the mechanism in the operative position and means for releasing the pivoted catch when the sliding piston reaches the end of its travel.

2. A device for locking the control mechanism of a machine in an operative position and releasing it therefrom only at the end of a predetermined period of time comprising an outer casing,

a piston sliding therein, a chamber at one end of the piston, a spring controlled plunger within the chamber, a fluid containing second chamber at the other end of the piston, a stationary apertured piston carried by the outer casing and situated within said second chamber whereby the sliding piston can slide over the stationary piston, a needle valve to vary the size of the aperture in the stationary piston so that the fluid may escape from one side thereof to the other at a variable rate of speed, a pivoted lever operated by the control mechanism to move the spring controlled plunger and exert pressure on the sliding piston to expel fluid from one side of the apertured piston to the other, a pivoted catch mounted on the outer casing which when the control mechanism has been moved will engage the said pivoted lever and lock the mechanism in the operative position and means for releasing the pivoted catch when the sliding piston reaches the end of its travel.

3. A device for locking the control mechanism of a machine in an operative position and releasing it therefrom only at the end of a predetermined period of time comprising an outer casing, a piston sliding therein, a chamber at one end of the piston, a spring controlled plunger within the chamber, a fluid containing second chamber at the other end of the piston, a stationary apertured piston carried by the outer casing and situated within said second chamber whereby the sliding piston can slide over the stationary piston, a needle valve to vary the size of the aperture in the stationary piston so that the fluid may escape from one side thereof to the other at a variable rate of speed, a pivoted lever operated by the control mechanism to move the spring controlled plunger and exert pressure on the sliding piston to expel fluid from one side of the apertured piston to the other, a pivoted catch mounted on the outer casing which when the control mechanism has been moved will engage the said pivoted lever and lock the mechanism in the operative position and an inclined surface on the periphery of the sliding piston engaged by one end of the pivoted catch whereby the other end is moved out of engagement with the pivoted lever when the sliding piston reaches the end of its travel.

4. A device for locking the control mechanism of a machine in an operative position and releasing it therefrom only at the end of a predetermined period of time comprising an outer casing, a piston sliding therein, a chamber at one end of the piston, a spring controlled plunger within the chamber, a fluid containing second chamber at the other end of the piston, a stationary apertured piston carried by the outer casing and situated within said second chamber whereby the sliding piston can slide over the stationary piston, a needle valve to vary the size of the aperture in the stationary piston so that the fluid may escape from one side thereof to the other at a variable rate of speed, passages in the stationary piston to allow fluid to return when the pressure on the spring controlled plunger is released, a flap valve controlling said passages, a pivoted lever operated by the control mechanism to move the spring controlled plunger and exert pressure on the sliding piston to expel fluid from one side of the apertured piston to the other, a pivoted catch mounted on the outer casing which when the control mechanism has been moved will engage the said pivoted lever and lock the mechanism in the operative position and an inclined surface on the periphery of the sliding piston engaged by one end of the pivoted catch whereby the other end is moved out of engagement with the pivoted lever when the sliding piston reaches the end of its travel.

5. A device for locking the control mechanism of a machine in an operative position and releasing it therefrom only at the end of a predetermined period of time, comprising an outer casing, a piston sliding therein, a chamber at one end of the piston, a spring controlled plunger within the chamber, a fluid containing second chamber at the other end of the piston, a stationary apertured piston carried by the outer casing and situated within said second chamber whereby the sliding piston can slide over the stationary piston, a needle valve, a screwed spindle passing through the outer casing carrying the needle valve to vary the size of the aperture in the stationary piston so that the fluid may escape from one side thereof to the other at a variable rate of speed, passages in the stationary piston to allow fluid to return when the pressure on the spring controlled plunger is released, a flap valve controlling said passages a pivoted lever operated by the control mechanism to move the spring controlled plunger and exert pressure on the sliding piston to expel fluid from one side of the apertured piston to the other, a pivoted catch mounted on the outer casing which when the control mechanism has been moved will engage the said pivoted lever and lock the mechanism in the operative position, and an inclined surface on the periphery of the sliding piston engaged by one end of the pivoted catch whereby the other end is moved out of engagement with the pivoted lever when the sliding piston reaches the end of its travel.

6. A device for locking the control mechanism in an operative position and releasing it therefrom only at the end of a predetermined period of time comprising an outer casing, a piston sliding therein, a chamber at one end of the piston, a spring controlled plunger within the chamber, a fluid containing second chamber at the other end of the piston, a stationary apertured piston carried by the outer casing and situated within said second chamber whereby the sliding piston can slide over the stationary piston, a needle valve to vary the size of the aperture in the stationary piston so that the fluid may escape from one side thereof to the other at a variable rate of speed, a pivoted lever, a recess in one end thereof engaged by the control mechanism to cause the other end to move the spring controlled plunger and exert pressure on the sliding piston to expel fluid from one side of the apertured piston to the other, a bolt head projecting from the pivoted lever, a pivoted catch mounted on the outer casing to engage behind the bolt head when the control mechanism has been moved to lock the mechanism in the operative position and an inclined surface on the periphery of the sliding piston engaged by one end of the pivoted catch whereby the other end is moved out of engagement with the pivoted lever when the sliding piston reaches the end of its travel.

7. A device for locking the control mechanism of a machine in an operative position and releasing it therefrom only at the end of a predetermined period of time as in claim 5 in which a cap is screwed on to the upper end of the outer casing to enclose the needle valve control spindle.

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