May 30, 1944. E. DAVIS 2,350,153

PRESSING MACHINE MECHANISM AND LOCKING MEANS

Filed May 3, 1941 3 Sheets-Sheet 1

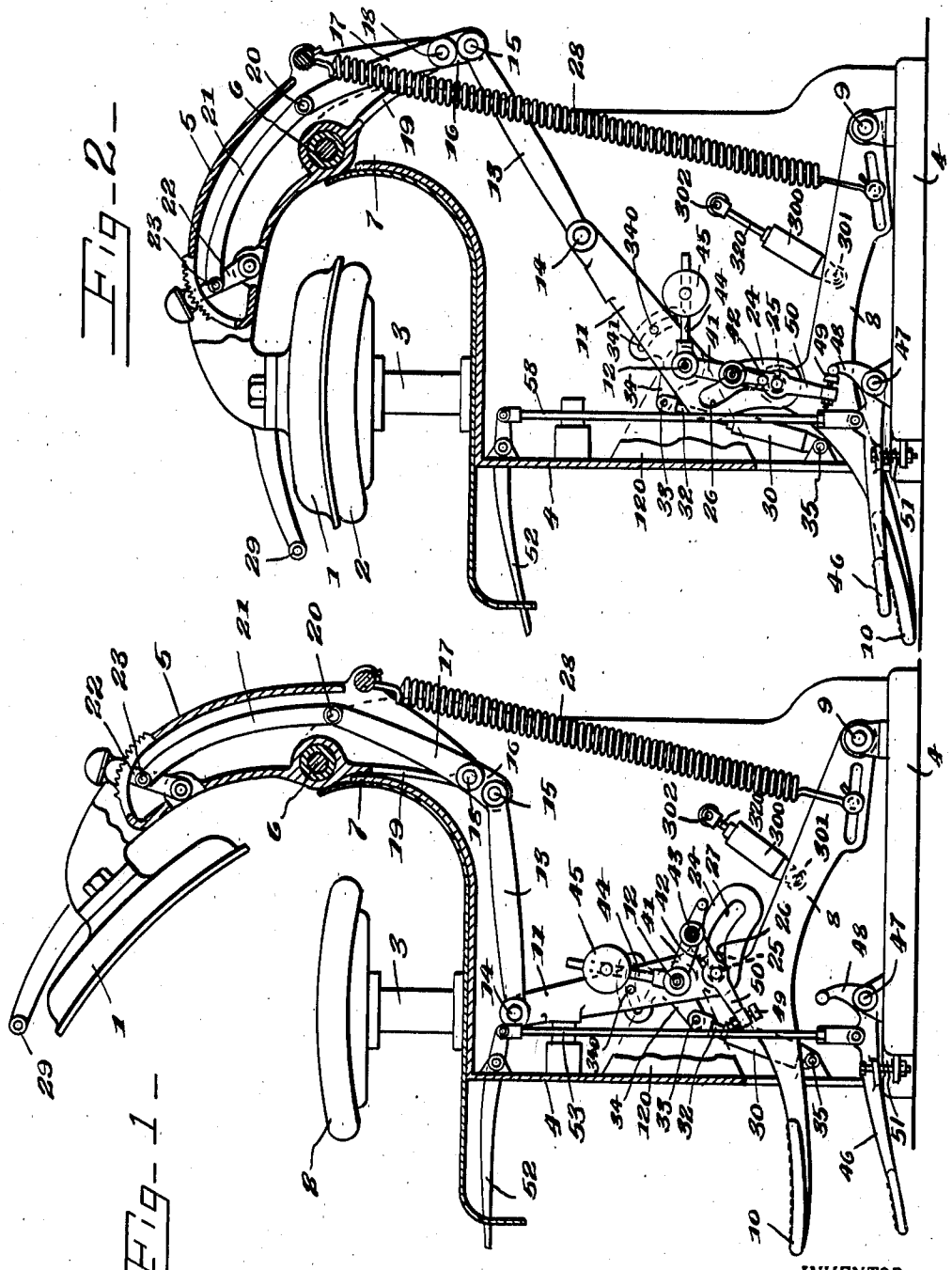


Fig. 2.

Fig. 1.

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Fig. 3.

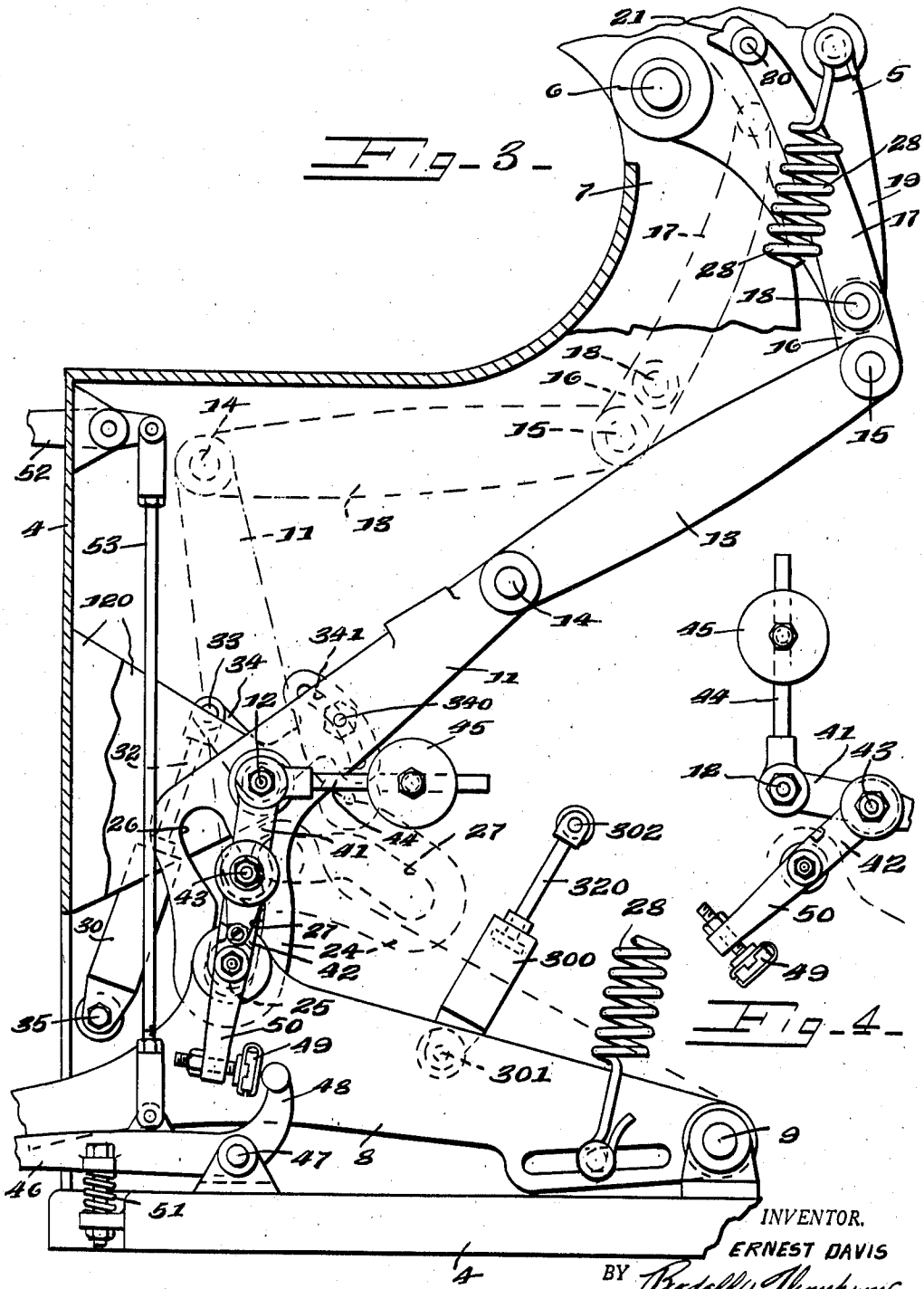


Fig. 4.

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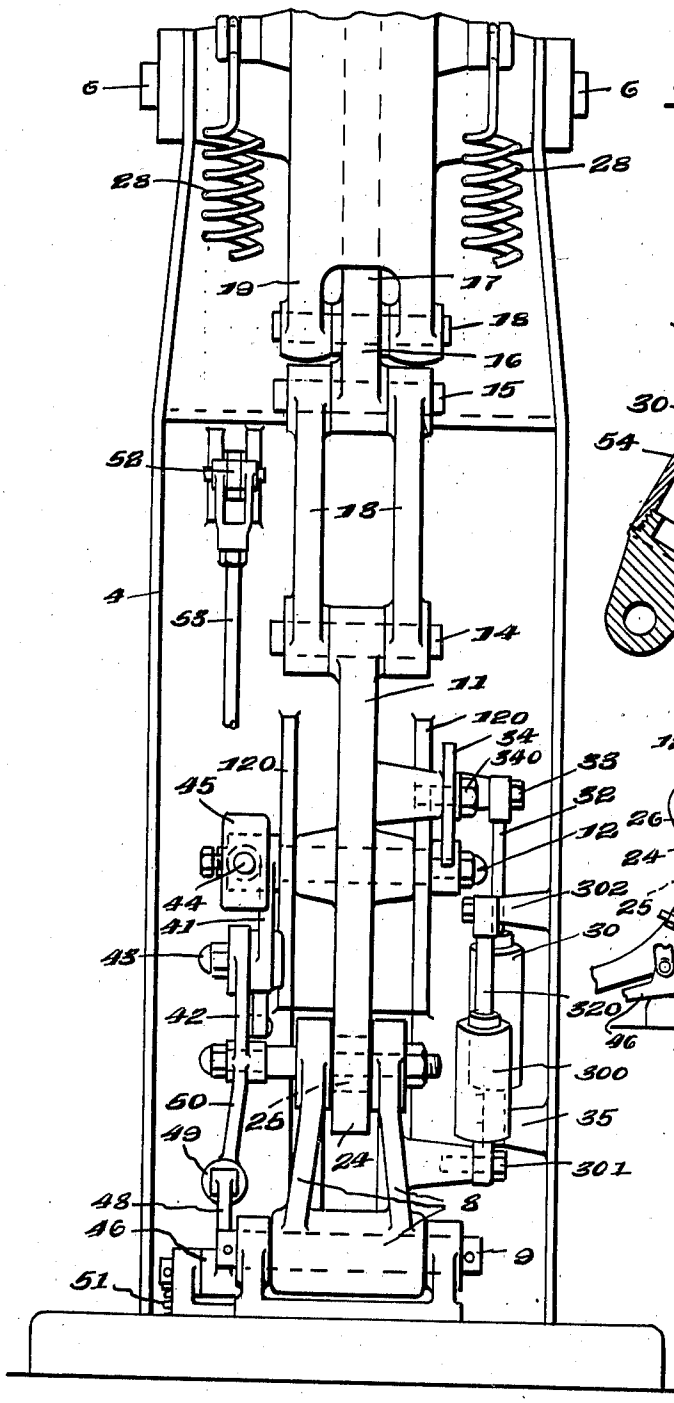


Fig-5-

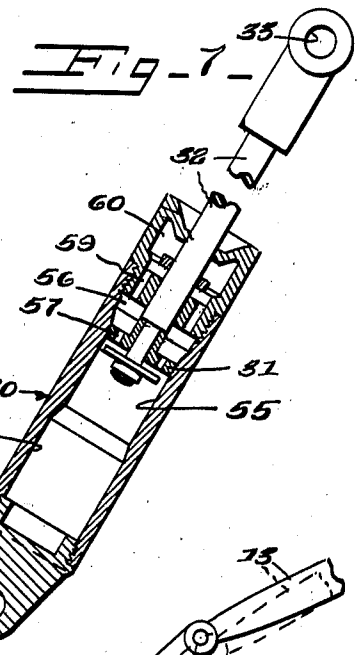


Fig-7-

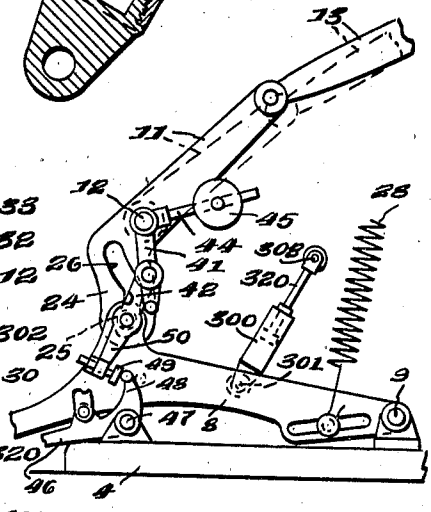


Fig-6-

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UNITED STATES PATENT OFFICE

2,350,153

PRESSING MACHINE MECHANISM AND LOCKING MEANS

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Application May 3, 1941, Serial No. 391,776

6 Claims. (Cl. 38—36)

This invention relates to machines having an opening and closing movement, as garment and laundry pressing machines, and has for its object means for locking the machine closed, which locking means is operated into a final operating position by an inert or momentum member set in motion by the closing movement of the machine or press, and more specifically a locking means including a toggle which is moved toward a straight or dead center line passing through the pivotal points of the toggle, by the closing movement of the machine or press and into or beyond the dead center of the toggle under the action of the momentum member.

It further has for its object a press actuating mechanism and also the embodying of the lock in the actuating mechanism or between two relatively movable parts thereof.

The invention consists in the novel features and in the combinations and constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawings in which like characters designate corresponding parts in all the views.

Figures 1 and 2 are side elevations, partly in section, of a pressing machine embodying this invention, showing the press in open and closed positions respectively.

Figure 3 is an enlarged fragmentary elevation showing the locking means and the contiguous portions of parts of the actuating mechanism when the lock is in locking position and the press closed.

Figure 4 is a fragmentary enlarged detail view of the locking means showing the same in its normal or unlocked position, when the press is open.

Figure 5 is an enlarged rear elevation looking to the left in Figure 3.

Figure 6 is a fragmentary view illustrating the relative position of the locking toggle when the press has been closed to preliminarily closed position, or into a position where the head is close to the lower pressing element or buck just prior to the press going under final pressure and prior to the straightening of the toggle by the momentum member.

Figure 7 is an enlarged longitudinal sectional view through one of the hydraulic shock absorbers or dash pots.

The invention is here illustrated as embodied in a garment or laundry press, which is foot operated, although it may be embodied in any machine having an opening and closing movement. The machine may be of any suitable form, size and construction. It includes an upper pressing element or head 1 movable toward and from a lower pressing element or buck 2 suitably mounted on a bracket 3 on the frame 4 of the machine. The head 1 is carried at the front end of a yoke lever 5 pivoted between its ends at 6 to a standard 7 rising from the frame in the rear of the buck 2, the pivot 6 being located near the level of the pressing face of the buck 2.

The actuating mechanism here shown includes a forwardly and rearwardly, horizontally extending lever 8 pivoted at its rear end at 9 to the base of the frame on a transverse horizontal axis, so that the front end of the lever moves vertically, and motion transmitting mechanism between the foot lever 8 and the yoke lever 5. This lever 8 is, in the illustrated embodiment of the invention, a pedal lever and is provided with a foot plate 10 at its front end. The motion transmitting means includes an upwardly extending lever 11 pivoted at 12 between its ends to brackets or webs 120 on the frame, and cooperates at its lower end through a follower and slot connection with the lever 8, a link 13 pivoted at one end at 14 to the upper end of the lever 11 and at its other end at 15 to the short arm 16 of a lever 17 pivoted at 18 to the rear arm 19 of the lever 5. The long arm of the lever 17 is pivoted at 20 to a link 21 which is anchored at its front end to the yoke lever 5 through an adjusting lever 22 pivoted thereto at 23. The long arm of the lever 17 and the link 21 are curved to conform to the curvature of the yoke lever 5, this yoke lever being hollow and the lever 17 and link 21 being located therein. Normally, the lever 17 and link 21 act as a unit rigid with the yoke lever 5. The adjusting lever 22 is held in any adjusted position by a suitable rack and pawl mechanism. It is shiftable on its pivot to vary the radial angle of the short arm 16 of the lever 17 to adjust the pressure to compensate for settling of the compressible resilient padding on the lower pressing element.

The slot and follower connection between the link or lever 11 and the foot lever 8, as here shown, comprises a slot formed in a rearwardly extending angular arm 24 at the lower end of the link or lever 11 and extending rearwardly therefrom in which works the follower 25 on the lever 8. The slot is arranged in a general horizontal position when the press is open and shifts to an upright position, as the press closes. The slot includes a portion 26 which is horizontal, when the press is open, as seen in Figure 1, and a portion 27 inclined slightly out of the horizontal, the follower being arranged, when the press is open, in the horizontal portion. When the press closes, as the lever 11 shifts about its axis 12, the slot moves into a generally upright position, as seen in Figures 2, 3 and 6. The closing movement of the press is against the action of suitable countersprings 28, which are also connected to the lever 8 to return it to starting position.

The press is intended to be preliminarily closed

by hand, and for this purpose, the head 1 is provided with a handle 29, although the press may be closed preliminarily by depressing the lever 10 when the follower 25 is in the horizontal portion 26 of the slot, as seen in Figure 1, because of the friction between the follower and the wall of the slot, when the pedal is being depressed and the follower moving in a forward and downward extending arc about the axis 9. During the closing of the press, the upper arm of the lever 11 swings rearwardly about the axis 12 from the position shown in Figure 1 toward that shown in Figure 2, moving the slot in the arm 24 into an upright position, and when the follower moves into the portion 27 of the slot and the follower, due to the pivotal movement of the lever 8, presses against the front wall of the slot, the lever 11 and link 13 is caused to move into the position shown in Figure 2.

The closing of the press to a position wherein the head 1 is close to the buck 2 is therefore through a quick acting high leverage ratio through the lever 11 until the lever 11 and link 13 move from folded position (Figure 1) toward straightened position (Figure 2) and then through a reduction leverage while the follower 25 of the pedal lever is moving down the portion 27 of the cam slot and the lever 11 and link 13 are moving farther toward a straight line. The pivotal movement of the lever is controlled by shock absorbers which govern and smooth the closing and opening movements. The shock absorbers here illustrated are of the dash pot or cylinder and piston type.

30 designates the cylinder of the dash pot; 31 the piston therein, the rod 32 of which is pivoted at 33 to an angular arm 34 rigid with the lever 11 and radial with the axis of the lever. The cylinder 30 is pivoted at 35 to the frame to have an oscillating movement. The angular arm 34 is adjustable to vary the relative radial angle thereof. It is here shown as one arm of a bell crank lever pivoted at its angle on the axis 12 and lying alongside the lever 11 and secured thereto in any one of a plurality of angular positions by a bolt 340 passing through an arcuate slot 341 into the lever 11. A similar shock absorber is connected to the lever 8.

As seen in Figure 5, there are two parallel links 13 or the link 13 is double, as is also the foot lever 8 which is double or bifurcated and the lever 11 mounted between the bifurcations of the link 13 and the lever 8.

The locking means for locking the press in final closed position and operated into final locking position by an inert or momentum member, comprises toggle links 41, 42 pivoted at like ends together at 43 and at their other ends to the lever or link 11 and to the lever 8 respectively, they being here shown as pivoted concentric with the pivotal axis 12 of the lever 11 and with the axis of the follower 25 respectively. The inert or weighted member 44 consists of an arm rigid with one of the links, as the link 41, and here illustrated as forming a bell crank lever therewith and a weight 45 adjustable along the arm. The toggle consisting of the links 41 and 42 is in folded position when the press is open, as seen in Figures 1 and 4. When the press is moved to preliminarily closed position, either by pulling down on the handle 29 or pressing down on the foot plate 10 of the lever 8, the inert member 44 is started in motion, swinging rearwardly about the pivot 12 and by the time the press reaches finally closed position, which is the position shown in Figures 2 and 3, the weight continues under its momentum to move the toggle links 41 and 42 from the position shown in Figure 5, wherein they are short of the dead center line passing through the points 12, 43 and 25, into a position in which the joint 43 of the toggle is in or beyond in a forward direction such dead center line. The joint at 43 is a stop joint functioning as a knuckle joint. It is understood that the final closing movement by means of the pedal 10 is a continuation without pause of the preliminary closing movement of the handle 29 or the foot lever 8. The press is thus locked closed by the straightened toggle.

To open the press, operator-operated means is employed to start the folding of the toggle out of dead center line, so that the press will open under the influence of counter springs 28. This release mechanism is shown as a pedal 46 pivoted at 47 to the base of the frame and having an upwardly extending arm 48 which coacts with an adjustable head 49 on an arm 50 forming a continuation beyond the pivotal point 25 of the link 42 of the toggle. The movement of the foot lever 46 is against the action of a returning spring 51. The foot pedal 46 may also be actuated by a hand lever 52 connected to the lever 46 by a link 53. When the press is to be opened, either the pedal 46 is depressed, this being usually referred to as the kick-off pedal, or the hand lever 52 may be operated to initiate the folding of the toggle links 41, 42 toward the position shown in Figure 1 from the position shown in Figures 2 and 3. The opening shock is cushioned and smoothed by the shock absorber or dash pot 30 and a similar dash pot, the cylinder 300 of which is pivoted at 301 to the lever 8 to have an oscillating movement and the piston rod 320 of which is pivoted at 302 to the frame. These dash pots are substantially alike in construction and are shown in Figure 7, one acting on the motion transmitting mechanism and the other on the actuator lever 8. In the form shown in Figure 7, the cylinder is formed with an enlarged portion of its bore 54 at its lower end, a narrower central portion 55 and a widening upper portion 56. The piston is formed with passages 57 therethrough from either side to the other and the head 58 of the cylinder is also formed with passages 59 into and out of chamber 60 in the head. The arrangement is such that during the closing movement of the press, while the piston is moving upwardly from the lower end of the cylinder 30, there is a minimum resistance and after the head is started in motion or its static inertia overcome, there is a greater resistance due to the piston passing through the narrow central portion 55 of the bore of the cylinder, until the head reaches preliminarily closed position close to the buck, when the piston passes into the wider upper portion 56 of the cylinder while the head is going under final pressure. During the opening movement of the press, when the release pedal is operated, the piston momentarily has a relatively free movement, although not an entirely free movement, as there is always hydraulic or oil resistance, and then the opening movement and rebound is checked or smoothed until the parts approach fully open position.

The construction of the shock absorber per se forms no part of this invention.

The lower pressing element 2 usually has applied thereto a compression spring padding. This gradually settles during the use of the machine and a pressure adjustment is desirable. This is

accomplished by shifting the pressure adjusting lever **22** to change the initial radial angle of the lever arm **16**.

What I claim is:

1. In a machine having an opening and closing movement, and means operable to close the machine including operator controlled actuating mechanism and motion transmitting mechanism operable thereby, said mechanisms including elements connected directly together, the combination of means for locking the machine closed including a lock member movable with and relatively to the motion transmitting element, an inert member coacting with the lock member to set it in motion upon movement of the motion transmitting element by the actuating element, and a part actuated by the lock member, said part coacting with the element of the actuating mechanism to hold the actuating and the motion transmitting mechanisms in operated position, whereby the locking mechanism is free of transmitting motion and the transmission of motion is confined to the motion transmitting mechanism.

2. In a machine having an opening and closing movement, and means operable to close the machine including actuating mechanism and motion transmitting mechanism operable thereby, said mechanisms including elements connected directly together, the combination of means for locking the machine closed including a lever pivoted to and movable on its pivot relatively to the motion transmitting element and having an arm provided with a weight and a link pivoted to the lever and to the actuating element, the lever and the link forming a normally folded toggle when the machine is open, which toggle is movable toward straight position by the movement of the motion transmitting mechanism by the actuating mechanism and moved to finally straightened locking position under the momentum of the weighted lever, whereby the toggle is free of transmitting motion to close the press and the transmission of motion is confined to the motion transmitting mechanism.

3. In a machine having an opening and closing movement, means operable to close the same including a forwardly and horizontally extending, vertically movable, actuator lever pivoted near its rear end, motion transmitting means operated thereby including an upright lever pivoted between its ends having a cam slot in its lower end, the upright lever being located toward the front end of the actuator lever at an angle thereto, the actuator lever having a follower movable in the slot, the slot extending in a general horizontal direction and movable into a vertical position as the upright lever swings about its pivot during closing of the machine, locking means including an inert member carried by the upright lever and set in motion by the swinging movement thereof and movable relatively thereto, and means operable under the momentum of the inert member relatively to the upright lever to lock the machine in final closed position.

4. In a machine having an opening and closing movement, means operable to close the same including a forwardly and horizontally extending, vertically movable, actuator lever pivoted near its rear end, motion transmitting means operated thereby including an upright lever pivoted between its ends having a cam slot in its lower end, the upright lever being located toward the front end of the actuator lever at an angle thereof, the actuator lever having a follower movable in the slot, the slot extending in a general horizontal direction and movable into a vertical position as the upright lever swings about its pivot during closing of the machine, locking means including toggle links pivoted at their like ends respectively to the actuator lever and to the upright lever and at their other ends being pivoted together, an inert member rigid with the toggle link pivoted to the upright lever and set in motion by the swinging movement of the upright lever to finally straighten the toggle when the machine finally closes, and means operable to initiate the folding of the toggle from straightened position.

5. In a machine having an opening and closing movement including a frame, cooperating pressing elements, one of which is movable toward and from the other, actuating mechanism for the movable element including an actuator, motion transmitting mechanism between the actuator and the movable pressing element operable to quickly close the press from open to nearly closed position through a high ratio leverage upon small movement of the actuator, and to close the press under final pressure through a reduction leverage upon comparatively great movement of the actuator, and means in addition to, independent of and co-operating with, the motion transmitting mechanism, for locking the press closed including an inert member set in motion by the movement of the motion transmitting mechanism during the quick closing of the press from open to nearly closed position, the locking means having an idling movement relatively to the actuating and the motion transmitting mechanisms, under the momentum of the inert member.

6. In a machine having an opening and closing movement including a frame, cooperating pressing elements, one of which is movable toward and from the other, operator controlled actuating mechanism for the movable element including an actuator, motion transmitting mechanism between the actuator and the movable pressing element having a long high leverage movement to close the press from open to nearly closed position upon small movement of the actuator, and a reduction leverage movement to close the press under final pressure upon comparatively great movement of the actuator, means for locking the press closed including toggle links pivoted together at adjacent ends and at their remote ends respectively to one of the motion transmitting parts and to the actuator and arranged to have an idling movement relative to said one of the motion transmitting parts and the actuator, said links being normally arranged in folded position and movable toward a straight line position, as the press closes from open to nearly closed position, and an inert member set in motion by the closing of the press from open position and also having an idling movement relatively to said one of the motion transmitting parts and the actuator, said inert member coacting with the toggle to straighten the same into a locking straight line position when the press closes under the reduction leverage action of the motion transmitting mechanism.

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