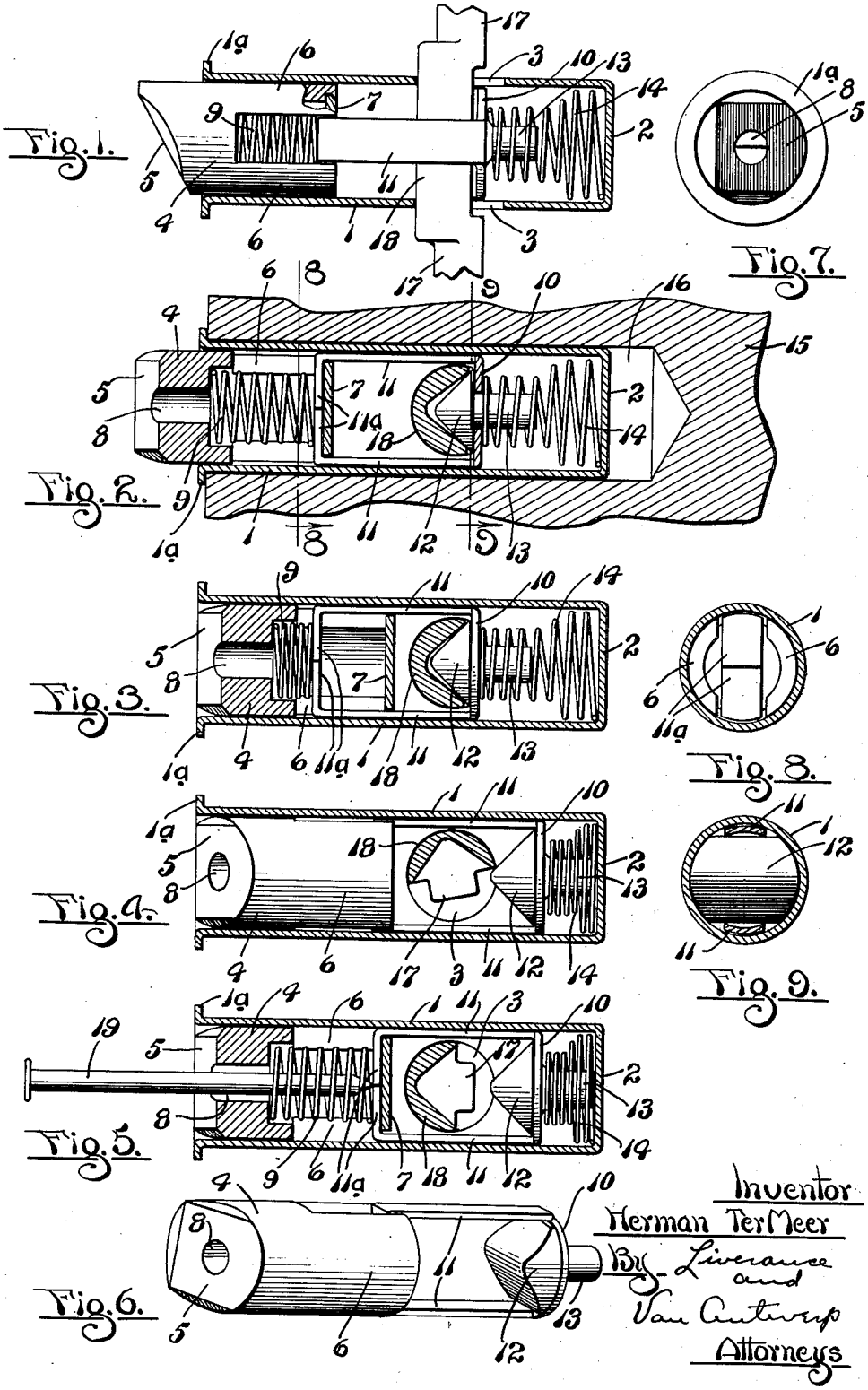
Aug. 16, 1932. H. TER MEER 1,871,633

SPRING BOLT LATCH

Filed Aug. 10, 1931



Inventor
Herman TerMeer
By Livernance and Van Antwerp
Attorneys

Patented Aug. 16, 1932 1,871,633

UNITED STATES PATENT OFFICE

HERMAN TER MEER, OF GRAND RAPIDS, MICHIGAN, ASSIGNOR TO NATIONAL BRASS COMPANY, OF GRAND RAPIDS, MICHIGAN, A CORPORATION OF MICHIGAN

SPRING BOLT LATCH

Application filed August 10, 1931. Serial No. 556,083.

This invention relates to latches and more particularly to latches of the spring bolt type which automatically retract when a door is closed and engage with a keeper plate on the door frame and which may be manually retracted by turning a door knob or handle to open the door.

The present invention is concerned with a very practical, economically constructed and serviceable latch in which the immediate engaging portion of the latch bolt is movable with respect to another part thereof and is normally spring operated so as to project a distance beyond its housing for engagement with a retaining keeper plate on a door frame, whereby the main spring of the latch construction is not compressed on closing a door but only on the manual operation of the latch to open the door, thereby decreasing resistance imparted by the latch in closing the door, and cutting in half the number of compressions to which the main spring of the latch construction is subjected, thereby adding to the life of the latch which is rendered useless on any failure of said spring.

It is an object and purpose of the present invention to provide a latch construction having the advantages enumerated, which is of a relatively simple and compact construction and in which the parts when assembled are held together by the manually operated latch retracting bar which passes through the door and latch, and at the ends of which door knobs or handles are attached for manual operation. Other objects and purposes than those stated will be apparent upon understanding the invention had from the following description, taken in connection with accompanying drawing, in which,

Fig. 1 is a fragmentary horizontal section and plan view of the latch construction, the section being through the latch housing.

Fig. 2 is a fragmentary vertical section taken through the latch construction and through the adjacent part of a door on which it is mounted.

Fig. 3 is a view similar to Fig. 2 of the latch construction alone showing the projecting end thereof retracting into the housing as occurs when a door, on which the latch is mounted, is closed.

Fig. 4 is a fragmentary section and side elevation illustrating the manner in which the latch bolt is retracted manually on opening the door.

Fig. 5 is a vertical section similar to that shown in Fig. 3 wherein the latch bolt is retracted by means of an implement inserted longitudinally through the outer portion thereof to force the bolt inwardly for passing the operating bar therethrough and assembling the parts.

Fig. 6 is a perspective view of the latch bolt assembly.

Fig. 7 is an end elevation of the latch locking at the projecting end of the latch bolt, and

Figs. 8 and 9 are transverse sections through the latch construction, substantially on the planes of lines 8—8 and 9—9 of Fig. 2, looking in the direction indicated by the arrows.

Like reference characters refer to like parts in the different figures of the drawing.

In the construction of the door latch, a housing or shell 1 of cylindrical form is made of thin metal, the inner end being closed by an end 2, and the outer end having an outturned annular lip or flange 1*a*. In opposed sides of the housing 1 circular openings 3 are made in horizontal alinement, as shown.

The latch bolt construction includes an outer member 4 of cylindrical form, the outer end of which is cut to provide a beveled face 5, while the inner portion of the member 4 is bored outwardly for a distance and the opening closed at the inner end by a disc 7 which is secured in place by spinning the metal over its edges. The latch bolt member 4 likewise is provided with a small axial opening 8 therethrough leading from its outer end to and joining with the larger longitudinal opening, in which last opening a coiled spring 9 is seated. This spring is of relatively light force and compresses readily with little resistance.

The latch bolt is completed by a stirrup member of sheet meal having a disc 10 at its

inner end, from which spaced apart upper and lower legs 11 are bent at right angles, the same extending to the openings between the sides or legs 6 of the bolt member 4 and being bent inwardly at right angles, as indicated at 11*a*, to engage against the outer side of the disc 7, with the inner end of the coiled spring 9 bearing against said inwardly bent portions 11*a* of the legs 11.

At the outer side of the disc 10 a head 12, having upper and lower sides substantially at right angles to each other and each at an angle of 45° to the horizontal, is located and secured and has a stem 13 extending therefrom through said disc 10 toward the closed end 2 of the latch housing. A heavier coiled compression spring 14 surrounds the stem 13 at one end portion and the other end bears against the closed end 2 of the housing as shown. The spring preferably is of large coils at its inner end and smaller coils where it surrounds the stem 13.

The latch is designed to be mounted on a door 15 by boring a cylindrical hole 16 therein horizontally at the free edge of the door of a size such that the housing is readily insertible therein until the flange 1*a* comes against the edge of the door. Other holes are bored transversely through the door so as to come into conjunction with the circular openings 3 in opposite sides of the housing 1. An operating member comprises preferably a square rod 17 the intermediate portion of which is formed into a trough 18 having angular faces at one side adapted to bear against the angular faces of the head 12, as in Fig. 2, while its opposite face is of semi-cylindrical form.

The latch is attached to the door by inserting the housing 1 in the opening 16 after which the spring 14 is placed within the housing and then the latch bolt assembly, shown in Fig. 6, inserted in the open end of the housing until disc 10 comes against the smaller end of the spring 14. In order to insert the operating member transversely through the door and housing a rod or nail, preferably, indicated at 19 in Fig. 5, is inserted through the opening 8 and through the spring 9 to engage against one or the other or both of the terminal ends 11*a* of legs 11. Pressure is placed upon the outer end of the part 19 to compress the spring 14 and move the entire latch bolt inwardly bringing the head 12 back of the openings 3 in the housing whereupon the operating member may be readily inserted through the door and latch, and upon withdrawing the member 19 head 12 will seat in the trough of the intermediate portion 18.

After the assembly and installation the parts of the latch will occupy the position shown in Fig. 2. It is of course to be understood that the square outer portions 17 of the operating member may be equipped with door knobs or suitable handles for manually turning the same.

With a latch thus constructed and installed on a door, on closing the door the beveled end 5 of the projecting member 4 of the latch bolt rides upon the usual keeper plate secured at the inner side of the door frame, spring 9 is compressed and the outer member 4 of the latch bolt forced inwardly to the position shown in Fig. 3, without compressing spring 14 or without any movement of the operating member or the stirrup portion consisting of the parts 10, 11, 12 and 13 of the latch bolt. This is permitted because the strength of the spring 9, even when compressed as in Fig. 3, is not sufficient to overcome and compress the spring 14. The door accordingly closes very easily and gently and much more so than if the heavier or main spring 14 had to be compressed.

To open the door and retract the latch bolt the operating member 17 is rocked about its axis, turning the intermediate engaging portion 18 to the position shown in Fig. 4. If the operating member is rocked in a clockwise direction, the upper part of the member 18 riding upon the upper inclined surface of the head 12 retracts the entire bolt with a compression of the spring 14 until the free end of the stem 13 engages against the end 2 of the latch housing, and stops any undesired too far turning of the operating member. It is of course evident that the operating member may be turned in either direction and that the same retraction of the bolt will take place. When the bolt is rocked in the opposite or in a counterclockwise direction the lower part of the intermediate section 18 engages against the lower inclined side of the head 12 but the retraction of the bolt occurs exactly the same in extent and otherwise as when rocked in clockwise direction as in Fig. 4.

The construction is one of a very economical character, is sure in its operation, is more durable by reason of the less number of flexings and compression of the spring 14, which occurs only in opening a door. The door is more easily and gently closed and with a less rubbing and bearing of the beveled end 5 of the bolt member 4 against its keeper plate. The invention is defined in the appended claims and is to be considered comprehensive of all forms of structure coming within their scope.

I claim:

1. A latch comprising, a housing closed at one end and open at the other, a coiled spring located within the housing against its closed end, a latch bolt located within the housing formed of two parts longitudinally extensible with respect to each other, a second coiled spring between said parts of the latch bolt normally extending the same, the outer of said parts of the latch bolt having a longi-

tudinal passage therethrough whereby an implement may be passed through the passage to engage with the inner part of the latch bolt to actuate the same and move it inwardly against the first mentioned spring.

2. In a latch construction, a housing closed at one end and open at the other, a coiled spring in said housing seated at one end against the closed end thereof, a latch bolt member having an inner end bearing against the other end of the coiled spring and two spaced apart arms extending therefrom for a distance and then turned toward each other, a second latch bolt member comprising a body longitudinally slotted at its inner end portion, a disc across the inner end of said second bolt member in front of which the inturned ends of said arms are positioned, and a coiled spring of less strength than the first mentioned spring interposed between the second latch bolt member and the first part thereof tending to extend said parts of the bolt longitudinally.

3. A construction containing the elements in combination defined in claim 2, the second member of the latch bolt having an axial opening therethrough through which an implement may be passed and also through the second coiled spring to engage with the first member of the latch bolt, for the purposes described.

4. In a construction of the class described, a housing closed at one end and open at the other, a coiled spring having one end bearing against the closed end of the housing, a bolt member formed of sheet metal including a disc bearing against the opposite end of the spring and having spaced apart arms extending from opposite edges of the disc longitudinally of the housing for a distance and then turned inwardly toward each other at their free ends, a second bolt member having a longitudinal slot cut therein from its inner end a distance toward its outer end, a member secured at the inner end of the second bolt member across said slot back of the inturned ends of said arms, and a coiled spring mounted in said second bolt member engaged at one end thereagainst and at the other end against the inturned ends of said arms.

5. A construction containing the elements in combination defined in claim 4, said second bolt member having an axial opening through the same whereby an implement may be passed longitudinally therethrough and through the second coiled spring to engage against the inturned ends of said arms to thereby move the entire bolt construction inwardly, as specified.

6. A latch bolt comprising, an inner member of sheet metal and including a disc at its inner end, diametrically opposed arms extending from said disc in parallel relation to each other and having free end portions inturned at right angles from the arms toward each other, a second bolt member having the inner portion thereof slotted across its axis and axially bored from its inner end outward for a distance, the inturned end portions of said arms extending into said slots, a member extending across the inner end of said second bolt member back of said inturned ends of the arms, and a coiled spring of light strength located in the opening bored in said second bolt member bearing at its outer end against the second bolt member and at its inner end against the inturned ends of said arms.

7. A construction containing the elements in combination defined in claim 6, said second bolt member having an axial opening extending from its outer end to the spring receiving opening bored therein, said axial opening being of less diameter than the spring receiving opening.

In testimony whereof I affix my signature.

HERMAN TER MEER.