(No Model.) 2 Sheets—Sheet 1.

I. J. GRAY.

LATCH.

No. 508,541. Patented Nov. 14, 1893.

Fig. 1.

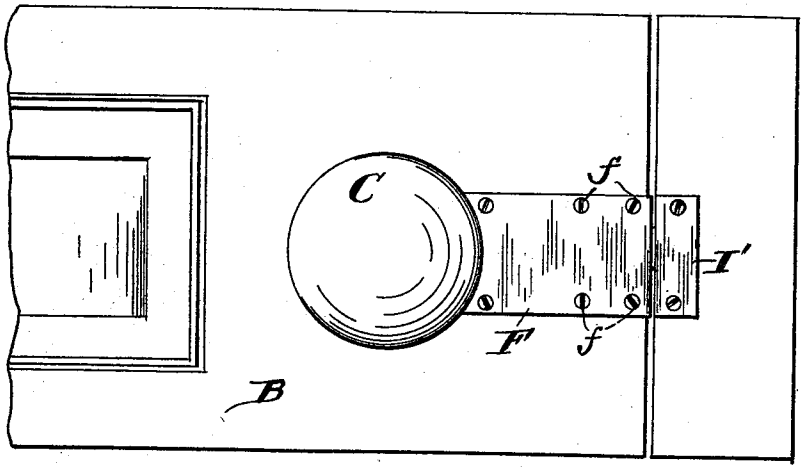


Fig. 2.

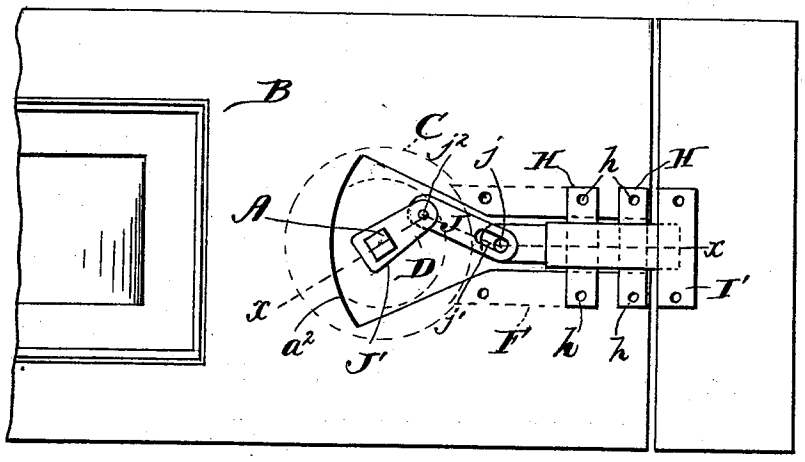
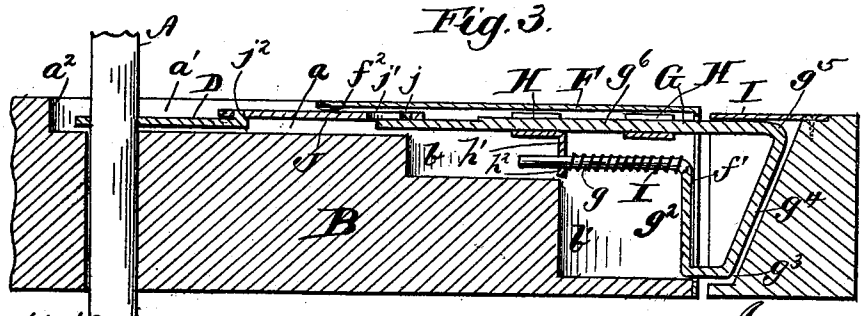


Fig. 3.



Witnesses:
H. B. Boulter
C. G. Northrup

Inventor:
Isaac J. Gray,
by his attorney Wm. E. Boulter.

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

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Fig. 4.

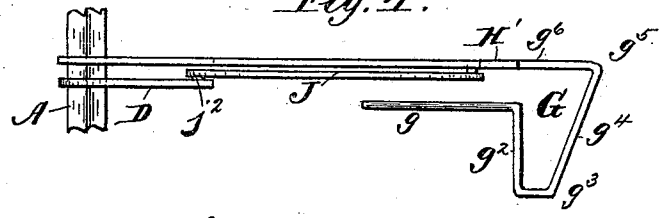


Fig. 5.

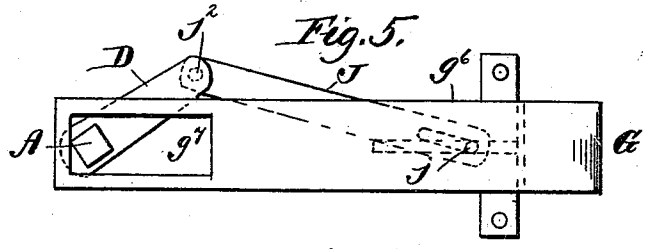


Fig. 7.

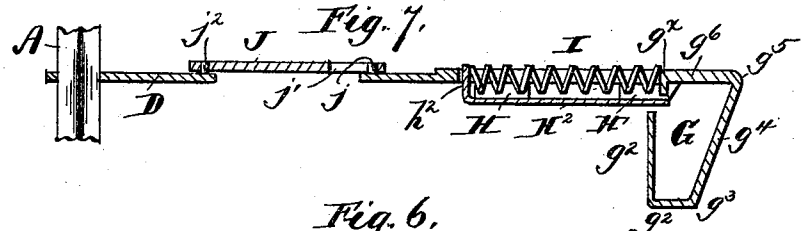


Fig. 6.

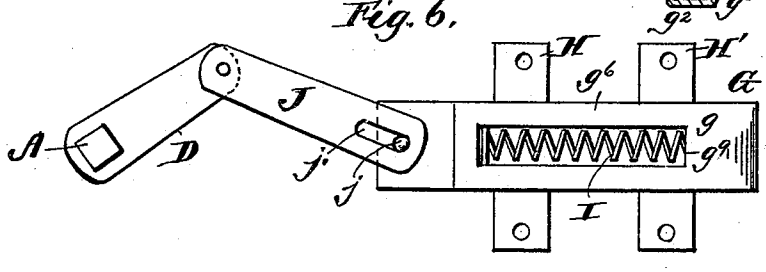
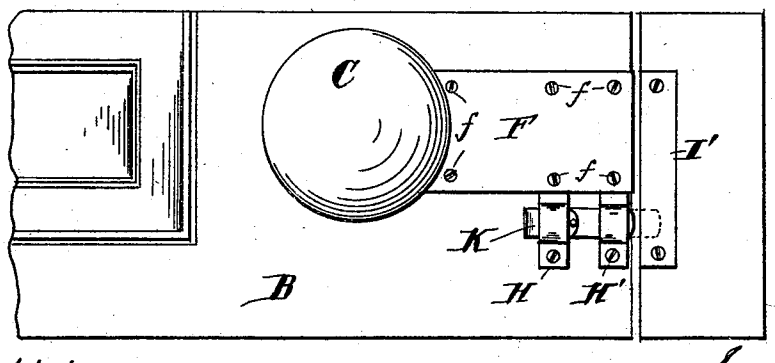


Fig. 8.



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Inventor
Isaac J. Gray.
by his attorney Wm. S. Boulter.

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ISAAC J. GRAY, OF BELOIT, KANSAS.

LATCH.

SPECIFICATION forming part of Letters Patent No. 508,541, dated November 14, 1893.

Application filed November 14, 1892. Serial No. 451,956. (No model.)

To all whom it may concern:

Be it known that I, ISAAC J. GRAY, a citizen of the United States, residing at Beloit, in the county of Mitchell and State of Kansas, have invented certain new and useful Improvements in Latches for Doors; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has relation to certain new and useful improvements in latches for doors, and among the objects sought to be attained are to provide a combined rim and mortise latch adapted for quick and easy attachment to a door, without necessitating undue mortising of said door which tends to weaken the same; also, to provide a combined rim and mortise latch which is extremely simple in construction, very light in weight yet possessing great strength, requiring but few parts, and which is comparatively inexpensive to manufacture; also, to provide an improved construction of latch-bolt for use in connection with my latch, whereby the said bolt will be enabled to engage the usual keeper on the door frame without requiring any violent exertion or slamming of the door to effect said engagement as is ordinarily the case with the usual style of latch-bolt; also, to provide a latch-bolt which is not liable to catch in and injure the clothing of a person as is often the case with the usual bolt; also, to so reduce the cost of manufacture of the latch and bolt as to permit of the placing of the knob-spindle some distance from the edge of the door without materially increasing the cost of the device, and with the above and other objects in view. The invention consists in the construction, arrangement and combination of parts, all as hereinafter fully described, illustrated in the accompanying drawings, and pointed out in the claims.

In the drawings:—Figure 1 is an elevation of a portion of a door and door-frame showing my improved latch in position. Fig. 2 is an elevation showing the knob and escutcheon and covering plate removed to show the relative position of the parts of the latch. Fig. 3 is a vertical section on an enlarged scale on the line x—x of Fig. 2. Figs. 4 and 5 are a side view and plan view respectively of a slightly modified construction of latch-bolt and showing its connection with the knob-spindle. Fig. 6 is a side view showing still another modified construction of latch-bolt. Fig. 7 is a vertical section of Fig. 6. Fig. 8 is an elevation similar to Fig. 1, showing the keeper and guides for the latch-bolt extended to allow of a key-operated bolt being applied to the latch.

Referring to the drawings, and more particularly to Figs. 1, 2, and 3, A indicates an ordinary knob-spindle which passes through the door B, and is provided at each end with a knob C.

In one face of the door I provide a mortise or recess a, which receives in the portion a' thereof a crank arm D secured to the knob-spindle, and is adapted to permit said arm to rock or partly turn therein when said spindle is turned in the operation of unlatching the door, the rear wall a^2 of said mortise serving to limit the movement of the arm D in either direction. The door is also provided with deeper recessed portions $b\,b'$ which are of sufficient depth and length to receive the latch-bolt presently described and permit of its reciprocating movements.

F indicates a plate which partly covers the recess a, and is removably secured by screws f, to the door. Said plate F at one end is bent at right angles which bent portion may be secured by screws to the edge of the door and said portion is provided with a slot or opening f' through which the latch-bolt projects and is adapted to reciprocate. The plate F may if desired be inserted in a shallow recess f^2 in the face of the door so as to be flush therewith when in position and thus offer no obstacle to the ready cleaning of the door.

G indicates my improved latch-bolt and in constructing the same I make it entirely of metal and bend (or otherwise) the same to the proper shape. This latch-bolt is, as shown, provided with the rounded portion g, which toward the forward end of the bolt is broadened into a flat portion g' which is bent to form the angular portion g^2, the rounded nose g^3, the bearing portion g^4, the rounded nose g^5, and the horizontal portion g^6 parallel to the portion g, and somewhat longer than the latter. In providing the bearing portion g^4, I make the same of considerable length as compared with the bearing face of the ordinary latch-

bolt, said portion being of such length as to extend the entire thickness of the door or nearly so. Furthermore I give to said portion an inclination with respect to the portion g^6 whereby the angle formed between said portions g^4 g^6 will approach a right angle. This is an important feature in the construction of the latch-bolt since by the described incline given to the bearing portion g^4 the usual friction between the keeper and the bearing face of the bolt when the door is closed is avoided or at least reduced to a minimum, and the closing and latching of the door can be effected very easily without requiring violent effort or slamming of the same to effect the desired object.

By constructing the latch-bolt of one piece of metal and in the shape described the same will be very light in weight and yet possessing sufficient strength for ordinary uses. This construction also is very inexpensive and I may give the portion g^6 any desired length to permit the placing of the knob spindle at some distance from the edge of the door to avoid injury to the fingers during the closing of the door, and without materially increasing the cost of the latch.

The latch-bolt is held in place and guided in its movements by two guides H H′ which are secured intermediate the plate F and the door by means of the securing screws f, which pass through openings h, in said guides. The guide H is provided with the vertically bent portion h' having an opening h^2 through which passes the rounded portion g of the latch-bolt, and by means of a coiled spring I placed around said portion g and bearing at its ends against the portion h' and portion g^2 of the bolt, the latter is normally pressed outwardly to cause it to engage beneath the keeper I′.

Integral with the portion g^6 of the latch-bolt at its inner end is a pin or stud j, projecting upwardly, which pin or stud rides in a slot j' formed in one end of an arm J whose opposite end is perforated to receive a pin or stud j^2 formed on the outer end of the crank-arm D secured rigidly to the knob-spindle. By this construction it will be seen that when a knob is turned the crank-arm D will be turned partially, causing the latch-bolt to be drawn inwardly out of engagement with the keeper I′, and when the knob is released the coiled spring causes the latch-bolt to be again projected to engage the keeper.

By reason of the slot j' in arm J, the door may be closed without necessitating a partial turning of the knob and avoiding any injury to the parts, which would result were there no slot in arm J but merely a perforation for the pin j. Should the latter construction exist and the arm J should get in the same longitudinal plane as the latch-bolt it will be seen that if it is attempted to close the door a breakage or bending of the parts of the device would occur unless the knob is turned. If desired the slot j' may be formed in the latch-bolt and the pin j, provided on the arm J to attain the desired result.

In Figs. 4 and 5 I show a slightly modified construction of latch-bolt, more especially adapted for cupboard doors where a short latch is desirable. In this construction the rear end of the portion g^6 of the latch is provided with a slot g^7 through which is adapted to loosely pass the knob-spindle, and said portion g^6 is also provided intermediate its ends with the downwardly-projecting stud or pin j, which rides in a slot j' in the arm J, which latter, owing to the position of the pin j is somewhat longer than the arm J hereinbefore described. The opposite end of the arm J is perforated to receive the pin on the crank arm D attached to the knob-spindle. The principle of construction and operation of the form of latch is similar to that first described.

In Figs. 6 and 7 I show still another modified construction of latch-bolt. In this construction the guides H H′ are secured rigidly to each other by the connecting strip H^2 and the guide H has the upwardly-bent end h^2 against which bears one end of the coiled spring which is located in a slot g^9 formed in the portion g^6 of the latch-bolt and the opposite end of said spring bears against the downwardly-bent lip $g^\times$ of the latch-bolt, the rounded portion g, being here dispensed with.

If it be desired to employ a key-operated bolt in connection with any of the before-described latches I extend the guides and the keeper as shown in Fig. 8 and employ the sliding bolt K adapted to be guided by said guides, and to engage the keeper, and said bolt K may be operated by a key in the usual manner through the medium of any preferred means, or, said bolt K may be used as a thumb-bolt without a key if desired.

Having now described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination with a knob spindle, of a latch bolt constructed to form the horizontal portion g, the vertical portion g^2, inclined bearing portion g^4, and horizontal portion g^6, a pin or stud on the latter portion, an arm provided with a slot at one end in which said pin or stud is slidingly mounted, a crank arm secured at one end to the knob spindle and pivotally connected at its opposite end to the aforesaid arm, a guide for guiding the latch bolt in its reciprocating movements, and a coiled spring encircling the portion g of the latch bolt and bearing against the guide and portion g^2, for the purpose specified.

2. The combination with a door, and a knob spindle working therein, of a latch bolt constructed to form the horizontal portion g, the vertical portion g^2, inclined portion g^4, and horizontal portion g^6, a pin or stud on the latter portion, an arm provided with a slot in which said pin or stud is slidingly mounted, a crank arm secured at one end to the knob spindle and pivotally connected at its opposite

end to the aforesaid arm, guides secured to the door and in which the latch bolt is adapted to slide, one of said guides having a depending bent portion, as described, and a coiled spring encircling the portion g of the latch bolt and bearing against the said bent portion of the guide and the portion g^2, for the purpose specified.

3. As an improved article of manufacture, the herein described latch bolt consisting of the horizontally-arranged portion g, the portion g^3 arranged vertically with relation to the portion g, and extending below the plane of the latter, the broadened bearing portion g^4 arranged at an incline and extending above the plane of portion g, and the broadened portion g^6 arranged horizontally above and parallel to the said portion g, said latch-bolt being provided with a rounded nose g^5 at the junction of the portions g^4 and g^6, as and for the purpose specified.

In testimony whereof I affix my signature in presence of two witnesses.

ISAAC J. GRAY.

Witnesses:
A. D. MOON,
M. S. ATWOOD.