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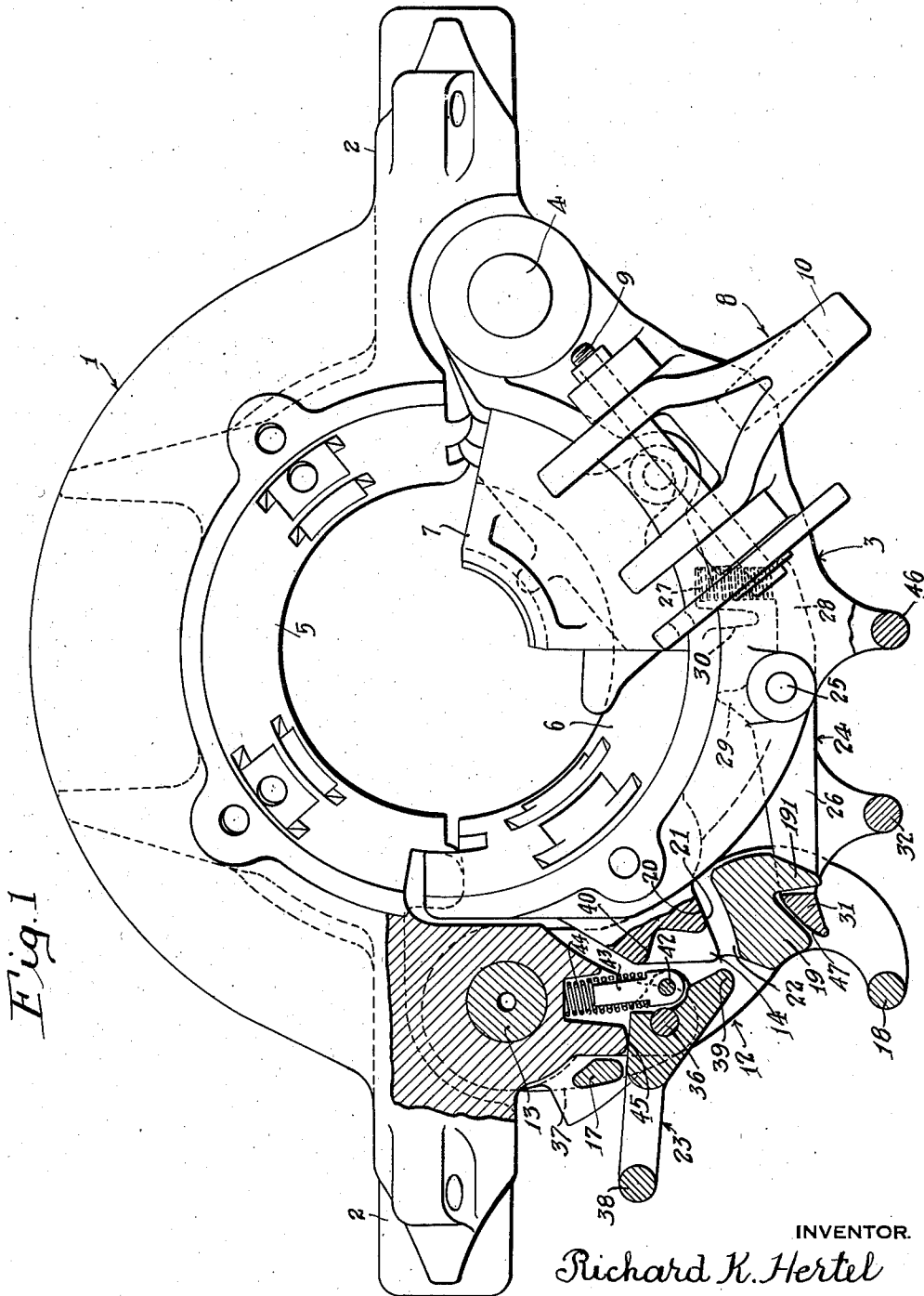
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ELEVATOR LATCH

Filed May 9, 1936

2 Sheets-Sheet 1



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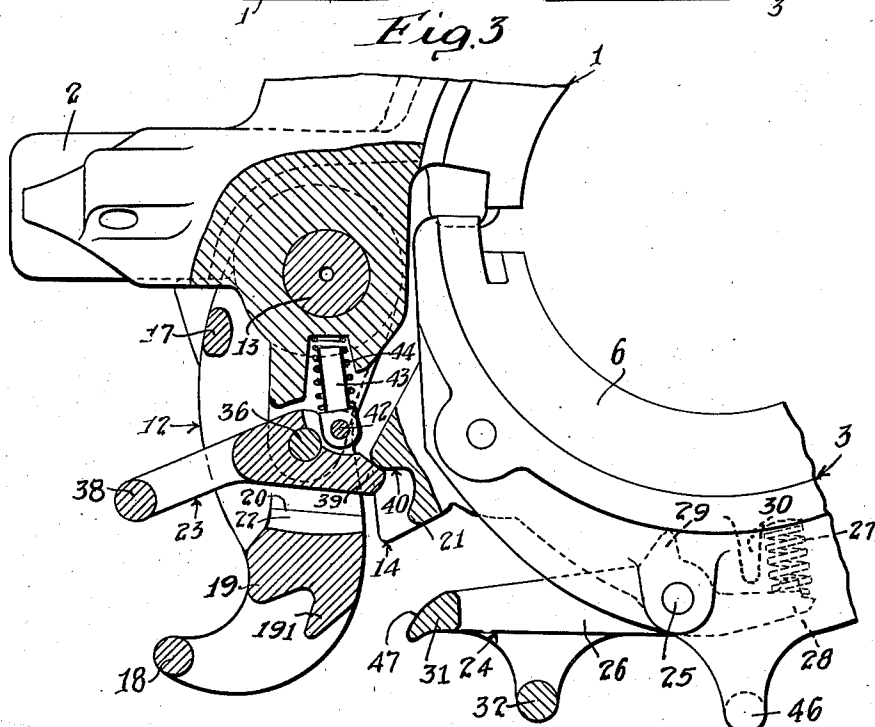
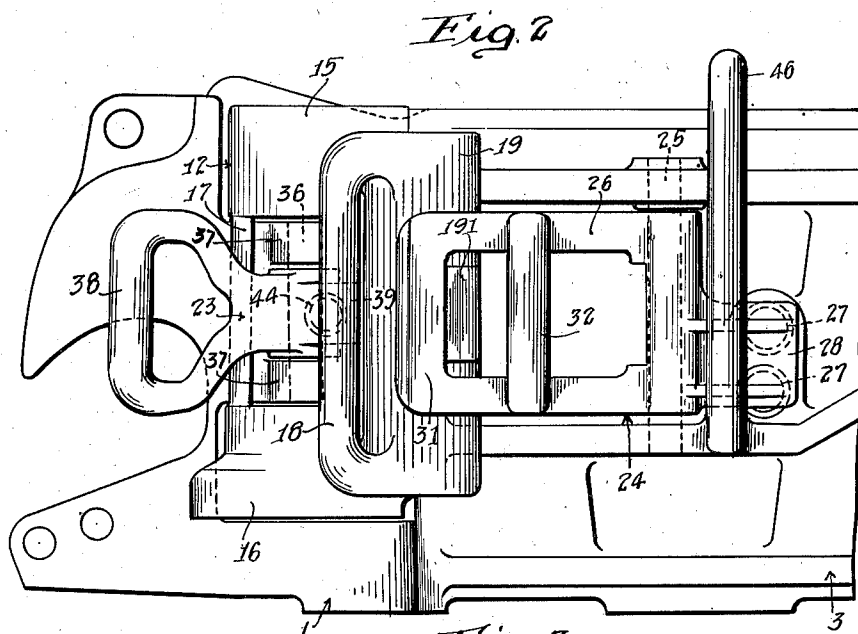
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ELEVATOR LATCH

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5 Claims. (Cl. 294—90)

This invention relates to elevators for support-
ing pipe, casing or the like while it is being raised
or lowered in a well and more particularly to slip
type elevators employing wedge-shaped slips for
gripping the pipe.

An object of the invention is to provide an
improved latch for an elevator, which latch is
simple and relatively inexpensive to make while
at the same time being convenient to operate and
safe in use.

In slip type elevators the weight of the pipe
acting upon the slips produces powerful radial
forces tending to open the elevator and these
forces must be opposed by the latch. The latter
therefore must be positively locked against dis-
engagement or release while a pipe is being sup-
ported and must be capable of withstanding great
strains.

Heretofore rather complicated latch mecha-
nisms have often been resorted to for slip ele-
vators in order to satisfy the safety requirements.
However, it is also an important requirement of
an elevator latch that it be possible to quickly
and positively operate it, and as a rule compli-
cated latch structures do not satisfy this require-
ment.

In accordance with the present invention, I
have devised a relatively simple latch construc-
tion which is rugged, safe and easily operated.
It will now be explained in detail with reference
to the accompanying drawings.

In the drawings:

Fig. 1 is a plan view of an elevator incorpo-
rating a latch in accordance with the invention,
that portion of the elevator involving the latch
being shown in section;

Fig. 2 is a front elevation of a portion of the
elevator shown in Fig. 1 to better illustrate some
features of the latch construction; and

Fig. 3 is a detail plan view of a portion of the
elevator showing the latch structure, the view
being similar to Fig. 1 but showing the latch
and elevator in partially opened positions.

Referring first to Fig. 1, the elevator therein
depicted is of the side door type comprising a
body member 1 having a pair of lugs or trunnions
2 thereon adapted to be engaged by links for sup-
porting the elevator, and a door 3 hinged to the
body 1 by a hinge pin 4. The body member 1
and the door 3 constitute jaws adapted to be
closed about a pipe. The inside surfaces 5 and 6
of the jaws are substantially conical in shape,
tapering inwardly and downwardly and serve as
seats to support wedge-shaped slips 7, only one
of which is shown in Fig. 1. However, in the

particular model shown there would be four slips
altogether, two on the body 1 and two on the
gate 3. A slip setting lever 8, which is pivotally
mounted by means of a pin 9 on the top of the
door 3, is provided for setting the slips. Thus
the bifurcated inner end of the lever 8 is posi-
tioned above one of the slips 7, as shown in Fig. 1,
so that if the handle 10 of the lever 8 is pulled
outwardly the slip is forced downwardly on its
tapered seat, causing it to move inwardly on a
pipe positioned within the elevator. All of the
slips are linked together so that they move up
and down in unison. However, the specific ar-
rangement and mounting of the slips is of no
interest in connection with the present invention
and for that reason will not be described in detail.

As previously indicated, the door 3 is hingedly
attached at one end to one end of the body mem-
ber 1 by the hinge pin 4. When the door is in
closed position it is adapted to be locked in closed
position by a latch 12 which is pivotally mounted
on the end of the body member 1 opposite the
door hinge pin 4 by a latch pin 13 so that it is
free to swing in a horizontal plane. This latch
12 cooperates with a lug or shoulder 14 on the
door 3.

As shown to best advantage in Fig. 2, the latch
12 comprises upper and lower arms 15 and 16,
respectively, which engage the hinge pin 13 ad-
jacent opposite ends of the latter. The hinge
pin in turn engages a hinge lug on the body mem-
ber 1, which lug is positioned intermediate the
latch arms 15 and 16. The latch arms are rein-
forced and maintained in proper spaced relation
adjacent the hinge end thereof by a strut 17 and
are joined at their outer ends by a handle por-
tion 18 and a lug engaging portion 19. This lug
engaging portion 19 is provided with a face 20
which is approximately normal to a radius drawn
from the axis of the pin 13 and engages a face
21 on the lug or shoulder 14 when in closed posi-
tion, the latch being shown in closed position in
Fig. 1. It is to be understood, however, that the
surfaces 20 and 21, instead of being substantially
flat as shown in the drawings, may be slightly
curved so that they are substantially concentric
with respect to the axis of the pin 13. A portion
of the latch face 20 is cut away to form a slot
22 to permit the latch to clear a door-closing lever
23 when the latch is swung open.

To retain the latch 12 in the closed position
shown in Fig. 1, a latch locking lever 24 is pro-
vided, this lever being pivotally mounted by a
pin 25 on the door 3 so that it swings in a hori-
zontal plane. The long end 26 of the latch lock-

ing lever 24 is normally urged inwardly toward the door by a helical compression spring 27 which is interposed between the short end 28 of the lever and the adjacent surface of the door.

To restrict the arc of movement of the locking member 24, a finger 29 is provided thereon, which finger is adapted to contact the surface of the door when the end 26 is moved a predetermined distance toward the door and a finger 30 is provided on the door 3 adapted to contact the short end 28 of lever 24 when that end is moved inwardly a predetermined distance. As shown to best advantage in Fig. 2, the long arm 26 of lever 24 is bifurcated and the outer ends of the two portions thereof are joined by a bar 31 and a handle 32. The bar 31, as clearly shown in Fig. 1, is adapted to engage a lug 191 on the latch 12 when the latter is in closed position and thereby retain the latch in closed position.

Elevators of the type described are often made in relatively large sizes to handle pipe and casing of large diameter. As a result, the parts are relatively heavy and sometimes offer considerable resistance to manual manipulation. Thus it is sometimes difficult to fully close the door 3 of the elevator about a pipe. To facilitate closing the door, a door-closing lever 23 (previously mentioned) is provided, this lever being pivotally mounted by a pin 36 between the bifurcated end of an extension 37 on the body member 1, this extension extending between the upper and lower portions 15 and 16, respectively, of the latch 12. The outer end of the lever 23 is provided with a handle 38 and the inner end 39, which is the short end, is adapted to engage a shoulder 40 on the door 3 (Fig. 3) so that by pulling on the handle 38 the end 39 may be brought to bear against the shoulder 40 and force the door into fully closed position. To limit travel of the lever 23 the latter has pivotally secured thereto as by a pin 42 a finger 43, the end of which is adapted to bear against the adjacent portion of the body member 1 when the lever is swung through a predetermined distance. A helical compression spring 44 surrounds the finger 43 and constantly urges the lever 23 into the retracted position shown in Fig. 1. The limit of movement in this direction of the lever 23 is fixed by a shoulder 45 on the body member which bears against the lever.

The mechanism described is operated as follows: Referring first to Fig. 3, assume that the elevator has been positioned about a pipe to be lifted and the door 3 is to be closed. Closing movement of the door is ordinarily effected by grasping the latch handle 18 in the left hand and grasping a door handle 46 (which is secured directly to the door 3) in the right hand and swinging the door shut. In some instances the door will readily move into fully closed position, under which conditions it is locked in closed position immediately by moving the latch 12 toward the door 3 until its face 20 engages the face 21 on the lug 14 of the door. Final closing movement of the latch 12 causes the lug 191 to bear against the curved surface 47 of the latch locking bar 31 and deflect the latter outwardly sufficient to permit the lug 191 to move therepast, after which the locking lever 24 is again urged into closed position (as shown in Fig. 1) by the spring 27 to engage the lug 191 on the latch 12 and hold the latter positively in closed or locked position.

However, in some instances it is difficult, if not impossible, to fully close the elevator door

by applying closing force directly to the door handle 46. Under these conditions the operator, having failed to fully close the door by pulling the handles 46 and 18 toward each other, releases the latch handle 18 and grasps the handle 38 on the lever 23 and pulls forwardly on the latter. This causes the inner end 39 of the lever to engage against the face 40 on the door and forces the latter into fully closed position, whereupon the operator releases the handle 38 and grasps the latch handle 18, pushing the latch into closed position, the latch lock 24 snapping over the lug 191 as previously described to maintain the latch in closed position.

When the elevator is to be removed from a pipe, the latch is first released by pulling out on the handle 32 to disengage the latch locking bar 31 from the latch lug 191. Thereafter the latch handle 18 is grasped and pulled outwardly and disengages the latch from the lug 14, after which the door handle 46 is grasped and pulled outwardly to swing the door open.

Various modifications can be made in the particular latch structure described without departing from the invention and the particular construction described is merely illustrative. The invention is therefore to be limited only to the extent set forth in the appended claims.

I claim:

1. An elevator comprising pivotally connected jaws, a main latch member pivotally supported on one of said jaws, a lug on the other jaw adapted to be engaged by said main latch member when the jaws are closed and said latch is swung against the said other jaw, a shoulder on said latch, an auxiliary latch pivotally supported on the said other jaw and adapted to engage said shoulder on said main latch when said jaws are closed and said main latch engaged, lever means pivotally supported on said one jaw for movement about an axis parallel to the axis of movement of said main latch, one end of said lever extending outwardly from said jaw and terminating in a handle, an auxiliary shoulder on said other jaw, the other end of said lever being positioned to engage said auxiliary shoulder when said jaws are almost but not quite closed, whereby said jaws can be urged toward fully closed position by pulling the handle of said lever.

2. An elevator as described in claim 1 with spring means for normally maintaining said lever in retracted position out of engagement with said auxiliary shoulder.

3. An elevator comprising pivotally connected jaws, one of said jaws having a hinge lug on the free end thereof, a main latch member comprising a pair of separated arm members positioned above and below said hinge lug on said one jaw and pivotally connected thereto by a pin extending through the said arms and lug, the outer end of said arms being rigidly connected with a latching bar, a lug on the other jaw adapted to be engaged by said main latch bar when the jaws are closed and said latch is swung against the said other jaw, auxiliary latch means pivotally supported on the said other jaw, and a shoulder on said main latch adapted to be engaged by said auxiliary latch when said jaws are closed and said main latch is in closed position, said hinge lug on said one jaw extending beyond the hinge pin connecting it to said latch member between said latch arms, and lever means pivotally supported on said lug intermediate said latch arms for movement about an axis parallel to the axis

of movement of said latch, one end of said lever extending outwardly from said jaws and terminating in a handle, and an auxiliary shoulder on said other jaw, the other end of said lever being positioned to engage said auxiliary shoulder when said jaws are almost but not quite closed, whereby the jaws can be urged toward fully closed position by pulling the handle of said lever.

4. An elevator comprising pivotally connected jaws, a main latch member pivotally supported on one of said jaws, a lug on the other jaw adapted to be engaged by said main latch member when the jaws are closed and said latch is swung against the said other jaw, said latch member and lug having cooperating contact faces substantially normal to a radius extended thereto from the axis of said latch member, when the jaws are in closed position, a shoulder on said main latch member, and an auxiliary latch pivotally supported on the said other jaw adapted to engage said shoulder on said main latch when said jaws are closed and said main latch is engaged with said lug.

5. An elevator comprising pivotally connected

jaws, a main latch comprising a single rigid latch member pivotally supported on one of said jaws, a lug on the other jaw adapted to be engaged by said rigid latch member when the jaws are closed and said latch is swung against the said other jaw, said latch member and lug having cooperating contact faces substantially normal to a radius extended thereto from the axis of said latch member when the jaws are in closed position, a shoulder on said rigid latch member, an auxiliary latch pivotally supported on the said other jaw adapted to engage said shoulder on said rigid latch member when said jaws are closed and said main latch is engaged with said lug, and spring means for urging said auxiliary latch into locking position, said auxiliary latch and main latch having cooperating tapering contact surfaces thereon whereby said auxiliary latch is automatically opened against the tension of said spring in response to closing movement of said main latch and is thereafter closed by said spring in response to completion of closing movement of said main latch.

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