

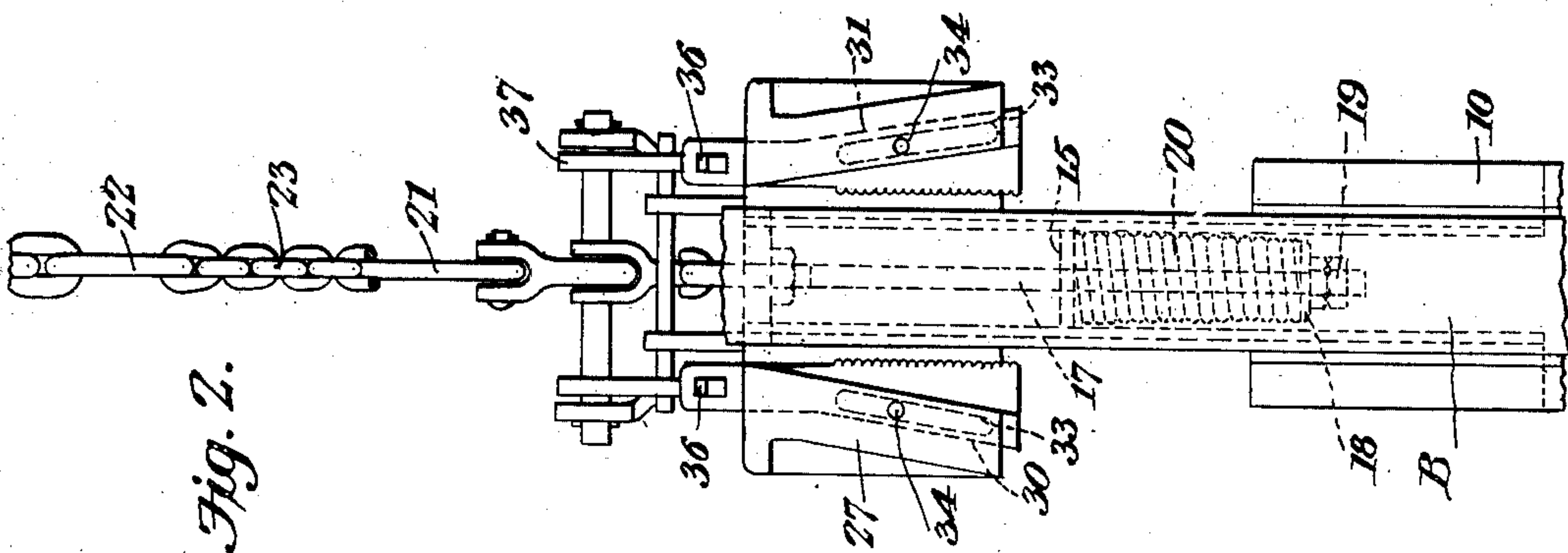
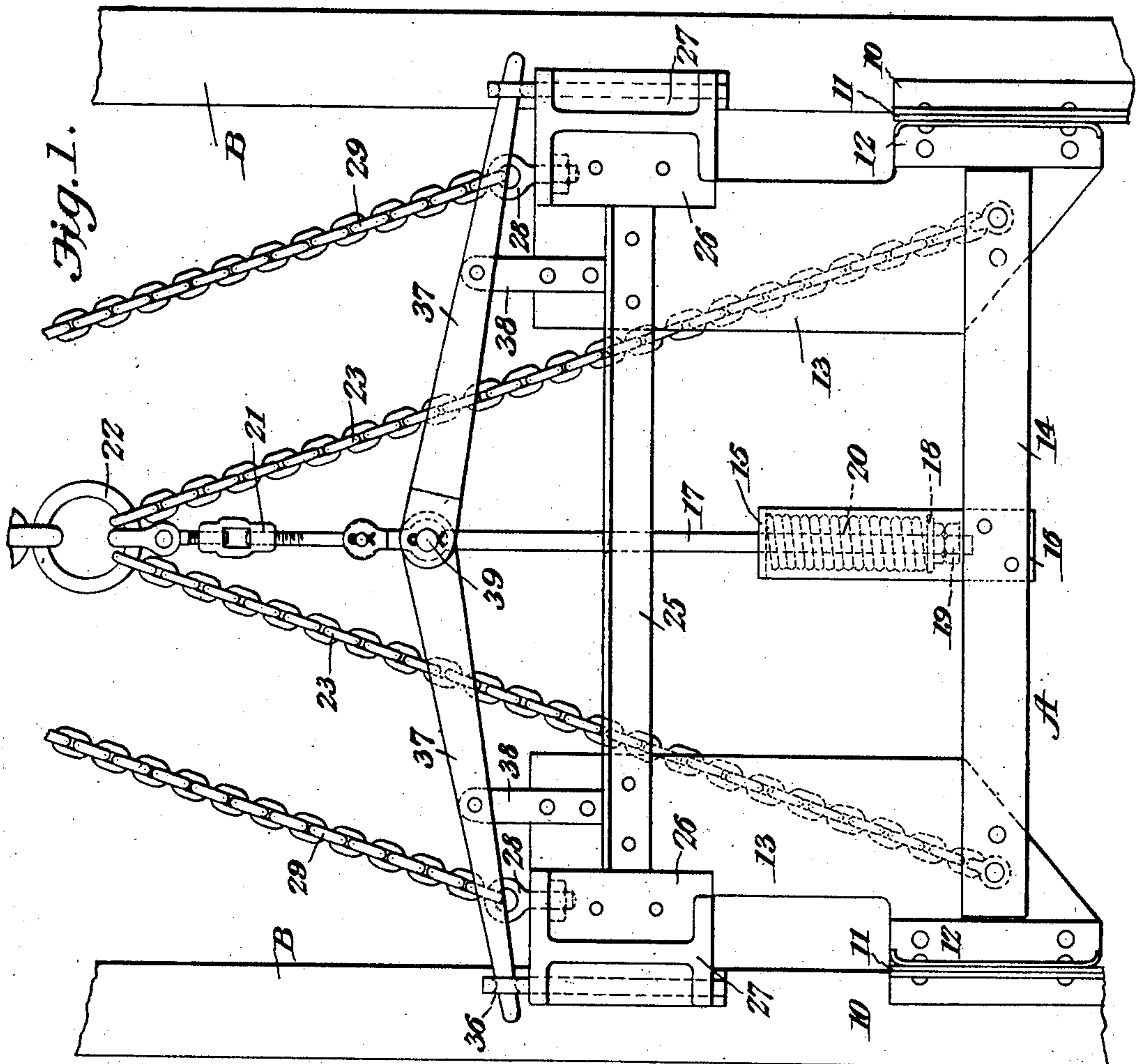
No. 826,586.

PATENTED JULY 24, 1906.

D. F. LEPLEY.  
SAFETY DEVICE FOR ELEVATORS.

APPLICATION FILED APR. 3, 1906.

2 SHEETS—SHEET 1.



WITNESSES:

*E. J. Stewart*  
*John C. Parker*

Daniel F. Lepley INVENTOR

By *Chas. Snow & Co.*  
ATTORNEYS

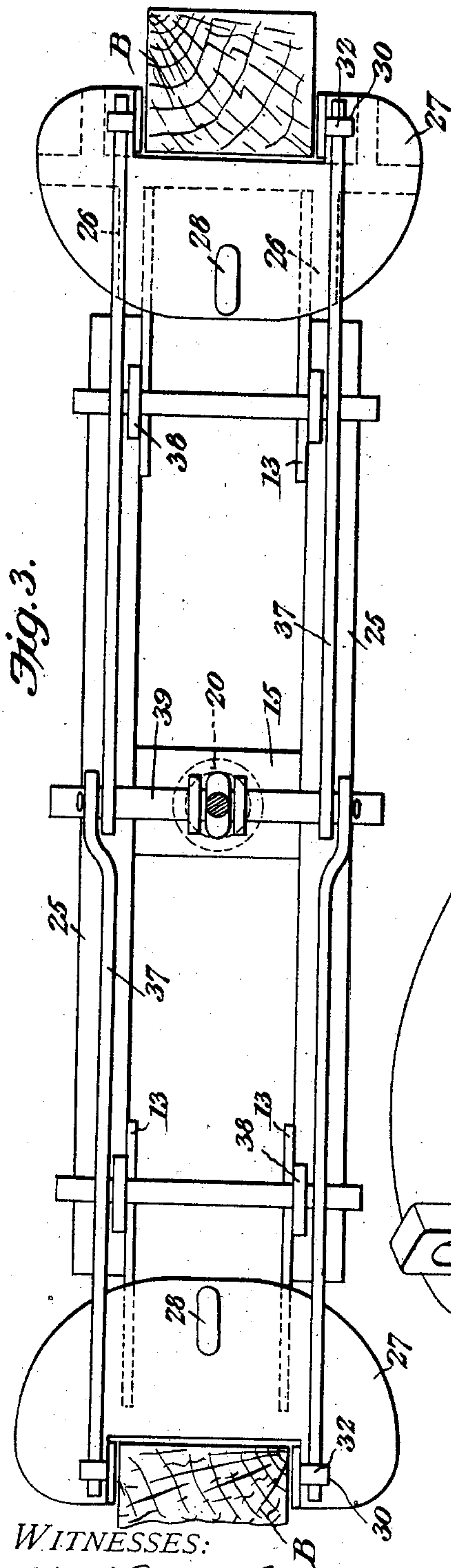
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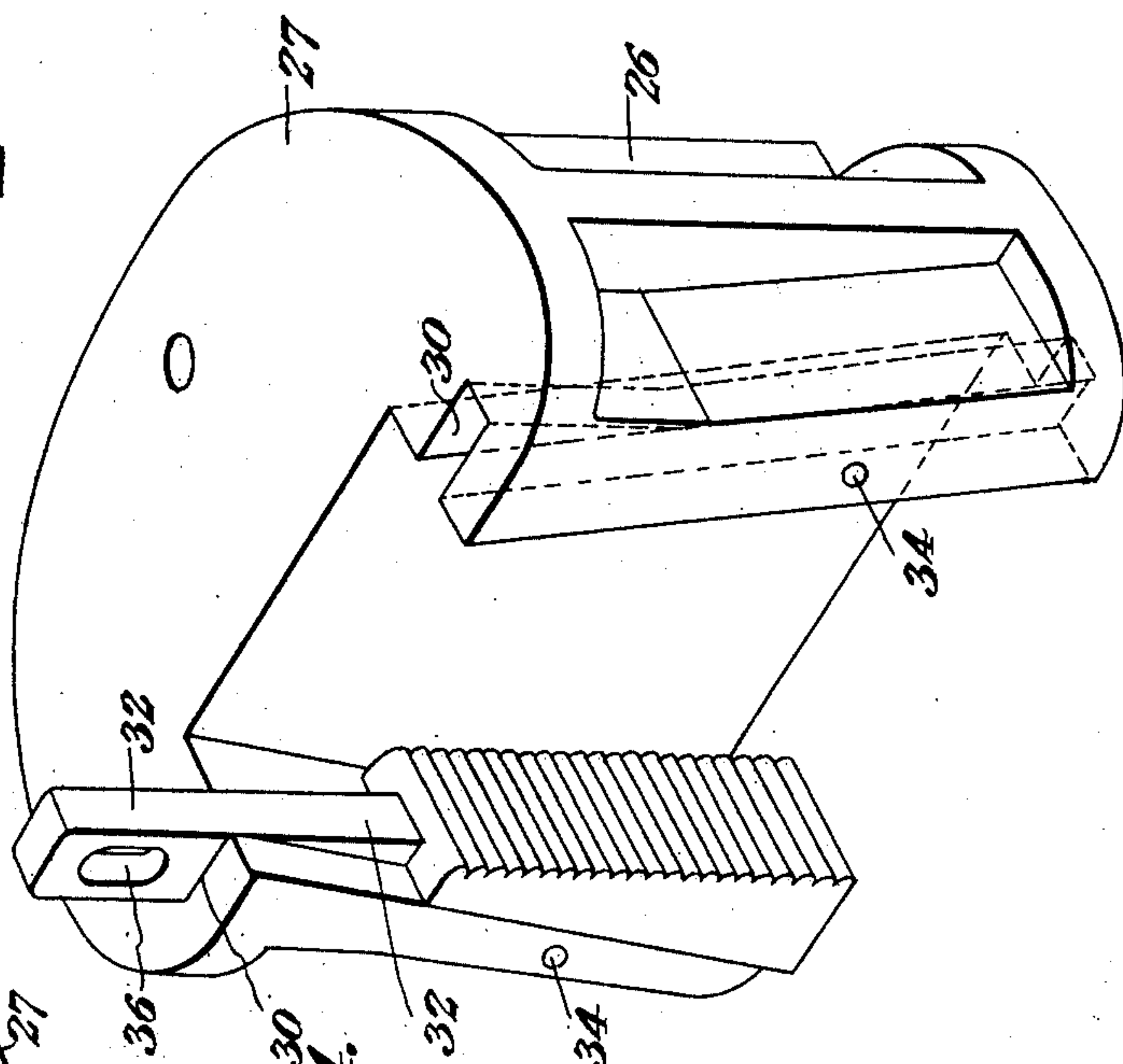
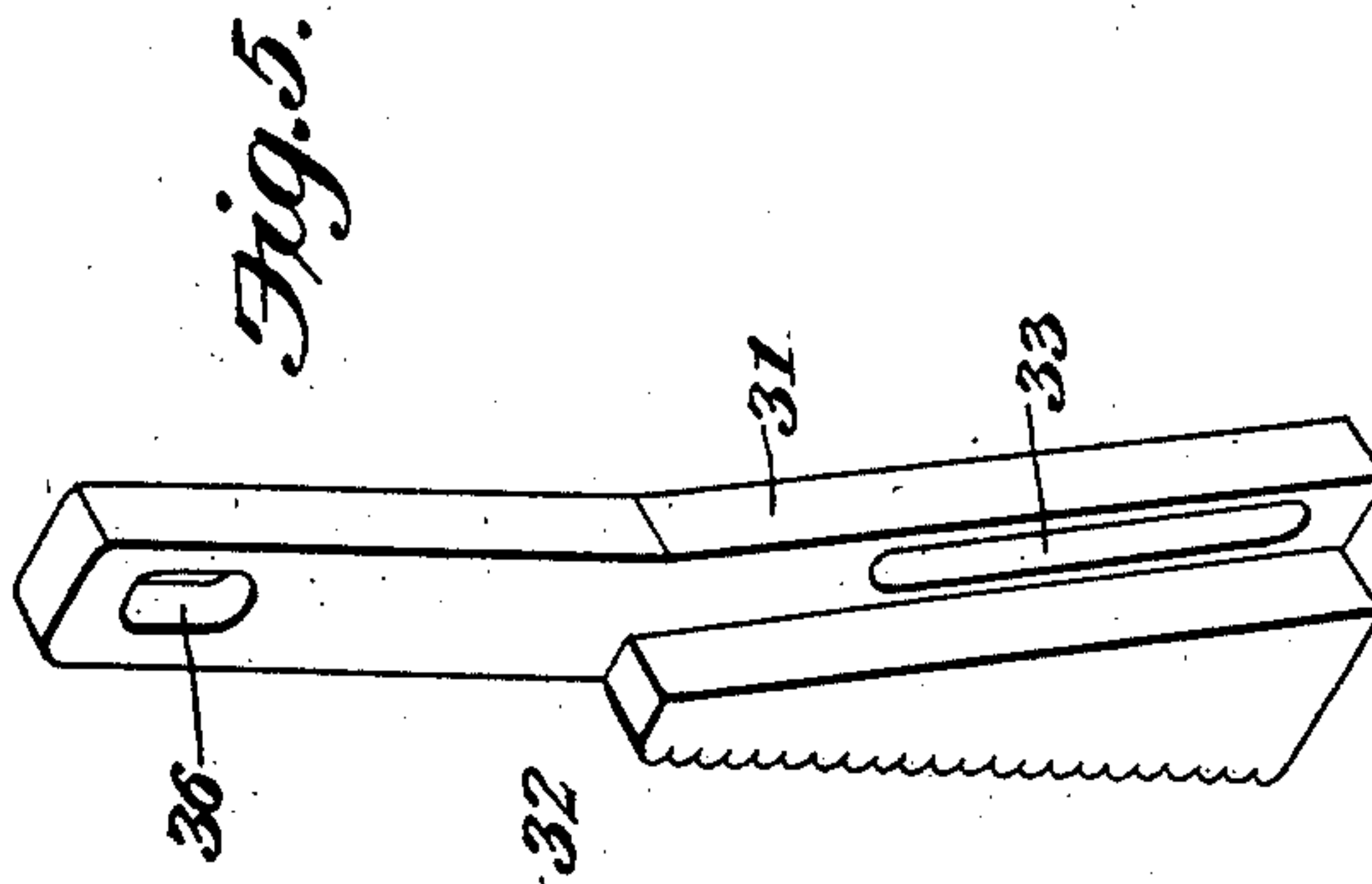
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E. F. Stewart  
Jno E Parker



*Daniel F. Lepley* INVENTOR

By *C. A. Snow & Co*  
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# UNITED STATES PATENT OFFICE.

DANIEL F. LEPLEY, OF CONNELLSVILLE, PENNSYLVANIA.

## SAFETY DEVICE FOR ELEVATORS.

No. 826,586.

Specification of Letters Patent.

Patented July 24, 1906.

Application filed April 3, 1906. Serial No. 309,641.

*To all whom it may concern:*

Be it known that I, DANIEL F. LEPLEY, a citizen of the United States, residing at Con-  
nellsville, in the county of Fayette and State  
of Pennsylvania, have invented a new and  
useful Safety Device for Elevators, of which  
the following is a specification.

This invention relates to safety appliances  
for elevators, and while applicable to eleva-  
tors in general is intended more especially to  
be used in connection with mine-cages.

The principal object of the invention is to  
provide a safety device in which wedge  
clutch-blocks are arranged to engage with  
the opposite sides of the guide rails or sills  
that run from bottom to top of the shaft and  
to so arrange these clutch-blocks as to obtain  
a very extensive clamping-surface that will  
not only arrest the downward movement of  
the cage, but will prevent injury to the  
guides, the gripping force being distributed  
over such a large area of the strips as to pre-  
vent serious mutilation or injury to said  
strips.

A still further object of the invention is to  
provide an improved means for controlling  
the operation of the safety clutching-blocks.

With these and other objects in view, as  
will more fully hereinafter appear, the inven-  
tion consists in certain novel features of con-  
struction and arrangement of parts, herein-  
after fully described, illustrated in the ac-  
companying drawings, and particularly  
pointed out in the appended claims.

In the accompanying drawings, Figure 1  
is a side elevation of the upper portion of a  
mine-cage provided with safety clutching-  
blocks constructed and arranged in accord-  
ance with the invention. Fig. 2 is an eleva-  
tion looking at right angles to Fig. 1. Fig. 3  
is a plan view of the top of the cage. Fig. 4  
is a detail perspective view of one of the  
clutching-block guiding and supporting de-  
vices, showing one of the clutch-blocks in  
position. Fig. 5 is a similar view of one of  
the clutch-blocks detached.

Similar characters of reference are em-  
ployed to indicate corresponding parts  
throughout the several figures of the draw-  
ings.

In mine-cages and elevator-cars generally  
serious accidents frequently occur from  
breakage of the hoisting-cable, and many  
forms of safety devices have been employed  
for arresting downward movement of the  
cage, most of which aim to grip or otherwise

engage with the guide-strips on the shaft, the  
latter in many cases being in the form of a  
toothed rack and the cage being provided  
with toothed blocks which may be projected  
into engagement with the rack or racks. It  
has also been proposed to employ pivotally-  
mounted cam-shaped or eccentric clamps  
for gripping the opposite side of the guide-  
strips and to employ wedge-shaped blocks  
which are forced into contact with the oppo-  
site sides of the strips to check the downward  
movement of the cage. In carrying out the  
present invention care is taken to distribute  
the gripping effect over a relatively large  
area, so that the strips will not be injured to  
such an extent as to interfere with their ordi-  
nary use, and the wedge blocks are so mount-  
ed and so related that they cannot be acci-  
dentally disengaged, and at the same time  
the controlling mechanism by which the  
wedges are set into operation is simplified and  
is so arranged as to insure simultaneous op-  
eration of all of the wedges.

The cage A may be of any ordinary con-  
struction, so far as the suspension members,  
flooring arrangements, and other parts are  
concerned, and the guides B are shown as  
formed of wood, this being the material com-  
monly employed for the purpose.

In constructing the cage angle-bars 10 are  
arranged at each side, the bars being disposed  
in pairs and spaced from each other to re-  
ceive the wooden guide-strips B. These bars  
have their inner webs riveted to plates 11,  
which serve to maintain them in fixed rela-  
tion to each other, and to the inner face of  
the plate 11 are secured angle-bars 12. As a  
rule it is found more convenient to rivet di-  
rectly through the webs of the angle-bars and  
the intervening plate 11, as shown. To the  
inner face of each angle-bar 12 is riveted the  
lower end of a heavy plate 13, that extends  
upward above the top of the cage proper.  
The lower portions of these plates 13 are con-  
nected by cross-bars 14, formed of heavy  
metal, and these form the main suspension-  
bars of the cage. At the central portion of  
these two bars is arranged a yoke 15, the  
lower edges of which are provided with  
flanges 16, that fit under the cross-bars, while  
the upper central portion of the yoke is pro-  
vided with an opening for the passage of a  
suspension-rod 17. The lower end of this  
rod carries a collar or disk 18, held in place by  
nuts 19, and surrounding the rod is a com-  
pression-spring 20, on which the weight of



the cage is suspended, the spring yielding to some extent as the cage starts on its upward movement, and thus taking up the jar at starting. The upper end of the suspension-rod is coupled by a bar 21 to a ring 22, to which the lower end of the hoisting-cable is secured, and depending from this ring are safety-chains 23, the lower ends of which are connected to pins or bolts that pass through the cross-bars 14 and the plates 13. The upper portions of the plates 13 are connected together by transversely-extending angle-bars 25, which hold the plates in rigid alignment.

The upper ends of the plates 13 extend within or between the rear vertical webs 26 of heavy castings 27, there being one of said castings at each side of the upper portion of the cage. These castings are firmly secured by rivets or bolts to the plates 13, and as a further precaution heavy pins 28 are passed through the webs 26 and plates and form the lower connections of auxiliary safety-chains 29, that extend up to the hoisting member.

The upper face of each of the castings 27 is provided with a recess to receive the guide-strip B, and the walls of this recess are tapering, being arranged on lines that gradually diverge from the top to the bottom of the casting. Each of the walls of the recess is provided with a groove 30, the bottom wall of which is parallel with the inclined wall of the recess. In these grooves fit the reduced shanks 31 of the wedge clamping-blocks 27, the parallel walls of the groove holding each block from lateral play, while outward movement from the strip is limited by engagement of the inclined face of the block with the inclined wall of the recess. In each of the shanks or ribs 31 is formed an elongated slot 33 for the passage of a bolt or pin 34, which is much smaller in diameter than the width of the slot, so that it is not subjected to any strain during the operation of the clamping-block, but merely serves to retain said block in position and to exercise a camming effect in drawing the blocks outward away from the guide-strip during the ordinary operation of the cage.

The upper ends of the blocks are provided with openings 36 for the reception of the inner ends of levers 37, that are pivoted on small brackets 38, carried by the plates 13. The levers all extend inward toward the center of the cage and are all connected together by a heavy pin or bolt 39, the central portion of which is rigidly secured to the extension-rod.

One of the principal difficulties found in safety devices of this general class is that where sharp teeth are employed on the gripping-blocks the wooden guides at the sides of the elevator-shaft will be destroyed, and considerable expense is entailed each time the elevator is tested. In order to overcome this

difficulty and at the same time to provide gripping members that will firmly clutch the guides, the wedge blocks 27 are provided with ribbed clutching-faces that are formed by grooving the faces of the blocks to present a series of small ribs approximately semicircular in cross-section. It is found in practice that these gripping-faces may firmly engage with the wooden guide-strips without any mutilation or stripping, and the gripping effect is practically the same as though sharp teeth were employed.

During the ordinary operation of the cage the weight of the latter will hold the spring 20 compressed, and the outer ends of the levers 37 will be forced down, so that the wedge blocks will be moved outward by the engagement of the walls of the slots 33 with the pins 34. Should the hoisting-cable or the connecting-rod 21 break, the spring 20 immediately pulls the suspension-rod 17 down and raises the outer ends of all of the levers 37. The inclined faces of the wedge blocks then ride against the inclined walls of the recesses of blocks 27, and the faces of the wedge blocks are thrust against the opposite sides of the guide-strips B. It will be noted that the wedge blocks are of a width equal to the width of the walls of the recesses and the clutching-faces of the blocks are of considerable length, so that the area of the blocks will be such as to distribute the shock of the clamping effect and bring the cage to a stop without serious injury to the guide-strips. The area of the blocks is of course proportioned to the weight of the cage and the loads which the cage is intended to carry.

Having thus described the invention, what is claimed is—

1. In a safety device for elevators, blocks arranged at each side of the cage and provided with recesses for the passage of the guide strips or sills, the opposite walls of the recesses being disposed on convergent lines, each wall being centrally grooved throughout its length, wedge blocks having their outer faces tapered and bearing against said convergent walls, each block being provided with a rearwardly-extending rib fitting within the groove, means under the control of the hoisting-cable normally holding the wedge blocks in inoperative position, and means for connecting the wedge blocks to the main blocks.

2. In a safety device for elevators, a block arranged at each side of the cage and each provided with a recess for the passage of the guide-strip, the opposite walls of the recesses being convergent, and wedge blocks having inclined outer faces bearing against such convergent walls, the rear faces of the wedge blocks being ribbed, and the main block being grooved for the reception of the ribs, a pin and cam slot connection between the rib and main block for moving the wedge blocks



outward from the strip, and means under the control of the hoisting-cable for permitting operative movement of said wedge blocks.

3. In a safety device for elevators, a block  
5 arranged at each side of the cage and each provided with a recess for the passage of the guide strip or sill, the opposing walls of said recess being convergent and each wall having  
10 a vertical groove, wedge blocks having inclined rear faces fitting against the convergent walls and provided with rearwardly-extended ribs that enter the grooves, said ribs having cam-slots, the walls of which are parallel with the convergent walls of the recess,  
15 pins extending through said slots, the slots being of sufficient width to avoid pressure on the pins, and means under the control of the hoisting - cable normally holding the wedge blocks in inoperative position.

20 4. In a safety device for elevators, a block arranged at each side of the cage and each provided with a recess for the passage of the

guide strip or sill, the opposing walls of said recess being arranged on convergent lines, wedge blocks having their inner faces bearing  
25 against said convergent walls, the upper ends of said wedge blocks being extended above the top of the main blocks, a hoisting device including a suspension-bar at the center of the cage, pins extending from the suspension-bar, a spring surrounding the suspension-bar, and subjected to the weight of  
30 the cage under normal conditions, and a plurality of levers extending from the wedge blocks to the pins, all of said levers being operated by the spring on breakage of the hoisting means.  
35

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

DANIEL F. LEPLEY.

Witnesses:

WILLIAM H. SOISSON

HENRY J. BOSLETT.