

J. D. HIGGINS.

DEVICE FOR PROTECTING ELEVATOR SHAFTS.

No. 497,447.

Patented May 16, 1893.

FIG. 1.

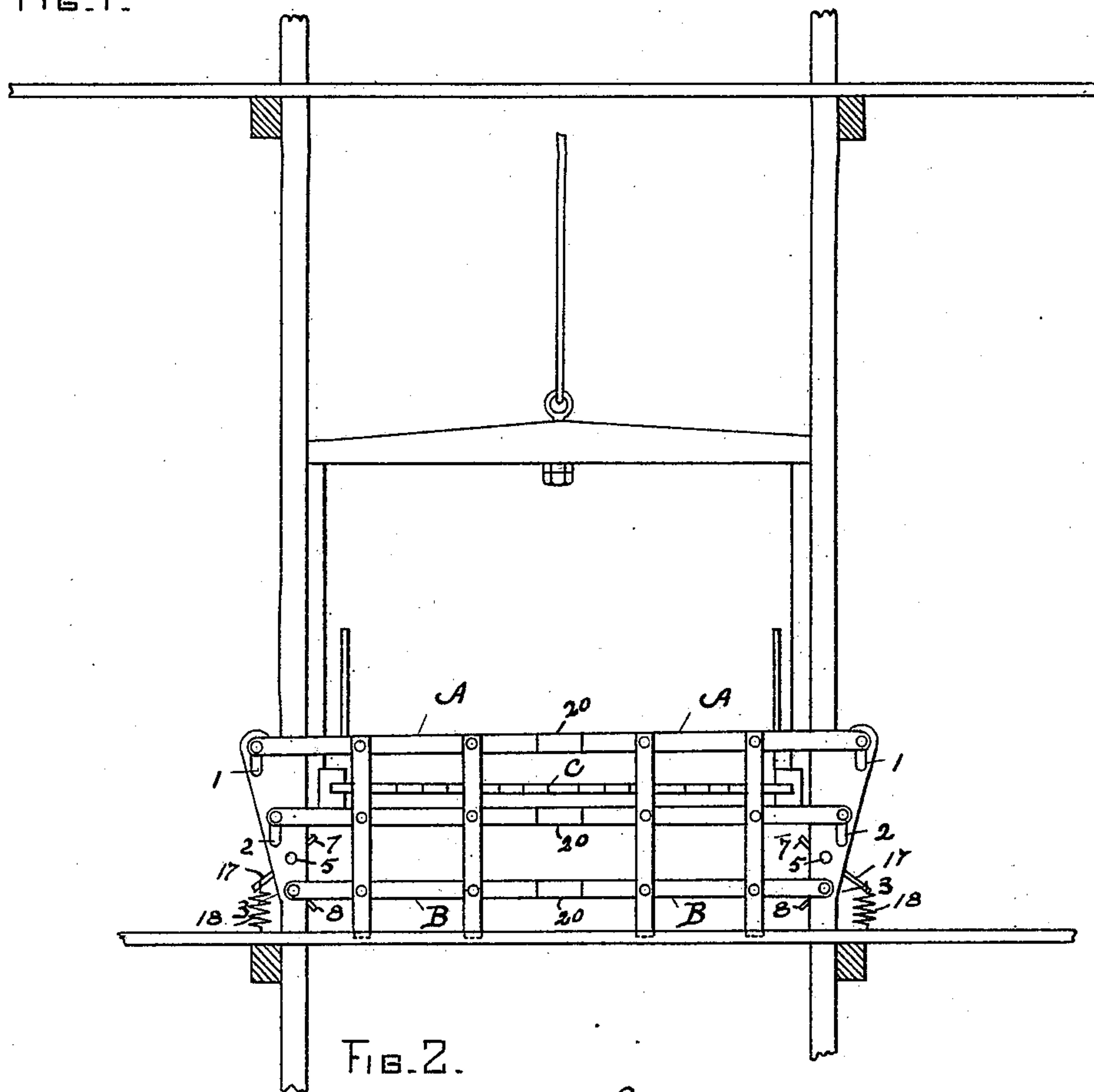
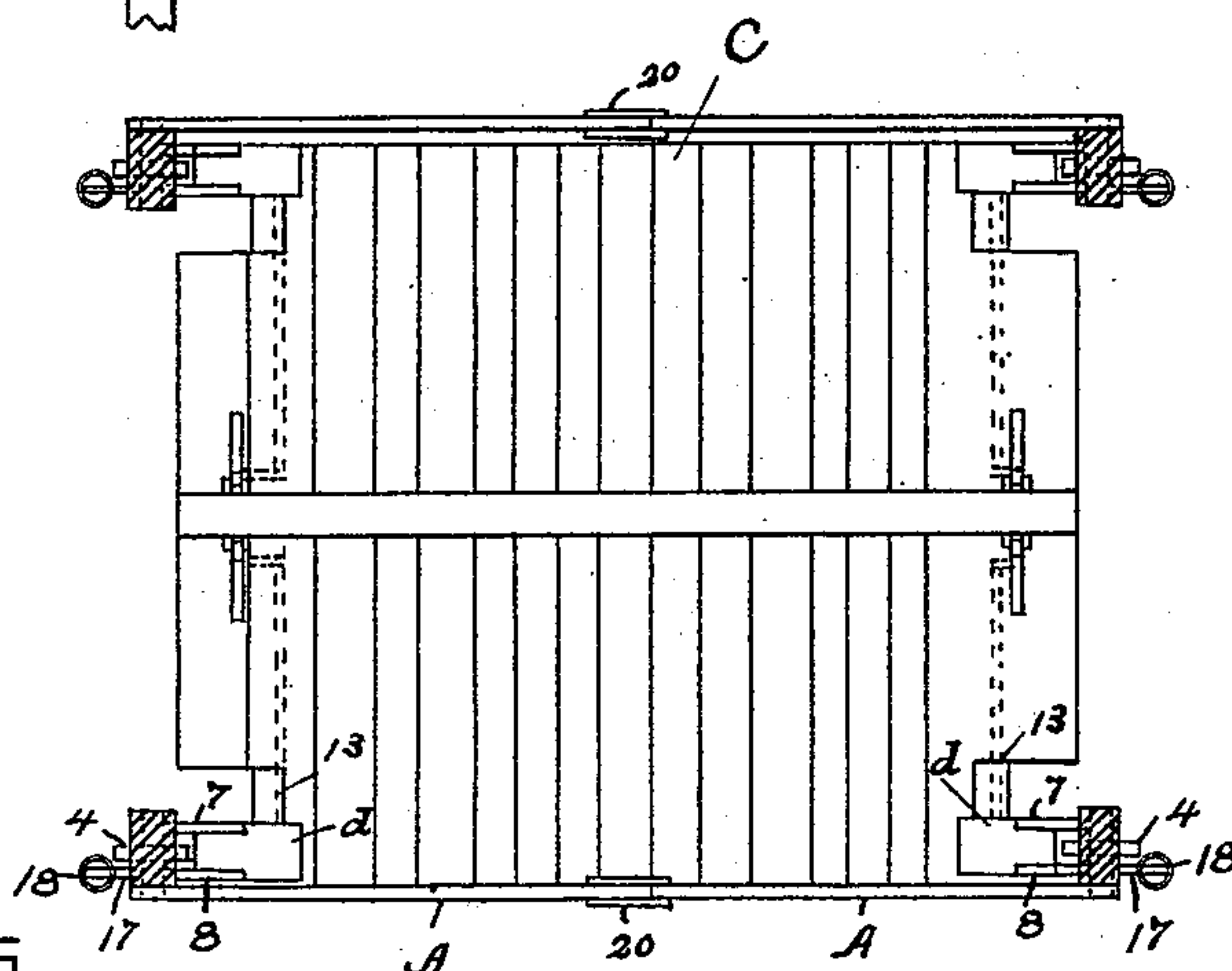


FIG. 2.



WITNESSES..

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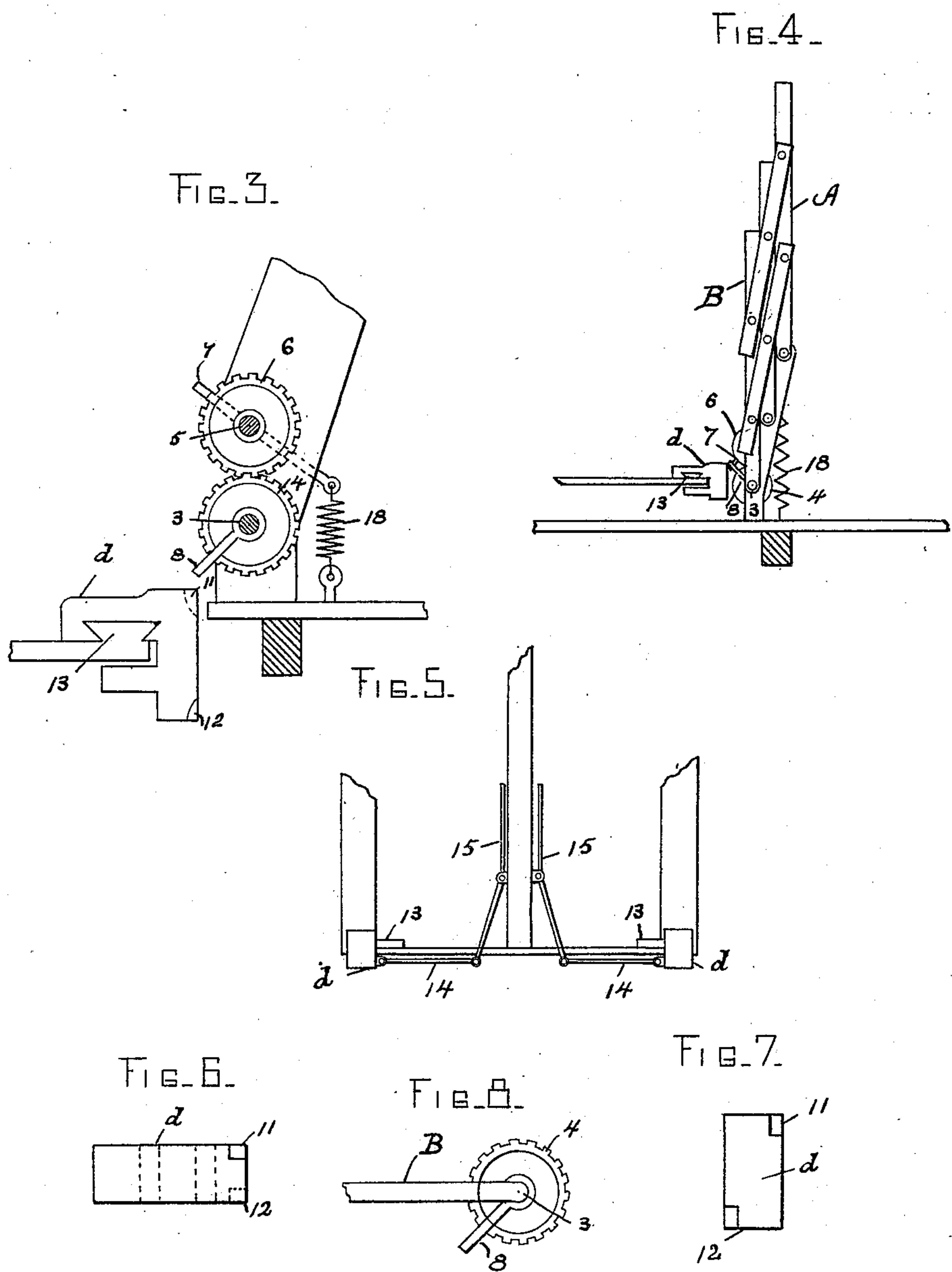
James D. Higgins
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UNITED STATES PATENT OFFICE.

JAMES D. HIGGINS, OF BOSTON, MASSACHUSETTS.

DEVICE FOR PROTECTING ELEVATOR-SHAFTS.

SPECIFICATION forming part of Letters Patent No. 497,447, dated May 16, 1893.

Application filed April 13, 1892. Serial No. 429,000. (No model.)

To all whom it may concern:

Be it known that I, JAMES D. HIGGINS, a citizen of the United States, and a resident of Boston, in the Commonwealth of Massachusetts, have invented a new and useful Device for Protecting Elevator-Shafts, of which the following is a specification.

My invention consists of a shear gate and connected mechanism for opening the same, operated by a contact piece upon the elevator car, said gate being adapted to be closed by gravity or by a suitable closing device.

My invention further consists of a device for controlling the opening of said gate by said contact piece; and of the minor devices and combinations of devices hereinafter set forth.

My invention is illustrated by the accompanying drawings, in which—

Figure 1 is a front view of an elevator shaft and elevator provided with protecting devices embodying my invention. Fig. 2 is a plan of same. Fig. 3 is a detailed view of a portion of my invention. Fig. 4 is a front view showing position of mechanism when the gate is open. Fig. 5 is a side view showing mechanism for shifting contact pieces. Figs. 6 and 7 are respectively a front view and plan of the contact piece forming a part of my invention. Fig. 8 shows a special arrangement for the upper floors.

Similar letters and figures of reference refer to similar parts throughout the several views.

Referring to the drawings A, A represent a pair of shear gates, so called, the bars of which are pivoted together and open and close on each other with a shear action when the gates are opened or closed. I find it convenient to close a single entrance with a pair of gates as shown in the drawings, as the weight thereof is more easily controlled than that of a single gate of sufficient length to close the entrance.

The gate shown in the drawings may be opened or closed by raising or lowering one of the horizontal bars or more strictly speaking by the rotation of one of the horizontal bars through an angle of ninety degrees or nearly so. I find it convenient to use for this purpose the lowest bars B, B upon the gates A, A which are hereinafter referred to

as the operating bars. The other horizontal bars of the gates A, A are pivoted to a suitable support secured to the walls of the building, or other convenient fixed object, the pivots being free to slide in the slots 1, 1 and 2, 2 which are successively set off the width of a bar of the gates so that the lowest bars may be raised to a vertical position, the other bars dropping into contact therewith, bringing the gates into the position shown in Fig. 4 of the drawings.

The bars B, B are rigidly secured to the pivots or shafts 3, 3. The shafts 3, 3 carry the gears 4, 4 which mesh with the gears 6, 6 upon the shafts 5, 5. The shafts 3, 3 and 5, 5 are respectively provided with the rigid arms 8, 8 and 7, 7 which extend into the elevator shaft. The shafts 3 and 5 are mounted in suitable bearings secured to the walls of the building or other convenient support. It will be noted that each pair of the arms 7, 8 and 7, 8 are geared together by the gears 4, 4 and 6, 6 so as to swing in opposite directions, and that in each pair the respective arms 7 and 8 swing in different vertical planes.

The elevator car C, carries the contact pieces *d, d* so placed on said car, that when the car rises and falls they will be brought in contact with the arms 7, 7 and 8, 8 (see Fig. 2), the plane of the vertical motion of the outer surface of contact pieces *d, d* being tangential or nearly so to the gears 4, 4 and 6, 6.

In the operation of my invention as the elevator rises, the contact pieces *d, d* first come in contact with the arms 8, 8 causing an upward rotation thereof, and a downward rotation to the arms 7, 7. In order to give the arms 7, 7 an opportunity to turn out of the way, the upper ends of the contact pieces *d, d* are cut away forming the recesses 11, 11, see Figs. 6 and 7, through which the arms 7, 7 turn until they are out of the path of the contact pieces *d, d*. The lower arms 8, 8 are rotated by the contact pieces *d, d*, through an angle of ninety degrees or nearly so, imparting a similar rotation to the shafts 3, 3 and raising the lower bars B, B of the gates A, A into a position shown in the drawings, Fig. 4, or slightly below said position, the rotation of the bars B, B being substantially coincident with that of arms 8, 8.

The arrangement of the contact pieces *d, d*

and the arms 7, 7 and 8, 8 is such that when the gates are brought into the position just described, the elevator has reached the level of the floor.

5 The gates A, A are held open by the contact pieces d, d as long as the elevator remains at the floor level. As the elevator rises, the lower arms 8, 8 are freed, and the arms 7, 7 bearing against the contact pieces
10 d, d lower the gates as the elevator rises. When the elevator falls, the contact pieces d, d first come in contact with the upper arms 7, 7 producing a rotation thereof through an angle of ninety degrees or nearly so, and a
15 corresponding rotation of the shafts 5, 5 and by means of the gears 4, 4 and 6, 6 and the shafts 3, 3 raising the operating bars B, B to a vertical position, or nearly so, and opening the gates.

20 The lower portions of the contact pieces d, d are provided with recesses 12, 12 upon the side toward the lower arms 8, 8 allowing said arms to turn under said contact pieces, as the elevator car falls, out of the path of said contact pieces.
25

When the elevator reaches the level of the floor, in its downward course, the gates are open, and close as the elevator sinks below said level, the lower arms 8, 8 bearing against
30 the contact pieces d, d and preventing sudden fall of the gates.

To the shafts 5, 5 are attached the rigid arms 17, 17 to which are attached the springs 18, 18 which are secured to some permanent
35 part of the apparatus. The springs 18, 18 operate as a closing device, but I find that it is necessary to have said springs act only to start the gates A, A from a vertical position for the gates A, A being started will be closed
40 by their own weight.

If the arrangement of arms 7, 7 and 8, 8 is such that the bars B, B are not raised above a position slightly below the vertical, arms 17, 17 and springs 18, 18 may be dispensed with
45 and the gates will be closed by gravity.

The contact pieces d, d are mounted upon the ways 13, 13 on the elevator car C, and by means of the connecting rods 14, 14 and levers 15, 15 fulcrumed on the car C, (see Fig. 5)
50 5) may be thrown out of the position shown in Fig. 2, so that the rise and fall of the elevator will not bring them in contact with the arms 7, 7 and 8, 8. In this way the elevator may be raised through any number of stories
55 without opening any of the gates A, A.

Upon the upper floor, where the car stops, the gears 4, 4 and 6, 6 and the shafts 5, 5 and arms 7, 7 may be dispensed with, the bar 8 being sufficient to operate the gates (see
60 Fig. 8).

On the lower floor where the elevator stops, the arms 8, 8 may be dispensed with.

In the arrangements upon the upper and lower floors, the arms are made longer than on the intermediate floors, to prevent the gates
65 from being dropped by the arms coming into the offsets when the elevator car C, reaches the floor level, and further to allow the car to rise on the upper floor slightly above the floor level, and on the lower floor to sink slightly
70 below the same, without dropping the gates, the lengthened arms keeping their bearing against the contact pieces d, d . The special form for the upper floor is shown in drawing Fig. 8.
75

To prevent the gates from sagging in when closed, I provide each of the upper bars of one of the gates A, with a lip 20 which closes
80 on the outer end of the corresponding bar of the other gate A, and further the vertical bars of both gates fall in slots let into the floor near the entrance to the shaft, (see Fig. 1.)

In shafts having entrances on both sides of the elevator car the herein described mechanism may be duplicated for the other side
85 (see Fig. 2).

I do not consider my invention limited to the special forms of mechanism shown in the drawings and herein described, as it is evident
90 that the form and arrangement of the arms and contact pieces and form of shear gate may be altered without essentially affecting same.

I claim as my invention and desire to secure by Letters Patent—
95

1. In an automatic device for protecting elevator shafts, the combination with a car, and a shear gate for the shaft, of two parallel shafts journaled in stationary bearings, a rigid
100 connection between the gate and one of the shafts intermeshing gear wheels on the shafts, rigid arms on the shafts extending out at an incline in opposite directions, and a contact piece on the car having cut-away portions on its upper and lower edges at opposite sides,
105 substantially as described.

2. In an automatic device for protecting elevator shafts, the combination with a car, and a shear gate for the shaft, of two rotatable shafts journaled in fixed bearings, a rigid
110 connection between one of the shafts and gate, intermeshing gear wheels on the shafts, rigid arms on the shafts extending out at an incline in opposite directions, and a sliding contact piece on the car having cut-away portions on its upper and lower edges in line
115 with the arms, substantially as described.

Dated at Lynn, April 11, A. D. 1892.

JAMES D. HIGGINS.

In presence of—

BENJAMIN PHILLIPS,
ALFRED SMITH.