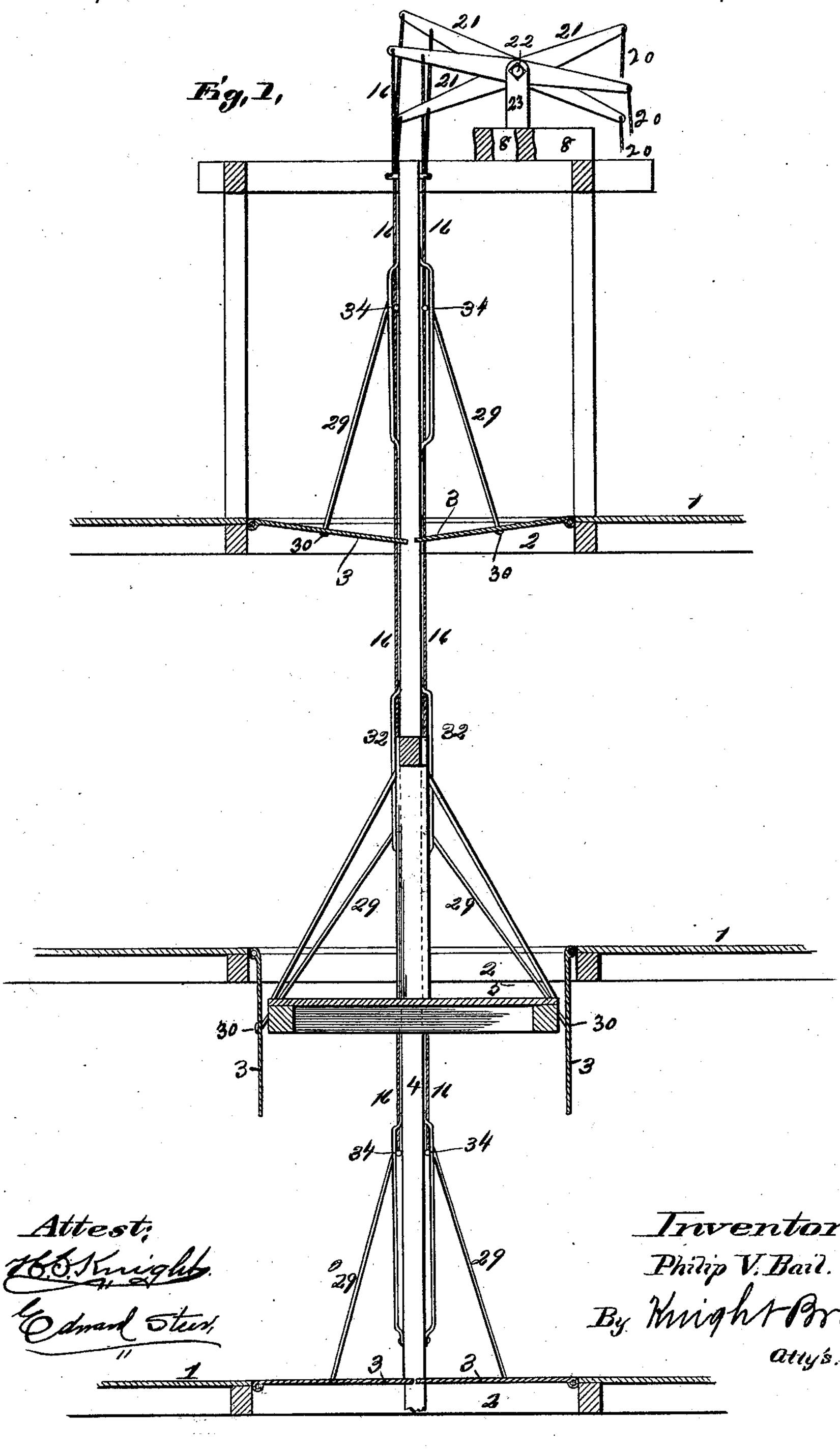
(No Model.) 4 Sheets—Sheet 1.

P. V. BAIL.

SELF CLOSING HATCHWAY.

No. 364,884. Patented June 14, 1887.

Fig. 1.



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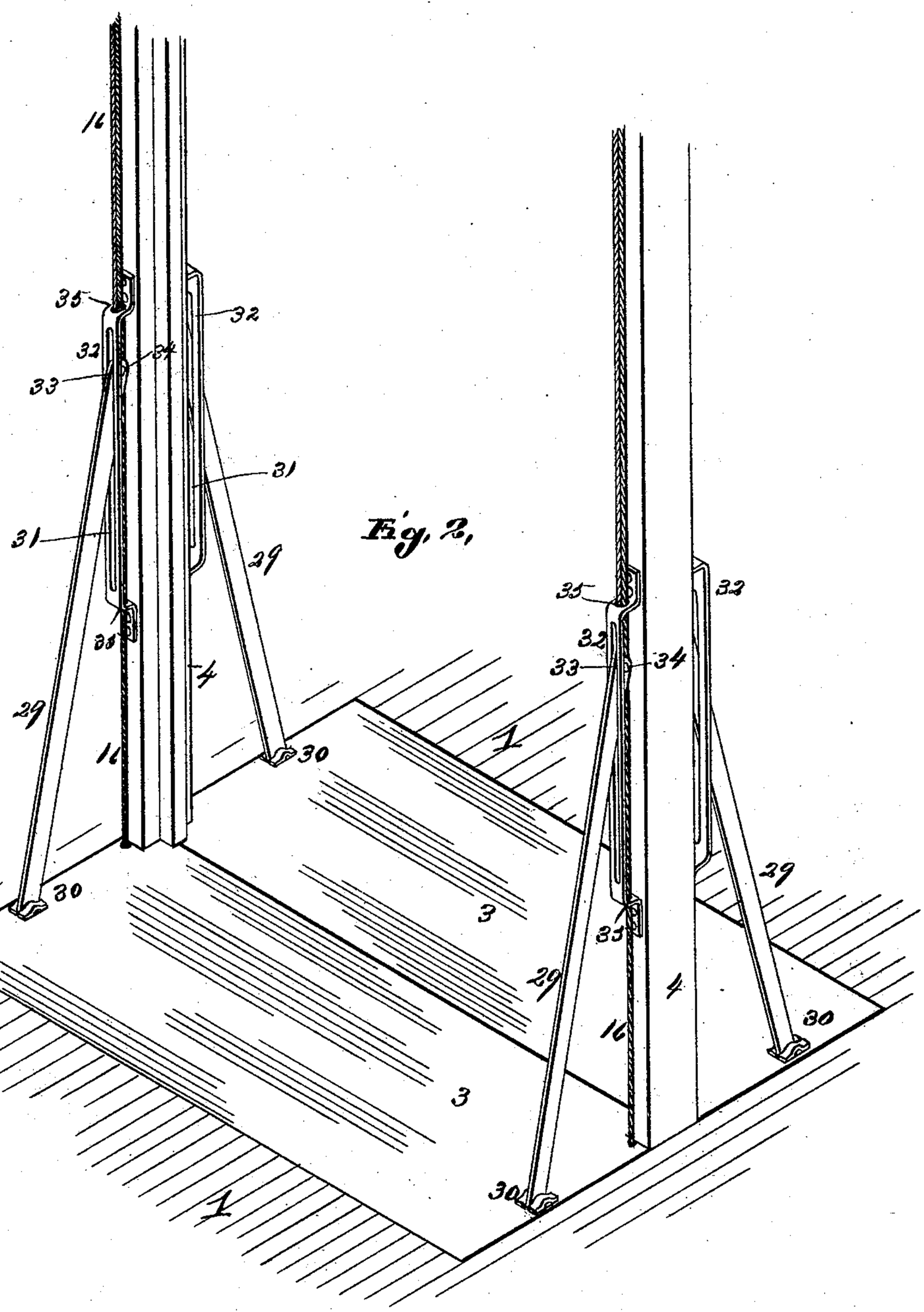

Fig. 2.

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Fig. 3,

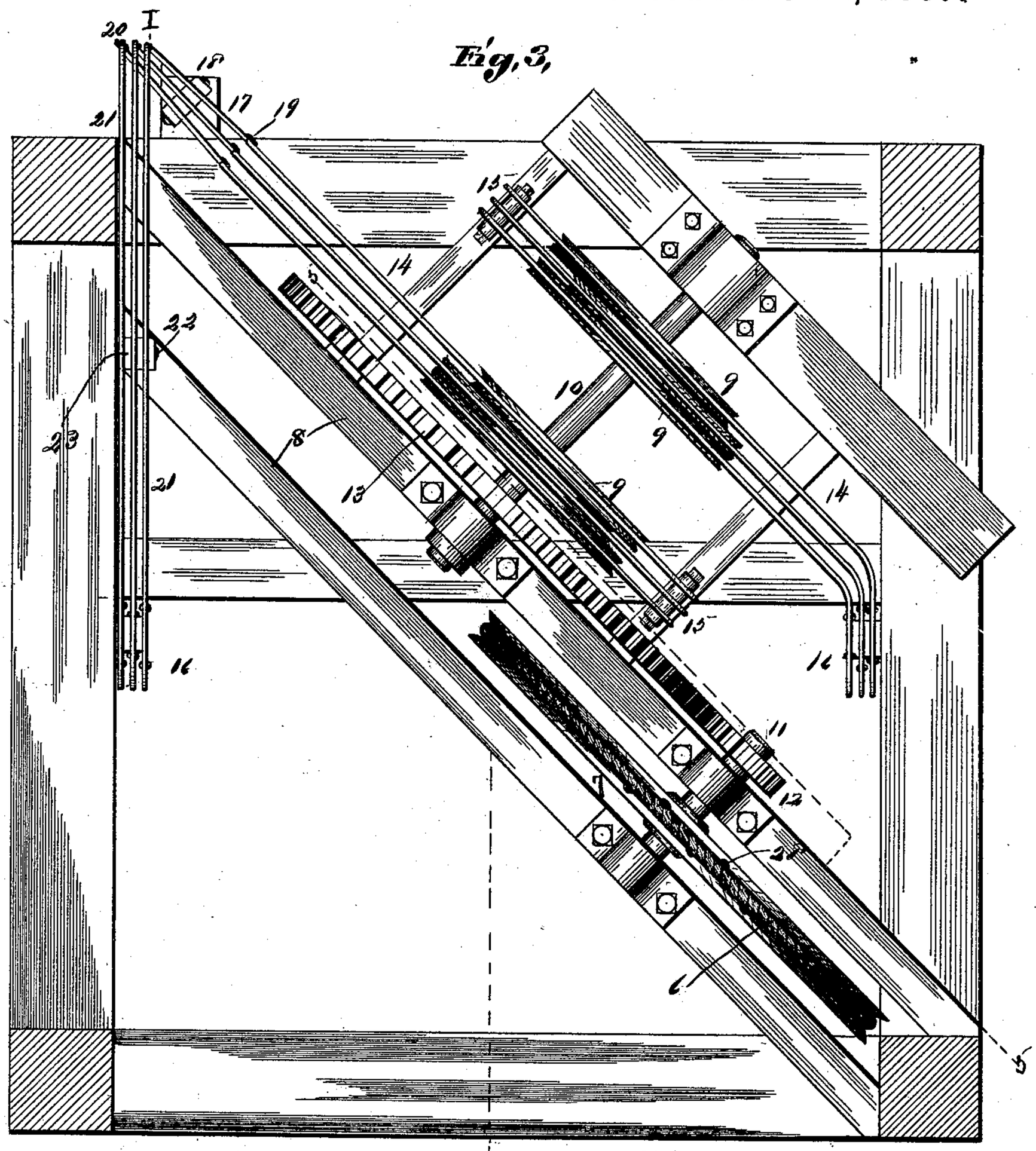

Fig. 4,

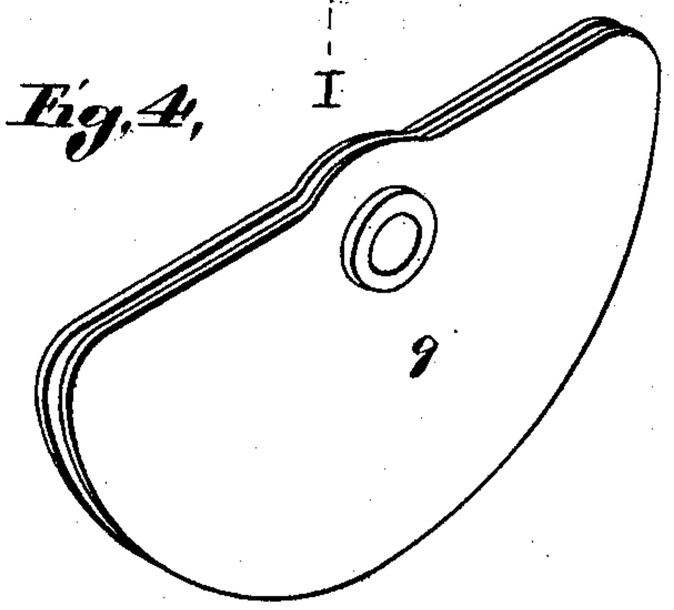

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Fig. 5.

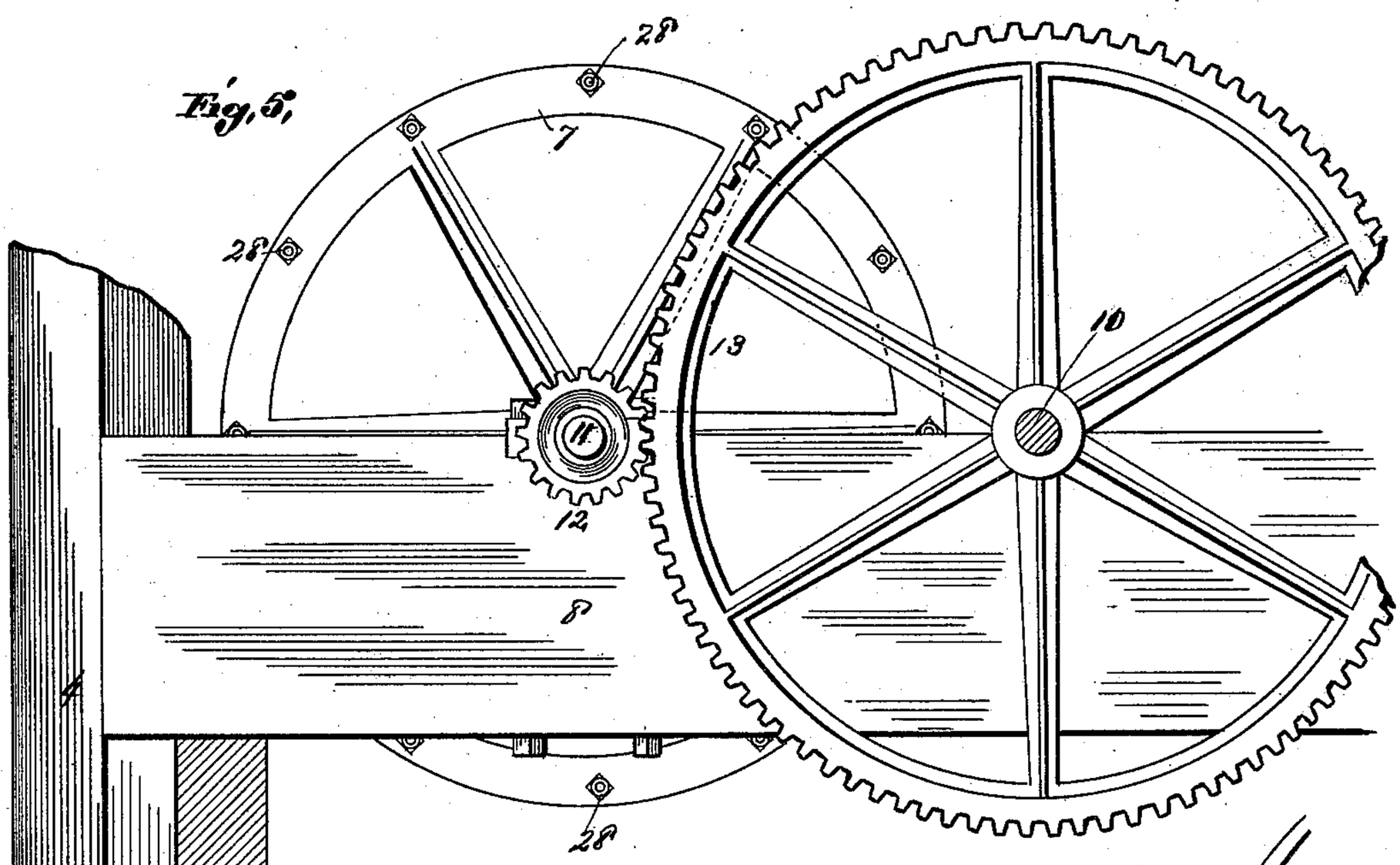


Fig. 6.

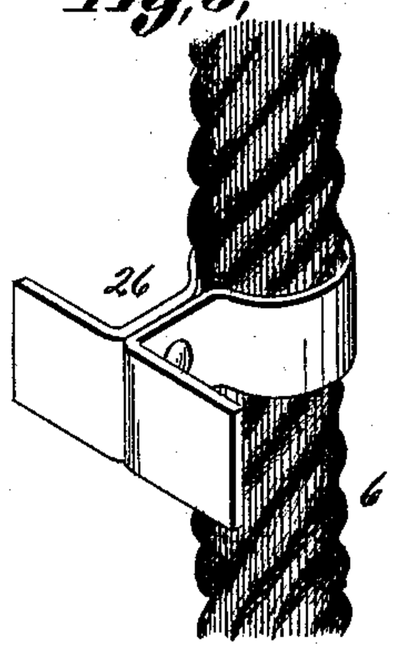


Fig. 7.

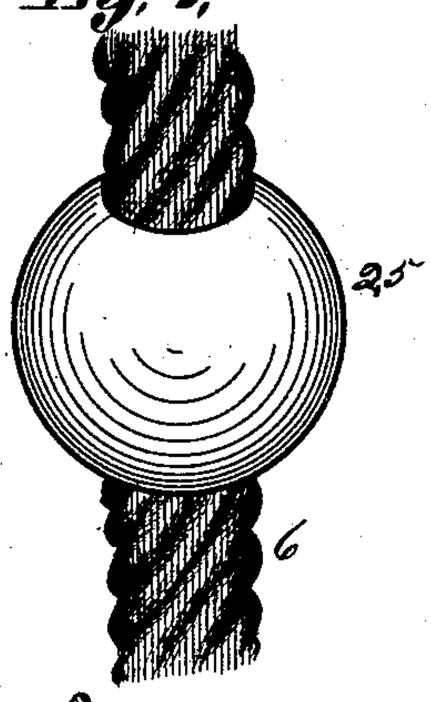


Fig. 8.

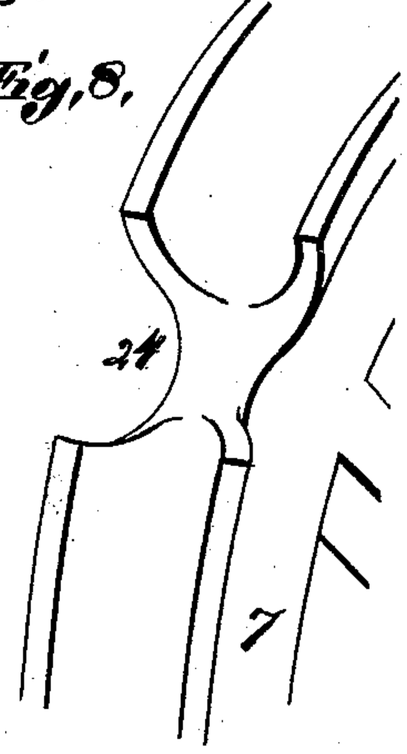


Fig. 10.

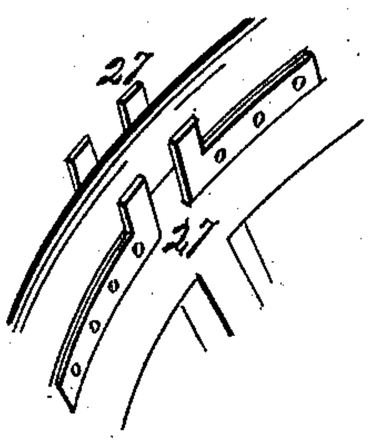
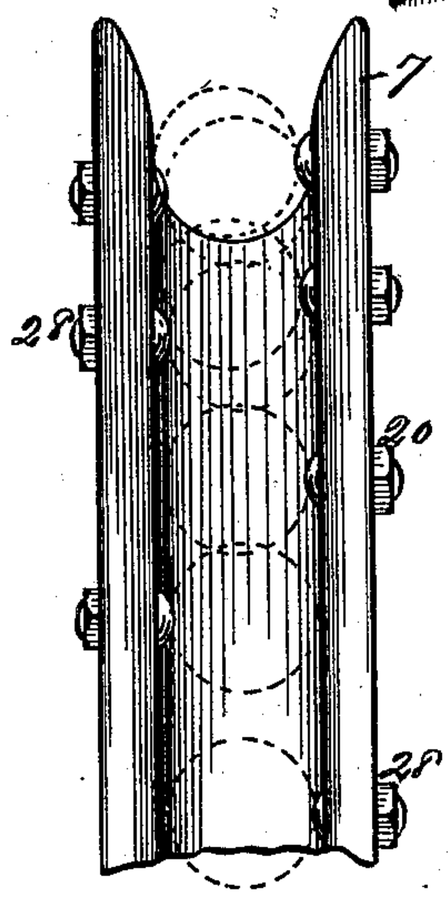


Fig. 9.



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UNITED STATES PATENT OFFICE.

PHILIP V. BAIL, OF ST. LOUIS, MISSOURI, ASSIGNOR OF THREE-FOURTHS TO BENJAMIN EISEMAN, JOHN W. ROWE, AND WILLIAM BAIL, ALL OF SAME PLACE.

SELF-CLOSING HATCHWAY.

SPECIFICATION forming part of Letters Patent No. 364,884, dated June 14, 1887.

Application filed December 4, 1886. Serial No. 220,729. (No model.)

To all whom it may concern:

Be it known that I, PHILIP V. BAIL, of the city of St. Louis, in the State of Missouri, have invented a certain new and useful Improvement in Self-Closing Hatchways, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, and in which—

Figure 1 is a vertical section of an elevator-shaft, cage, and doors illustrating my improvement, the section being taken on line 1 1, Fig. 3. Fig. 2 is an enlarged detail perspective view showing part of the uprights, one pair of doors, and their connecting-arms. Fig. 3 is a top view. Fig. 4 is an enlarged perspective view of one of the cams, removed. Fig. 5 is an enlarged detail side elevation. Figs. 6 and 7 are enlarged perspective views showing part of the hoisting-cable and different means on the cable for insuring the positive turning of the gearing that operates the cams. Figs. 8 and 10 are enlarged detail perspective views showing part of the main pulley of the hoisting-cable, and a means thereon for receiving the devices shown in Figs. 6 and 7 to insure the positive movement of the cam-gearing. Fig. 9 is an enlarged detail elevation showing another form of insuring the positive movement of the cam-gearing.

My present invention relates to certain improvements on the Letters Patent granted to myself and assignees December 16, 1884, No. 309,330; and this invention consists in features of novelty hereinafter fully described, and pointed out in the claims.

Referring to the drawings, 1 represents different floors of a building. 2 represents the hatchways of an elevator-shaft; 3, the doors of the hatchways; 4, the uprights that guide the cage; 5, the cage; 6, the hoisting-cable, and 7 the main pulley of the hoisting-cable, located on a cross timber or piece, 8, at or near the upper ends of the uprights 4. These parts may be arranged as shown in the patent referred to, or in any other suitable manner.

9 represents the operating-cams, similar to those shown and described in the patent referred to, and which are located on a shaft, 10, driven from the shaft 11 of the main pulley 7, with which it is geared by pinion 12 and cog-wheel 13.

14 represents levers, pivoted at 15 and located over the cams 9, and to which the cords or cables 16 are secured, either directly, as shown on the right-hand side of Fig. 3, or indirectly, as shown on the left-hand side of Fig. 3, in the latter case there being levers 17 pivoted to a support, 18, and connected at one end by cords 19 to the free ends of the levers 14 and at the other end by cords 20, one end of levers 21 pivoted at 22 to a post, 23, and to the other end of which the cords or cables 16 are secured.

In order to insure a positive movement of the pulley 7 by the cable, so that there will be a positive movement of the gearing that operates the cams, and through them the levers and doors, I provide the cable with means that will prevent it from slipping on the pulley.

In Figs. 7 and 8 I have shown the pulley provided with recesses 24, with which engage balls or circular projections 25 on the cable, the cable being provided with a number of the balls and the pulley being provided with a number of recesses.

In Fig. 6 I have shown the cable provided with a bracket or clip, 26, that engages between projections 27, secured to the periphery of the pulley, as shown in Fig. 10, there being also a number of the clips and projections.

In Fig. 9 is shown still another means of insuring the positive movement of the pulling of the cable, and this means is also shown in Figs. 3 and 5. It consists of a number of bolts, 28, the heads of which project into the cable-groove of the pulley and which causes the cable to be pressed or forced into an irregular plane, as shown by the circles in Fig. 9, which represent sections of the cable, so that the cable will not slip on the pulley.

Any of these means may thus be used, and still others might be devised for insuring the positive movement of the cam-gearing from the hoisting-cable.

The respective cords or cables 16 extend to the respective doors 3, as in the patent referred to; but instead of being connected directly

thereto and passing over or under pulleys or staples, as in the patent, a different connection is provided to overcome certain objections to the method of connecting them, as shown in the patent. In the present instance I employ arms or bars 29, which are hinged at 30 to the doors and enter vertical slots 31 at their upper ends, the slots being made in brackets or plates 32, secured to the uprights, as shown in Fig. 2. The upper ends of the arms or bars are connected to the cords or cables of their doors at 33, and are provided with pins or projections 34, that hold their upper ends in the brackets or plates. The brackets or plates are perforated at 35 for the passage of the cords or cables, as shown in Fig. 2, and the cords or cables thus have a vertical movement as the doors open and close, moving from the position shown in the central part of Fig. 1 to the position shown in the upper and lower parts of this figure. This construction has been found to insure a quicker and easier movement of the doors, which open by gravity as they are released, and this construction has also been found to have less wear upon the cords or cables 16 than the other method.

The arms or bars 29 in no manner prevent the free movement of the doors, but, on the other hand, their weight tends to assist in the rapid opening of the door by gravity.

I am aware that it is old to provide a pulley and cable with means to prevent slipping and insure a positive movement, and do not claim the same, broadly.

I claim as my invention—

1. In a self-closing hatchway, the combination, with the doors, door-cords, and means for operating the cords, of the bars hinged to the doors and connected to the cords, and guide-brackets 32, having vertical slots 31, substantially as shown and described.

2. In a self-closing hatchway, the combination of the cords or cables 16 and means, substantially as described, for operating the cords or cables, hatch-doors, arms or bars 29, pivoted to the doors, and guides 32, perforated at 35 and slotted at 32, for the purpose set forth, and projections 34 on the upper ends of the bars or arms 29, substantially as and for the purpose set forth.

PHILIP V. BAIL.

In presence of—
JOHN W. ROWE,
GEO. H. KNIGHT.