

I. J. HARVEY.
 AUTOMATIC GATE.
 APPLICATION FILED APR. 11, 1912.

1,056,537.

Patented Mar. 18, 1913.

2 SHEETS—SHEET 1.

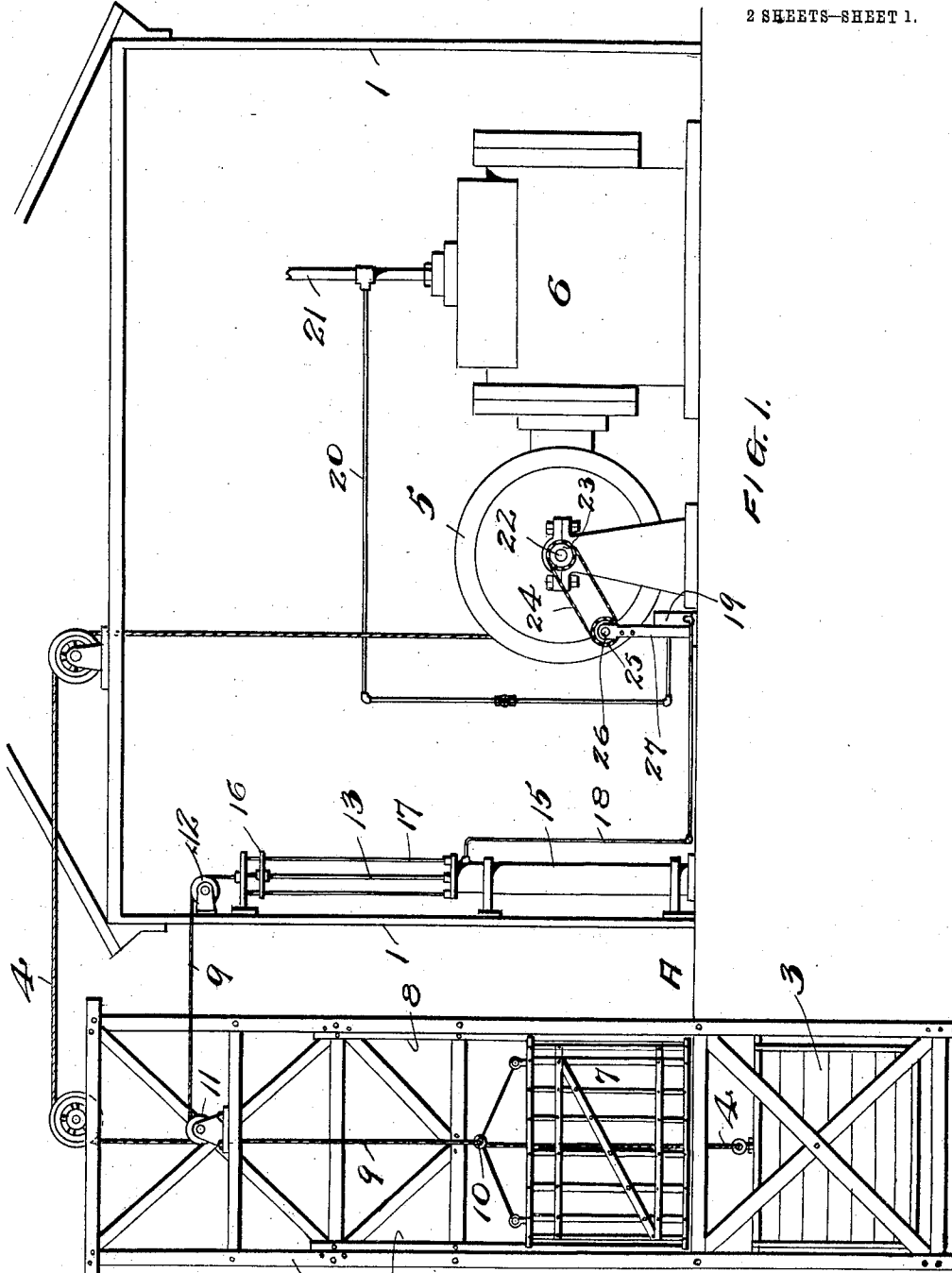


FIG. 1.

WITNESSES
C. H. Davis,
H. A. Phelps

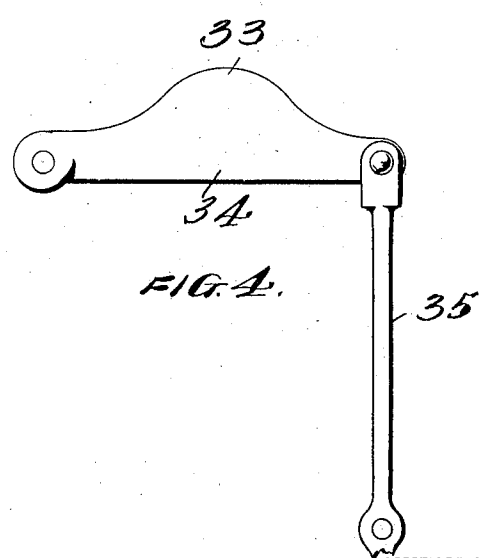
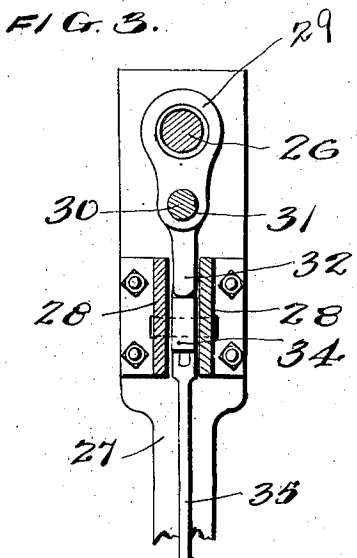
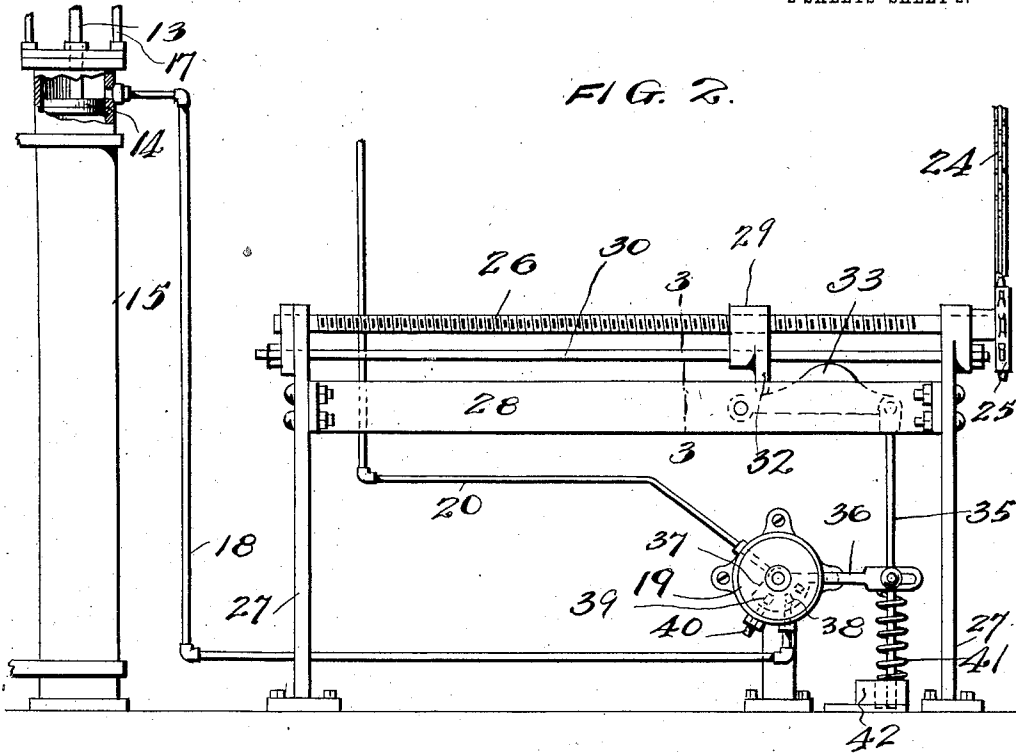
INVENTOR
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 By *Thomas R. Harvey*
 Attorney

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2 SHEETS—SHEET 2.

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UNITED STATES PATENT OFFICE.

ISAAC J. HARVEY, OF HELVETIA, PENNSYLVANIA.

AUTOMATIC GATE.

1,056,537.

Specification of Letters Patent.

Patented Mar. 18, 1913.

Application filed April 11, 1912. Serial No. 689,956.

To all whom it may concern:

Be it known that I, ISAAC J. HARVEY, a citizen of the United States, residing at Helvetia, in the county of Clearfield and State of Pennsylvania, have invented certain new and useful Improvements in Automatic Gates, of which the following is a specification.

The present invention relates to improvements in automatic gates.

The invention embodies an automatically operated gate, for use at the mouth of a mine shaft, in connection with an ascending elevator car. The gate, which is designed as a safety device, is adapted to be opened or lifted by fluid pressure actuated devices, and the actuated devices are operated in connection with the hoisting mechanism for the elevator car or cage.

The invention consists in certain novel combinations and arrangements of parts, whereby the gate or obstruction may be lifted by mechanism actuated from the operating hoist, at the approach of an ascending elevator-car, as will be hereinafter pointed out.

In the accompanying drawings I have illustrated one complete example of the physical embodiment of my invention, constructed according to the best mode I have so far devised for the practical application of the principles.

Figure 1 is a diagrammatic view showing the head frame of a mine shaft, the hoist mechanism, and the gate or barrier with connections. Fig. 2 is an enlarged view of the gate actuating mechanism. Fig. 3 is a sectional view at 3—3 Fig. 2. Fig. 4 is a detail view of valve actuating mechanism.

As will be observed in Fig. 1 of the drawings the working parts of my invention are all inclosed within the engine house 1 thus insuring protection against inclement weather, climatic changes, etc., and also bringing the mechanism into position so that it will be under the supervision of the engineer or other attendant in the hoist house.

I have illustrated in conventional form, the shaft with its head frame 2 projecting above the ground or surface line as indicated at A. The cage or elevator car 3 is of usual or suitable construction for mine uses and is lifted and lowered by winding the hoisting rope 4 over the drum 5, which is rotated by means of the engine 6.

The gate or barrier 7 is located on the

ground line at the mouth of the mine shaft, and is adapted to be lifted vertically between the two side guide bars 8 fixed to the head frame of the shaft. A lift rope 9 is attached at 10 to the gate and after passing over the idler or pulley 11, enters the engine house and is guided over the second pulley 12, suitably supported on the wall of the house.

The lift rope is connected to the piston rod 13 whose piston 14 is movable in the vertically arranged cylinder 15. The piston rod is equipped with a cross head 16 slidable on the guide posts 17 erected above the piston, and by means of this head the movement of the piston rod is steadied and the rod guided.

The cylinder, as illustrated in the drawings, is approximately six feet in length and is thus adapted to permit a travel of the piston for an approximately equal distance. This movement provides for a similar movement and lift of the gate or barrier, but it will of course be understood that these dimensions may be varied to suit different circumstances.

The cylinder is adapted to receive motive fluid under pressure, as compressed air or steam, for actuating or moving the contained piston to lift the gate or barrier. For supplying the motive fluid, a pipe 18 enters the cylinder above the piston, and a steam chest or valve casing 19 is interposed between the cylinder and the steam supply of the hoisting engine, a second pipe 20 connecting the steam chest with the steam pipe 21 of the engine.

Steam is admitted to the cylinder by means of mechanism operated from the shaft 22 of the winding drum 5. For this purpose I employ a sprocket drive comprising the sprocket wheel 23 on shaft 22, sprocket chain 24 and a second sprocket wheel 25, the latter fixed on the worm shaft 26.

Two braces 27 support the worm shaft or threaded bar 26, and these braces or standards are joined by the metallic cross arms 28, which are flanged and bolted to the standards. On the worm shaft a nut 29 is adapted to travel back and forth, and is guided in its movement on the guide rod 30, the nut being perforated as at 31 for the passage of the rod.

At its lower end the nut is formed with a projecting lug or tappet 32, adapted to travel in the space between the two brace

bars 28, and in the path of movement of this tappet is located a cam 33 formed on the pivoted lever arm 34 suspended between the two brace bars 28.

5 A valve rod 35 is pivoted to the end of the lever 34, and a valve arm 36 is pivoted at right angles to the valve rod 35, and extends into the casing 19.

10 Within the casing a valve 37 is connected to the arm 36 (as shown in dotted lines) and this valve is adapted to control the port 38 which leads to the pipe 18, and the port 39 leading to the exhaust 40. A spring 41 is held between base 42 and the end of the arm 15 36 which normally holds the port 38 closed.

The operation of the mechanisms illustrated will be apparent, and a lengthy description is believed to be unnecessary.

20 As the elevator cage or car approaches the ground or surface level, when lifted by the hoist engine, the shaft of the hoisting drum rotates the worm shaft and the tappet nut is traveling toward the cam lever. At a predetermined point in the ascent of the elevator car the tappet strikes the cam and depresses the lever, valve rod and valve arm and rotates the valve within the steam chest or valve casing 19. Fluid pressure is thus permitted to flow into the cylinder against 30 the piston, and the piston is depressed. The movement of the piston draws down upon the gate rope and the gate or barrier is lifted as will be understood. In this manner the gate or barrier is automatically lifted so 35 that the men on the ascending car may step from the car on the ground landing. During the time the engine is standing idle with the car at the ground level and the tappet engaging and holding down the cam lever, 40 the gate is held elevated. When the engine is again started and the car moved either up or down from the shaft landing, the tappet passes over the cam and the spring returns the levers to normal position shutting off pressure in the valve and opening 45 the exhaust, whereupon the gate is permitted to descend to closed position again. It will be understood that whether the car is ascending or descending toward the gate or 50 barrier, the contact of the tappet with the cam will cause the gate to be raised as described.

55 While moving in the shaft it will be understood that the approach to a landing, at which the car is to stop is slow, and the point of contact between the tappet and cam is of sufficient duration to actuate the gate lifting mechanism. On the other hand, should the car be hoisting coal and it be not 60 desired to stop at a landing, the ascent of the car is not diminished in its speed and the tappet passes so quickly over the cam

that the gate mechanism is not actuated. If desired however an engineer's valve may be placed in the steam pipe in a convenient 65 location, and by means of this valve the supply of pressure to the actuating valve may be controlled as will be understood.

70 While I have illustrated only one gate and actuating mechanism therefor, it will of course be understood that a system or series of gates may be actuated by the moving tappet coming in contact with a series of cam levers which actuate the operating valves for 75 separate or independent gates, and I contemplate such an embodiment of my invention wherever required.

80 It will also be understood that while I have referred to the motive fluid pressure as steam, I do not limit myself to such use, as compressed air or other medium may be utilized if desired.

85 Having thus fully described my invention what I claim as new and desire to secure by Letters Patent is:

1. The combination in a device as described of a driven worm shaft, a traveling nut thereon carrying a tappet, a valve having an operating arm and a pivoted cam lever in the path of said tappet, and a rod 90 connecting said arm and lever, for the purpose described.

2. The combination with a shaft and a hoisting mechanism of a movable gate, a cylinder and piston therein having its stem 95 connected to said gate, said piston movable under pressure to lift said gate, a controlling valve, a worm screw, a traveling nut and tappet, a cam lever in the path of said tappet, and means connecting said cam lever 100 with said valve.

3. The combination of a movable gate, fluid pressure actuated mechanism for lifting said gate, a worm screw suitably actuated, a traveling nut thereon carrying a tappet, a controlling valve in connection with the fluid pressure actuating mechanism, and means actuated by said tappet for moving 105 said valve for the purpose described.

4. The combination with a shaft and a 110 hoisting mechanism, of a movable gate, fluid pressure actuated mechanism for lifting said gate and a controlling valve, a worm screw suitably actuated, a traveling nut and tappet, a cam lever in the path of said tappet, 115 and means connecting said cam lever with said valve.

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

ISAAC J. HARVEY.

Witnesses:

J. F. HENRY,
GEORGE PITTAWAY.