

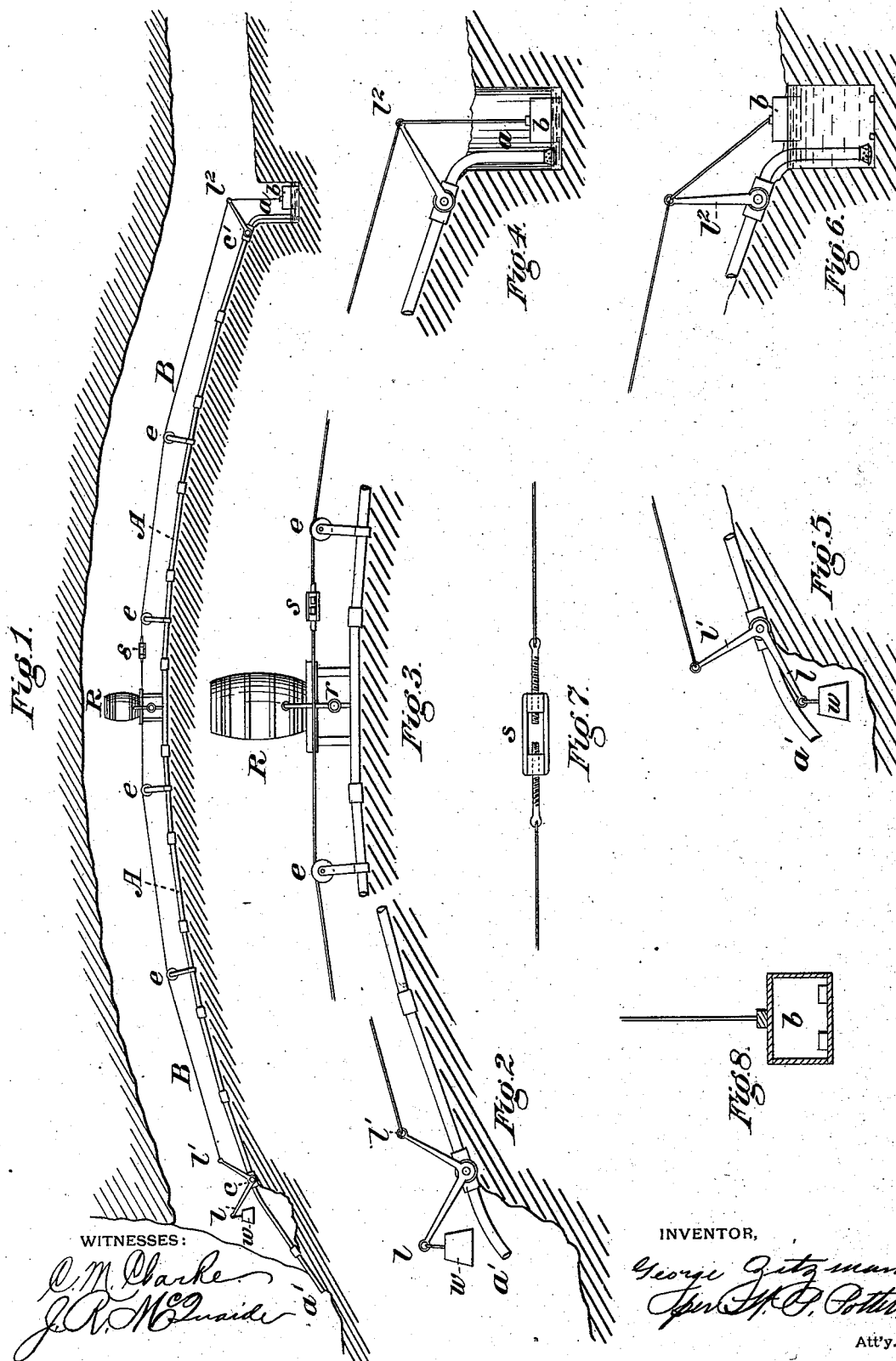
(No Model.)

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AUTOMATIC METHOD OF DRAINING COAL MINES.

No. 381,200.

Patented Apr. 17, 1888.



WITNESSES:

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UNITED STATES PATENT OFFICE.

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AUTOMATIC METHOD OF DRAINING COAL-MINES.

SPECIFICATION forming part of Letters Patent No. 381,200, dated April 17, 1888.

Application filed October 22, 1887. Serial No. 253,051. (No model.)

To all whom it may concern:

Be it known that I, GEORGE ZITZMANN, of Millvale, county of Allegheny, State of Pennsylvania, have invented or discovered a new and useful Improvement in Automatic Methods of Draining Coal-Mines; and I do hereby declare the following to be a full, clear, concise, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which like letters indicate like parts.

Figure 1 is a sectional view of a coal-mine, showing my improved method of and apparatus for automatic drainage. Figs. 2, 3, and 4 are detailed views of the operative parts of my apparatus on an enlarged scale, and showing the valves at the ends of the siphon closed. Figs. 5 and 6 are corresponding views showing the apparatus with the valves open as in operation. Fig. 7 shows a detailed view of the swivel which takes up and lets out the slack of the wire cable operating the valves of the siphon. Fig. 8 is a detached view of the box at the end of the wire cable, and which sits in the water in the drainage-pit, as shown in Figs. 4 and 6.

In the business of coal-mining a serious problem has often been found in the question as to how to dispose of surplus water which collects in the mines. Some mines are so fortunate in the dip of the veins as to drain themselves, while many more have the dip of the coal-vein inclined inwardly, or have the vein running as shown in the drawings at Fig. 1, entering first at an elevation and then gradually descending. At many mines, too, particularly at what are known as "river mines," the mouth of the mine is on the river-bank, and often elevated considerably above the water, thus furnishing the required conditions for the successful operation of a siphon. To this class of mines my improvement is particularly advantageous; and it is the object of my invention to facilitate the drainage by the automatic opening and closing of the valves which operate the siphon; and to this end it consists in the arrangement, in connection with a siphon, of means for this purpose, which, by reference to the drawings, I will proceed to describe more in detail.

In Fig. 1 A represents the line of pipe which

constitutes the siphon, terminating at the inner end in a pit arranged to collect the water, its outer end, A', at the mouth of the mine, being, of course, sufficiently depressed to insure the working of the siphon. Near the outer end of the pipe, at *c*, is placed a cut-off valve operated by two lever-arms, to the outer one of which, *l*, is attached the weight *w*. To the other arm, *l'*, is connected the cable B, running the entire length of the pipe A, and mounted thereon by any suitable pulley and standard attachments, as at *e*. Near the inner end of the pipe A is another cut-off valve, at *c'*, operated by a lever-arm, *l''*, to the end of which the cable B is firmly attached. Thus the cable B will extend from the lever-arm *l'* to the lever-arm *l''*, and will be kept sufficiently rigid or may be tightened and loosened, as the state of the atmosphere may require, by means of the swivel *s*, attached also to the lever-arm *l''*, and suspended therefrom is a box or wooden receptacle, *b*, which floats upon the water in the pit *a*. This box may be weighted or may be made sufficiently heavy to work without weights; but I deem it best that it should be about twice as heavy as the weights *w* at the other end of the cable B, so as to insure holding the valves *c* and *c'* always closed except when relieved by the presence and pressure of the water in the pit *a* under the box *b*, so that the normal condition of the apparatus when the siphon is not at work will be with the valves *c* and *c'* closed, and the lever-arms *l*, *l'*, and *l''* and the box *b* will all be in position as shown in Figs. 1 and 2.

As a matter of course, in order to start the siphon the pipe A must first be filled with water, and to facilitate this operation I provide midway of the pipe the reservoir R, from which the needed supply of water is admitted to the pipe by means of the stop-cock *r*. Ordinarily this reservoir will not be called into use after the siphon is first started. The pipe A will naturally retain sufficient water to start the siphon; but I purpose to keep the reservoir or barrel stored with water to provide for any emergency.

The operation of my apparatus will be apparent from an inspection of the drawings.

The normal condition of the apparatus, owing to the excess of weight at the box *b* over

that at *w*, will be as shown in Fig. 1, holding the valves shut and preventing the siphon from working; but as the water collects in the pit *a* it naturally raises or buoys up the box *b*, and thus allows the influence of the weight *w* to come into play upon the cut-off valves *c* and *c'*, opening them and starting the siphon, the pipe *A* having been, as heretofore explained, previously filled with water. If for any reason the pit *a* were allowed to fill entirely before the siphon were started, the lever-arms, weight *w*, and box *b* would assume the position shown at Figs. 5 and 6; but ordinarily, when the apparatus is allowed to work automatically, the box *b* will begin to rise and will permit the weight *w* to come into play, at once opening the valves *c* and *c'* only in part, and as the water is drawn off the box, from its excess in weight, will sink, drawing back the cable and closing, by means of the lever-arms, the valves in the pipe until opened automatically by the rising of the water in the pit, and with it the box *b*. As the mine is driven farther in the location of the pit *a* may be changed as required, and the pipe *A* lengthened accordingly, or it may be lengthened by means of hose or in any other suitable way.

My apparatus will be of use not only in mining operations, but in any place where it may be desirable to draw water by means of the principle of the siphon, as it saves the use of a force-pump and requires little or no attention after it is once placed in operation, regu-

lating itself with automatic precision. I have found in practice that it only needs careful adjustment of the parts and the regulation of the tension of the cable by means of the swivel to secure the most satisfactory results.

Having thus described my invention, what I claim herein, and desire to secure by Letters Patent of the United States, is—

1. A siphon operating as a drainage-pipe and provided with valves, in combination with means connected thereto at or near the extremities of the siphon for automatically opening and closing said valves, substantially as described.

2. In apparatus for draining coal-mines, the discharge-pipe *A*, operating as a siphon having within it cut-off valves *c* and *c'*, operated by lever-arms actuated by weights attached thereto, substantially as and for the purposes set forth and described.

3. The improved apparatus for operating automatically a siphon drain-pipe, consisting of the combination of discharge-pipe *A*, and cut-off valves *c* and *c'*, operated by means of lever-arms *l*, *l'*, and *l''*, connected by cable *B*, weighted at its extremities, substantially as shown and described.

In testimony whereof I have hereunto set my hand.

GEORGE ZITZMANN.

Witnesses:

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