L. PICHLER.

SAFETY DEVICE FOR MINE CAGES.

APPLICATION FILED JAN. 10, 1918.

1,278,742.

Patented Sept. 10, 1918.

2 SHEETS—SHEET 1.

Fig. 1.

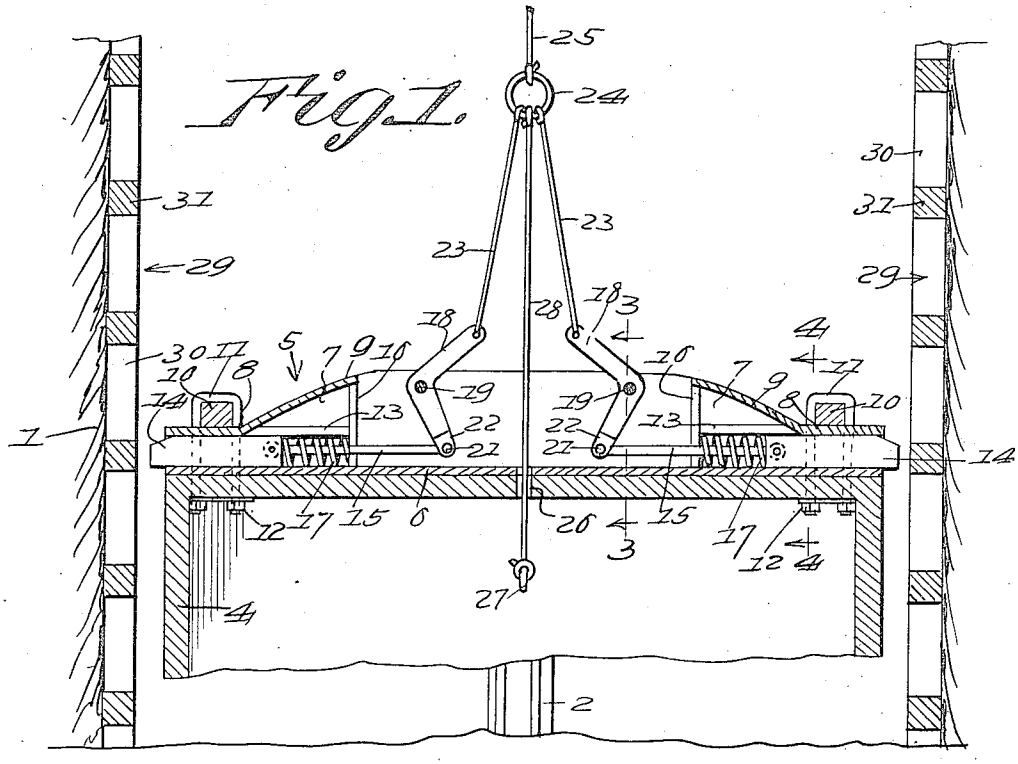
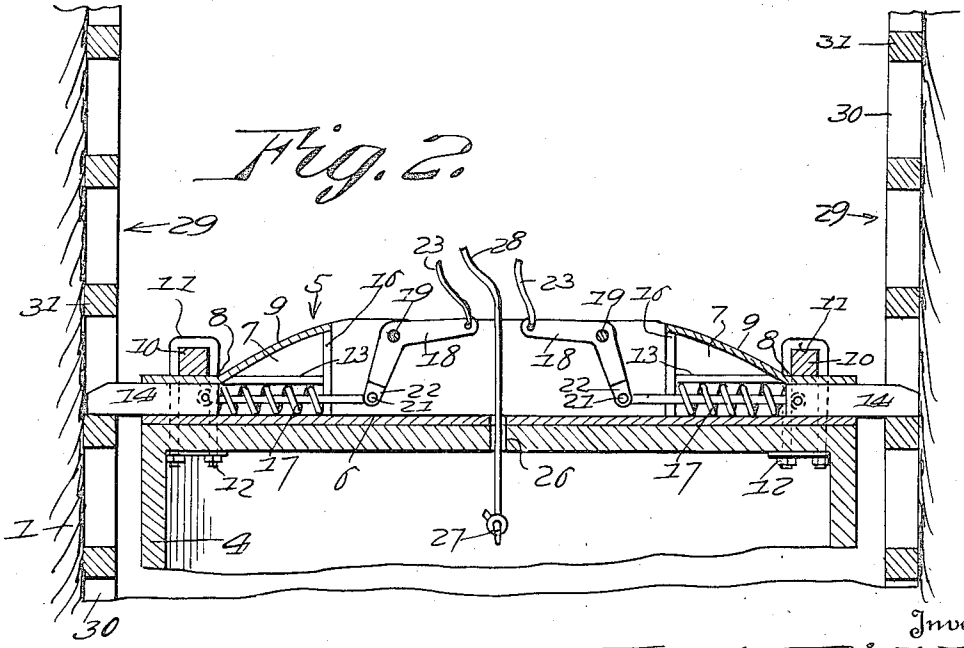


Fig. 2.



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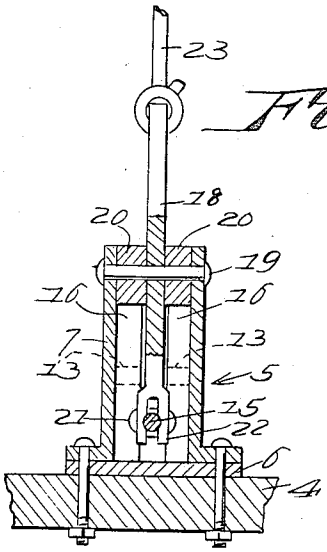


Fig. 3.

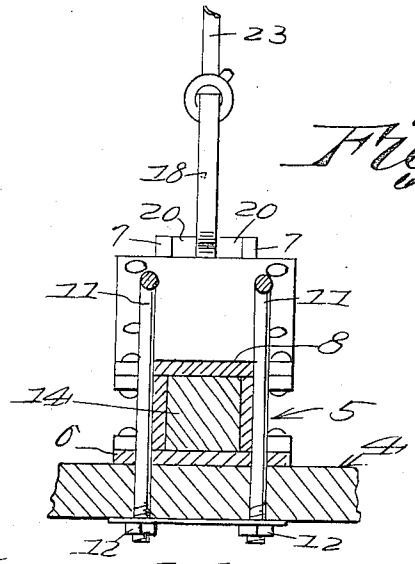


Fig. 4.

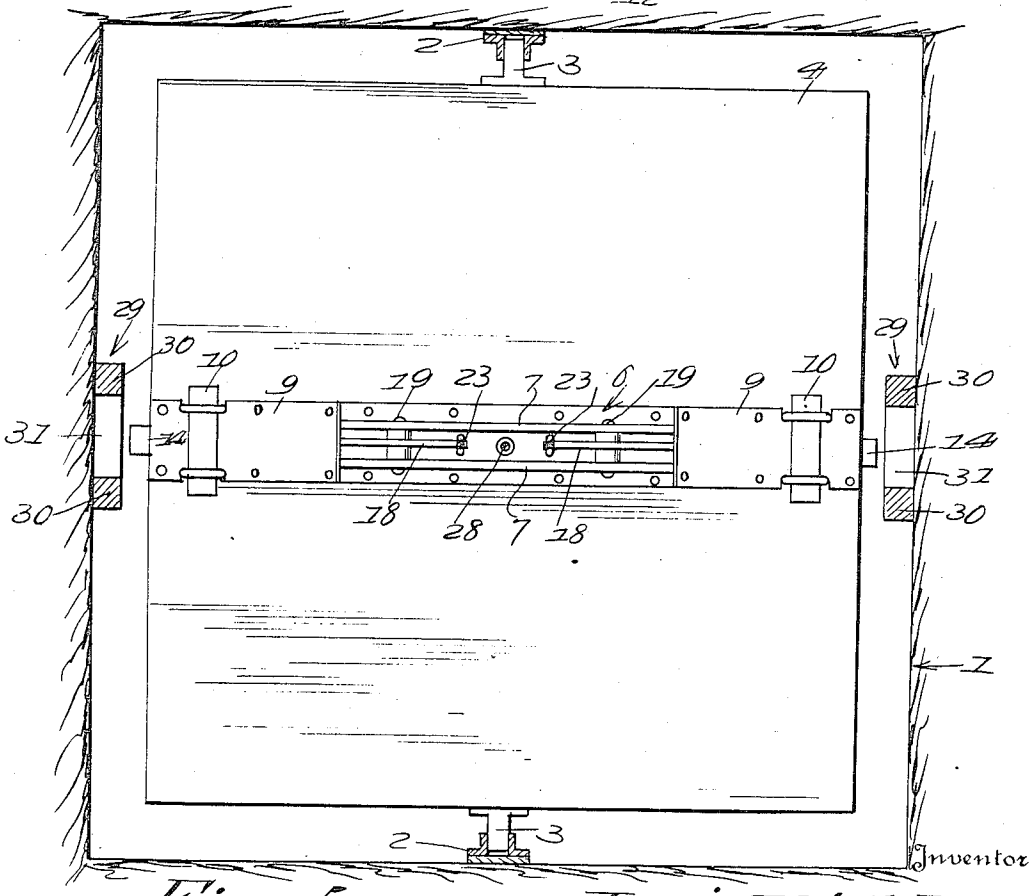


Fig. 5.

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UNITED STATES PATENT OFFICE.

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SAFETY DEVICE FOR MINE-CAGES.

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Application filed January 10, 1918. Serial No. 211,207.

To all whom it may concern:

Be it known that I, LOUIS PICHLER, a citizen of the United States of America, residing at Fort Wayne, in the county of Allen and State of Indiana, have invented new and useful Improvements in Safety Devices for Mine-Cages, of which the following is a specification.

This invention comprehends generally improvements in that class of inventions known as elevators and more particularly relates to a safety device for mine cages.

It is the principal aim and object of this invention to provide a device of the above mentioned character designed for mounting on a mine cage and operably connected with the hoisting cable and also arranged so as to engage the opposite sides of the shaft should the cable break, thereby preventing the cage from falling to the bottom of the shaft.

More particularly the present invention embraces the provision of a safety device for mine cages embodying a pair of spring controlled engaging bolts which are normally held by the lifting cable in a retracted position but adapted to be extended upon the breaking of the cable so as to engage coöperative racks mounted in opposed relation in the shaft.

As a further improvement the present invention includes the provision of improved means for connecting the hoisting cable and the cage in such a manner that the engaging bolts will also be held in a retracted position and will not be subjected to the weight of the car or cage when the latter is being lifted.

It is a more specific object of this invention to provide coöperative means for guiding the sliding movement of the engaging or catch bolts or pawls as well as the resilient tensioning means therefor.

Among the other aims and objects of this invention may be recited the provision of a device of the character described with a view to compactness, and in which the number of parts are few, the construction simple, the cost of production low and the efficiency high.

Other improvements and novel details in the construction and arrangement of the various parts of the apparatus will be brought out more in detail in the description to follow, which for a clear understanding of the invention should be considered in connection with the accompanying drawings forming a part hereof, and wherein is disclosed for the purpose of illustration a convenient and satisfactory embodiment of the invention. It is to be noted in this connection that minor changes in the construction and arrangement of parts may be made without departing from the principle of operation of the various parts.

The invention is clearly illustrated in the accompanying drawings, in which:—

Figure 1 is a vertical section of the invention, the cable being shown in a hoisted position;

Fig. 2 is a vertical sectional view of the invention when the cable is broken;

Fig. 3 is a transverse sectional view taken on line 3—3 Fig. 1;

Fig. 4 is a transverse sectional view taken on line 4—4 Fig. 1;

Fig. 5 is a top plan view of the invention.

Similar characters of reference are employed in all the above described views, to indicate corresponding parts.

Referring now, more particularly, to the accompanying drawings, there is provided a mine shaft 1 on opposite sides of which are mounted guide rails 2 for engagement with complemental guide rails 3 on the adjacent faces of the cage 4 so that the latter will be guided during its vertical sliding movement in the shaft.

With a view toward providing improved safety means for preventing the cage or car from falling to the bottom of the shaft a housing indicated in its entirety by the numeral 5 is rigidly mounted transversely of the top of the cage 4. This housing consists of a rectangular base 6 disposed on the cage 4 and having side walls 7 extending upwardly therefrom. The upper edges of these side walls are curved and reduced as indicated by the numeral 8 while cover sections 9 are detachably connected to the upper edges thereof as indicated. Retaining bars 10 are disposed across the reduced ends of the casing and are engaged by elongated U-bolts 11 the inner ends of which pass through the top of the cage and are removably anchored thereto by means of suitable retaining nuts 12. Guides 13 are mounted on the inner faces of the opposed side walls 7 in longitudinal alinement with the outer portions of the cover section 9 and coöperate with the same in guiding the sliding movement of the opposed engaging or catch bolts

or pawls 14 slidably mounted through the open ends of the casings. Rods 15 are pivoted to the inner ends of the bolts or pawls 14 for a purpose that will hereinafter appear. Opposed stops 16 are also mounted on the inner surfaces of the walls at the inner terminals of the guides 13. Suitable resilient means such as coil springs 17 are disposed about the rods 15 and have their respective ends bearing against the inner ends of the pawls and the stops and normally serve to force the pawls outwardly. Bell crank levers 18 are pivotally mounted between the side walls of the casing or housing 5 by means of pintles 19 while washers 20 are mounted on the pintles and bear against the inner surfaces of the opposed side walls and against the adjacent bell crank levers so as to assure of a proper swinging movement. The inner and lower ends of the bell crank levers 18 are bifurcated while pivotally mounted therebetween through the instrumentality of pintles 21 are ears 22 which in turn are formed on the inner terminals of the rods 15. Links 23 have their lower ends loosely engaged in the upper or outer ends of the bell crank levers 18 and their upper ends loosely engaged in a ring 24 in which is also engaged a hoisting cable 25 the inner end of which is passed through alining openings 26 in the base 6 and the top of the cage 4 and anchored on a hook 27 which in turn is rigidly mounted within the cage. That portion 28 of the cable between the hook 27 and the ring 24 is taut when the parts are in the position shown in Fig. 1 or when the pawls 14 are in a retracted position. By this arrangement the weight of the cage is not disposed on the safety means.

Coöperating with the pawls 14 are racks indicated in their entireties by the numeral 29 mounted on the inner faces of the opposite walls of the shaft 1. These racks are constructed in the form of ladders and embody spaced side rails 30 connected by rungs 31 which constitute teeth and upon any opposed pair of which the pawls 14 engage in the event that the hoisting cable breaks so that the pawls and the racks will coact in sustaining the weight of the cage to thereby prevent the latter from falling to the bottom of the shaft.

The mode of operation of the present invention may be reviewed as follows:—

Assuming that the parts are assembled in the manner described and as illustrated especially in Fig. 1 when the hoisting cable 25 breaks the springs 17 act to slide or extend the pawls in opposite directions swinging the bell crank levers about their pivots and permitting the pawls to engage upon any of the opposed rungs or teeth 31 so as to consequently prevent the cage from falling to the bottom of the shaft.

It is believed that in view of the foregoing description a further detailed description of the operation of the invention is entirely unnecessary. Likewise it is believed that the advantages of the invention will be readily apparent. It is also to be appreciated that constructing the racks in the form of ladders permits persons lowering themselves into the shaft with a view to making repairs to the safety means, etc.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limited sense.

Having thus described the invention what is claimed as new and desired to be secured by Letters Patent is:—

The combination with a mine cage and a hoisting cable passing through the top of the cage and anchored within the cage, of a housing embodying a base, spaced side walls having their respective ends reduced, cover sections detachably fitted upon the upper edges of the side walls adjacent the respective ends thereof, means for detachably connecting the housing to the top of the cage, opposed guides disposed longitudinally in the housing adjacent the respective ends thereof, opposed stops mounted in the housing at the inner terminals of the guides, engaging pawls slidably mounted in the open reduced ends of the housing and between the guides, rods pivotally connected to the inner ends of the pawls, pivotally mounted bell crank levers in the housing and operably connected to the rods and to the cable, and coil springs disposed about the rods and bearing against the pawls and the stops for automatically extending the pawls upon breaking of the cable yet normally held in a retracted position by the cable.

In testimony whereof I affix my signature

LOUIS PICHLER.