No. 776,083. PATENTED NOV. 29, 1904.

A. PALMROS.

SAFETY DEVICE FOR CABLE MINE HAULS.

APPLICATION FILED MAR. 22, 1904.

NO MODEL. 4 SHEETS—SHEET 1.

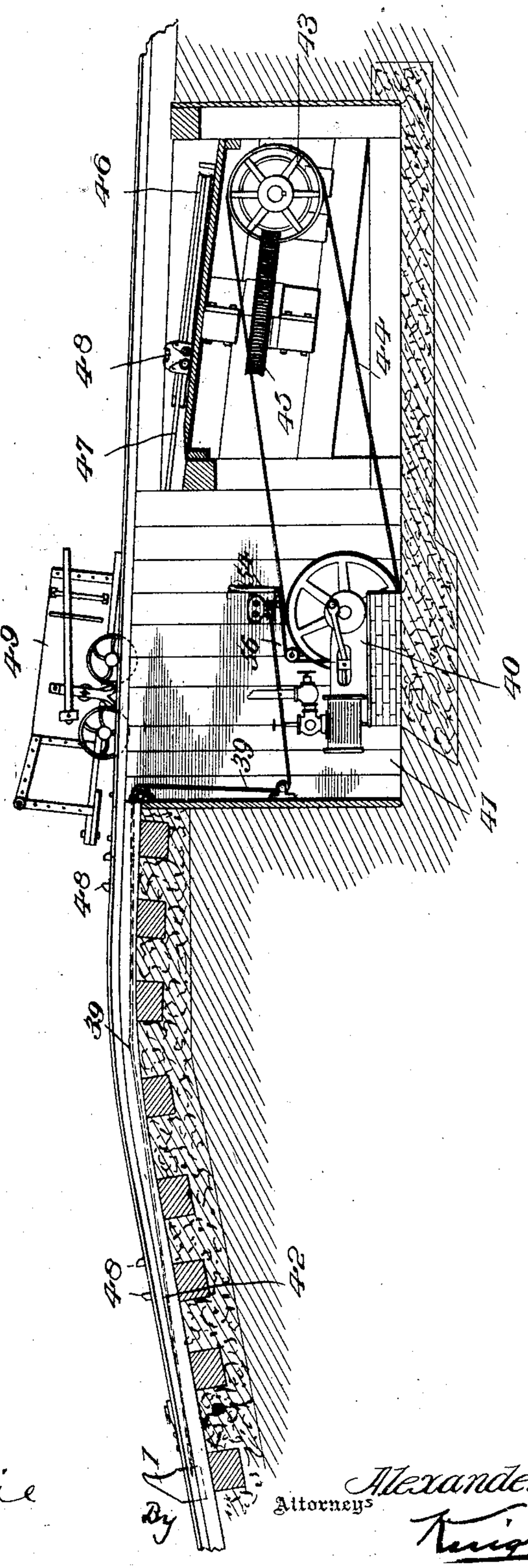

Fig. 1.

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NO MODEL. 4 SHEETS—SHEET 2.

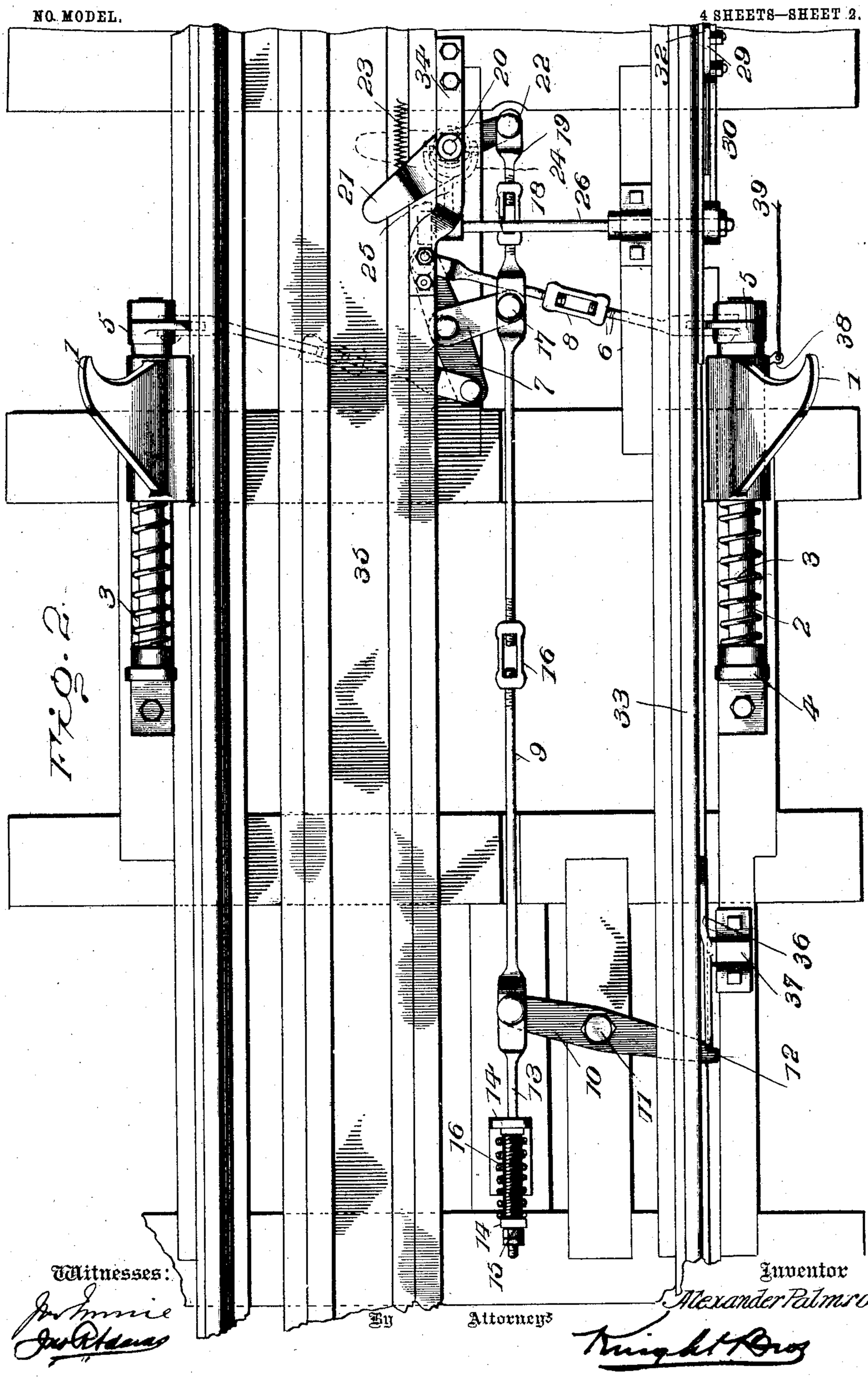

FIG. 2.

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NO MODEL. 4 SHEETS—SHEET 3.

Fig. 3.

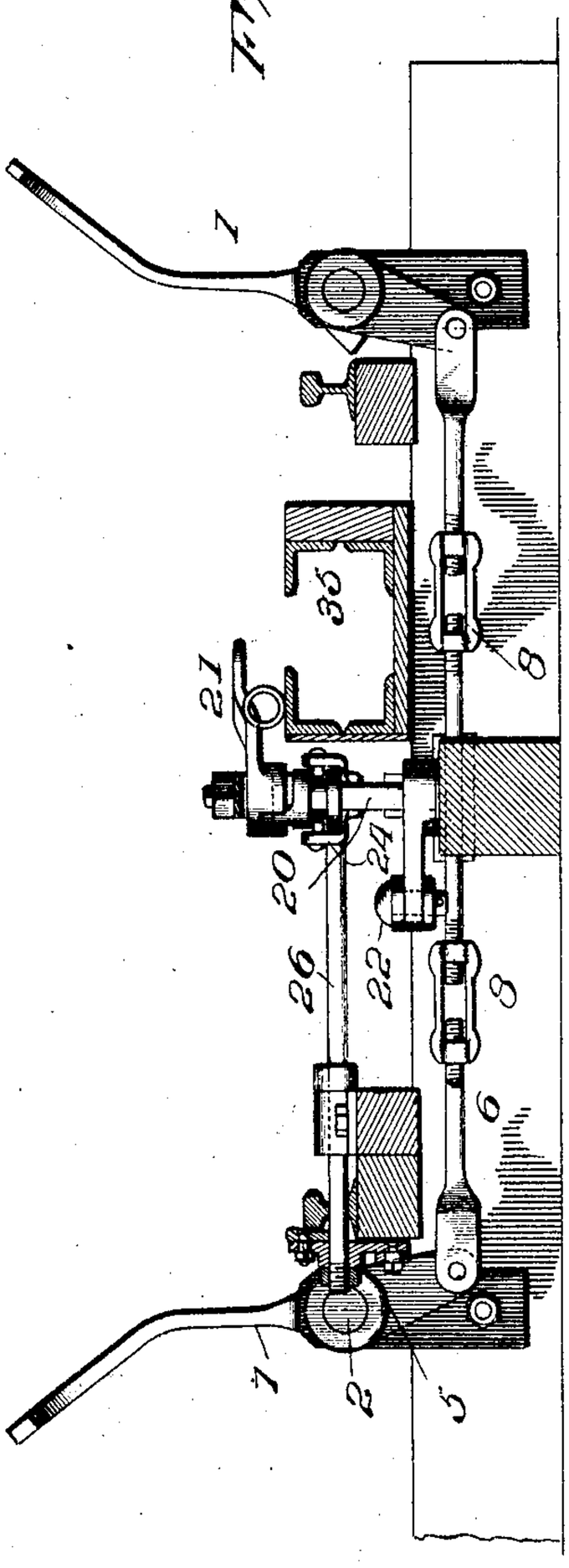
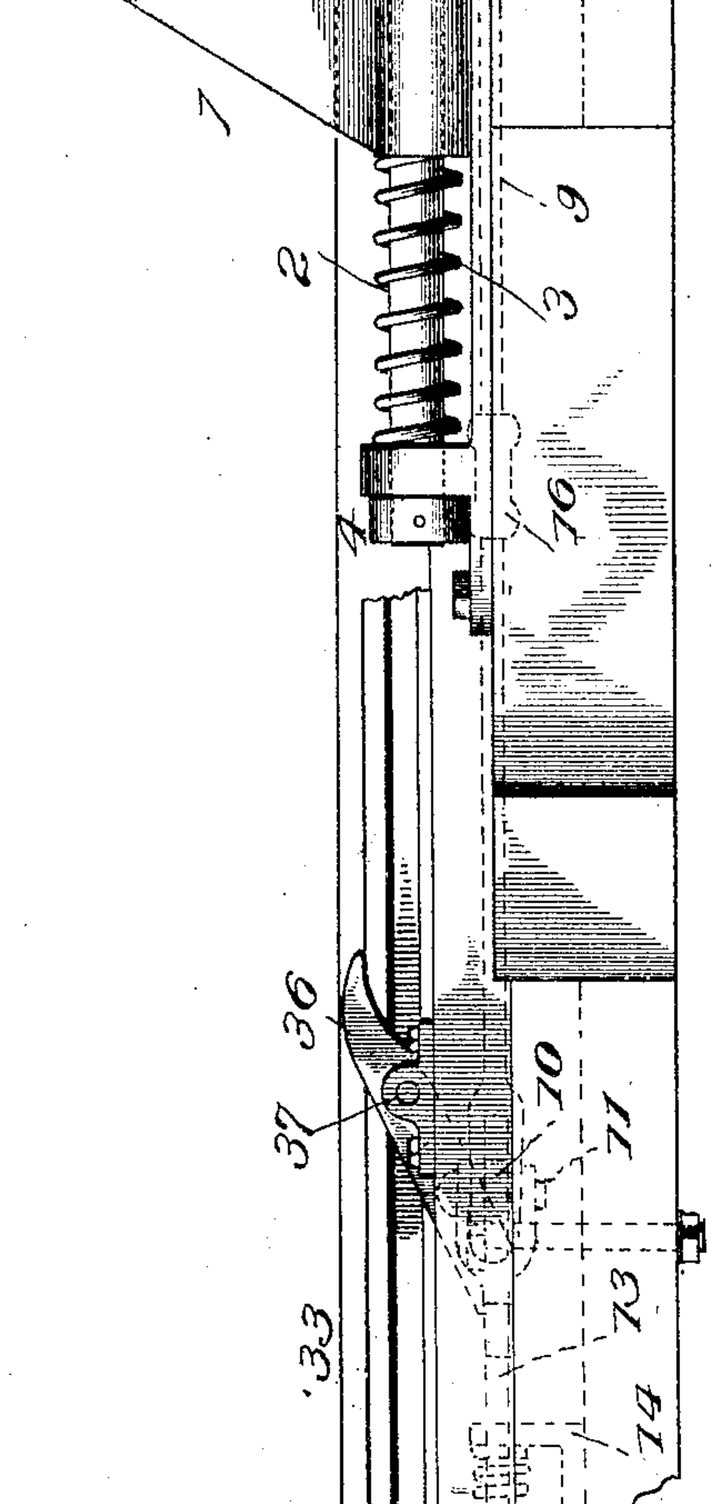


Fig. 4.



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NO MODEL. 4 SHEETS—SHEET 4.

Fig. 5.

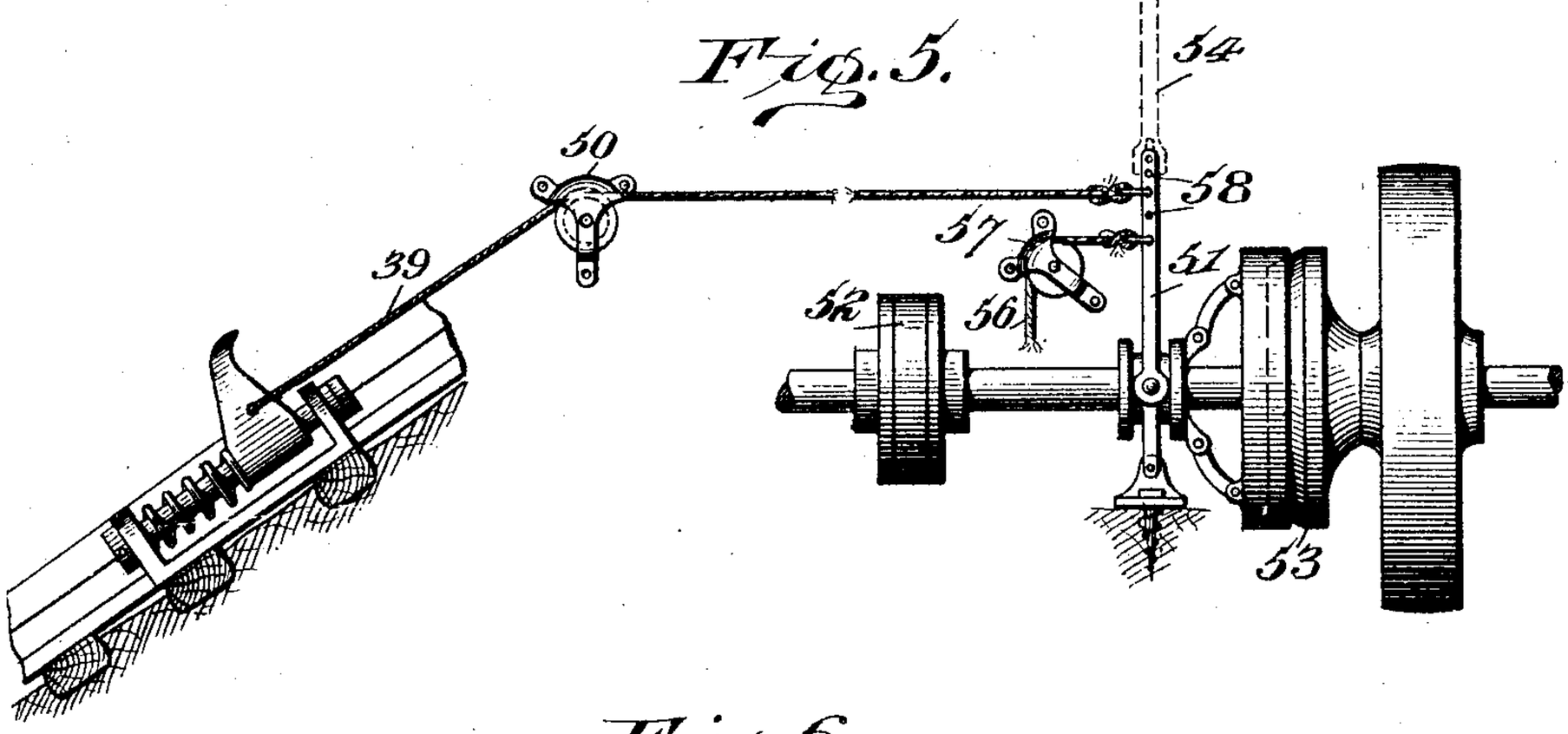

Fig. 6.

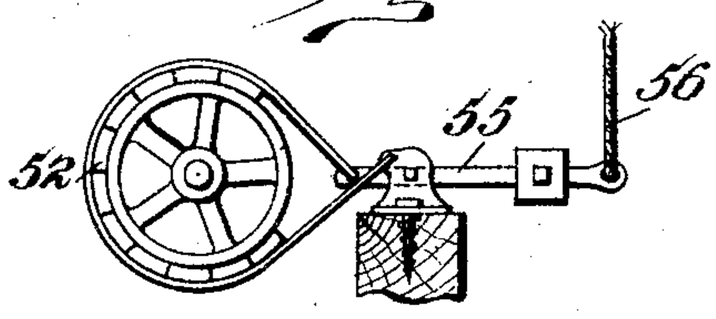

Fig. 7.

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No. 776,083. Patented November 29, 1904.

UNITED STATES PATENT OFFICE.

ALEXANDER PALMROS, OF FAIRMONT, WEST VIRGINIA, ASSIGNOR TO THE WAGNER-PALMROS MFG. CO., OF FAIRMONT, WEST VIRGINIA, A CORPORATION OF WEST VIRGINIA.

SAFETY DEVICE FOR CABLE MINE-HAULS.

SPECIFICATION forming part of Letters Patent No. 776,083, dated November 29, 1904.

Application filed March 22, 1904. Serial No. 199,506. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER PALMROS, a citizen of Finland, residing at Fairmont, in the county of Marion, State of West Virginia, have invented certain new and useful Improvements in Safety Devices for Cable Mine-Hauls, of which the following is a specification.

In practice it has often been found necessary to lower loaded mine-cars from a higher level—as, for instance, when the mine-opening is located on a mountain side some distance above the railroad. With the introduction of the cable mine-haul described in Letters Patent No. 722,951 it became evident that some device had to be provided for stopping or derailing mine-cars which either failed to engage with the dogs attached to the cable or were afterward disengaged from them to prevent them rushing down the incline, and thus endangering both life and property. As it is well known to those skilled in the art, every car has an attachment for proper engagement with the cable-dog. This attachment is bolted on the bottom of the car, projecting a few inches below the axles. When a car is derailed in the mine, it sometimes happens that this attachment is broken and when the car is brought out loaded ready for lowering by means of the cable-haul the dog fails to engage and the car remains standing until another loaded car, provided with an attachment in good order follows and is picked up by the dog. This car provided with the attachment in good order then pushes the first one before it until when the incline is reached the disabled car, being free from engagement with the cable, plunges forward on its downward course, usually tearing up everything in its path.

The object of my invention is to provide a safety device or car-retarder that will obviate accidents of this character by reason of said attachment being broken; and my invention consists of the parts and combination of the parts, as will be hereinafter more fully set out.

In the drawings, Figure 1 is a sectional view of the top of the incline and track with my invention shown in relative arrangement therewith. Fig. 2 is a top plan view of the track with my invention in position. Fig. 3 is a front elevation of my invention attached to the rails and ties of the railroad, the rails and sleepers being in section. Fig. 4 is a side elevation of the same. Fig. 5 is a front elevation of the suitable clutch on the driving-shaft of the engine shown connected with the safety device. Fig. 6 is a side elevation of the brake. Fig. 7 is a diagrammatic view of the safety device with an electric brake and an automatic cut-out switch.

1 represents the horns, which are mounted and feathered on the spindles 2, held in position by means of springs 3, said spindles being mounted in brackets 4, in which are formed suitable bearings for the spindles. Levers 5 are keyed to the spindles 2 and connect, through the rods 6, to the bell-crank lever 7. The rods 6 are provided with turnbuckles 8 for the purpose of adjustment, as will be readily understood. The rod 9 is attached at one of its ends to a double lever 10, which is pivoted upon the track structure, as at 11, said double lever having a notched end 12.

13 is a rod pivoted to the double end lever 10 in line with the rod 3, said rod 13 passing through the brackets 14 and provided with nuts 15 upon its outer end.

16 is a coil-spring secured around rod 13 between the brackets 14.

The rod 9 is provided with a turnbuckle 16 for purposes of adjustment.

The bell-crank lever 7 is of the three-arm type, as shown clearly in Fig. 2, the rods 6 being secured to two arms of this lever that are in alinement with each other. The third arm of this lever is provided with a wrist-pin 17, by means of which the rod 9 is connected near its forward end to said bell-crank lever 7, the rod 9 being extended beyond its connection or attachment to the bell-crank lever 7 by means of the turnbuckle 18 and rod 19.

20 is a spindle upon which is loosely journaled a lever 21, one end of which is pivotally connected, as at 22, to the extension 19 of

the rod 9, this lever being held in the position shown by the dotted lines by means of a spring 23. A jaw-clutch 24 is slidably mounted on the spindle 20 and is vertically operated by the lever 25, which is keyed to the shaft 26, extending through the rail to bent lever 29, by means of the link 30 and a crank-arm 31, said crank-arm being keyed to the shaft 26. The bent lever 29 is connected to a pressure-bar 32, positioned alongside of the track 33 and in the path of the car-wheels.

34 is a band positioned above the clutch 24 for the purpose of protecting the same.

35 is a guideway for the cable.

36 is a tripper-arm positioned closely beside the track 33 and in the path of the wheels of the car, one end of which is engaged by the notched end 12 of the double lever 10, said tripper-arm being mounted in a strap-bearing 37.

One of the horns 1 is provided with a perforated lug 48, to which one end of the cable 39 or rod is secured, the other end of said cable or rod being secured in a suitable manner to a suitable switch or clutch attached to the engine 40 in the pit 41, located at top of the incline 42.

43 is a power or band pulley connected to the engine 40 by means of the belt-band 44, said band-pulley having a suitable worm (not shown) secured to its shaft, which engages with the worm-wheel 45, upon the shaft of which is mounted a cable-drum 46, around which the cable 47 passes, said cable having secured to it at intervals dogs 48, such as are described in Patent No. 722,951, above referred to.

49 is a suitable car which is provided with any suitable attachment for the proper arrangement with the cable-dog 48, said attachment, as is well known, being bolted on the bottom of the car and projecting a few inches below the axles.

The operation of the device is as follows: The two horns obstruct the passage of any car down the incline unless both the attachment and the cable-dog are in good order and properly connected. When a car properly attached to the cable-dog approaches the two horns, its weight operates the jaw-clutch 24 through a set of engaging rods 6, bell-crank lever 7, and connecting-rod 9 by reason of its engagement with the lever 21. Shortly after the engagement of this clutch the dog holding the car forces the above-mentioned lever to the left and deflects the horns outwardly, thus allowing the car to pass between them freely; but in case the car is not guided by a dog attached to it in proper order its mere pressure and the consequent engagement of the clutch does not deflect the horns. In the same way a dog in good order, but unattached to a car, will move the lever without affecting the position of the horns. Thus, briefly stated, the principle involved is a simultaneous operation of the car's weight and of a properly-attached dog guiding it upon the mechanism of the horns. The rods 13 by means of the spring 16 cause a pull toward the left, which is transmitted by the rods 6 to the spindles 2 and horns 1. A car-wheel coming in contact with the pressure-bar 32 forces said bar down by the weight of the car, thus revolving the shaft 26, which in turn elevates the clutch 24 to the position shown in Fig. 4. As stated, the lever 21 is loosely journaled on the spindle 20 and is held in the position shown by dotted lines in Fig. 2 by means of the spring 23. The cable-dogs moving in their guide force lever 21 toward the left; but unless the clutch 24 is simultaneously elevated by the pressure-bar 29 this motion will not cause a revolution or turning of the spindle 20. If the car properly attached to its dog forces the pressure-bar down, thereby elevating clutch 24 to the position shown in Fig. 4, then when the dog forces the lever 21 toward the left it will cause the spindle 20 to turn, and thereby operate rods 9 and 6. The object of the lever 10 is to lock the mechanism in the position last described, the lever being wedged by means of the tripper-arm 36. This tripper-arm releases the mechanism after the car has passed through the horns by forcing its opposite end downward by contact with the wheel of the car in passing, whereupon the lever 10 is free to act and is actuated by the compressed spring 16, thereupon restoring the mechanism to its original normal position. A "wild" car running down the incline would meet the obstructing horns 1, which would act as a buffer to the shock, they being yieldable by reason of the pressure of the spring 30. As stated, a suitable clutch or switch is employed in the driving-gear and connected to the horns by means of the cable, rope, or rod 39, whereby the switch or clutch is automatically operated whenever the horns 1 are pressed back by the weight of the wild car, thus stopping the cable and preventing any danger of the other cars following the wild car down the incline and running into it, thereby protecting life as well as property.

In Figs. 5 and 6 the horn 1 is attached by rope 39, running over guide roller or rollers 50, to the friction-clutch lever 51, and the clutch is on the worm-shaft of the power-pulley 43. On the same shaft is also a friction-brake 52, which is not in action when machinery is operating, but is "set" when clutch 53 is opened by hand-lever 54 or rope 39 at will or automatically. The hand-lever 54 is shown in dotted lines above clutch-lever 51 for operating the clutch and brake by hand. It is detachable from the lever 51 and can be hung in a convenient position close by, and when machinery has to be stopped the operator pushes it on the end of lever and forces it over to the right. This will open clutch and set

the brake. This friction-brake is of any approved type, having a weighted lever 55, to one end of which is attached a rope or other suitable means 56, which passes over a pulley 57, suitably secured to a support, the other end of rope 56 being secured in one of the series of perforations 58 in the operating-lever 51, as shown in Figs. 5 and 6.

In Fig. 7 I have shown an electric "cut-off" in connection with the safety device. 59 is an insulator in switch-box 60, which is made open or dust-proof, as preferred. 61 are contact-springs connected electrically to coil 62, as shown by wires 63 and 64. 65 is a knife on stem 66, insulated at 68. 69 is a spring holding the stem 66 in tension. 70 is arm attached to horn 1 of safety device. Lines 71 and 71 are connected across coil 62, which is a magnet holding lever 72 on full-load notch. Coil 62 is connected in series with field-coils of motor. When safety-device horn 1 is pushed by wild car, knife 65 and short-circuit contact-springs 73 are operated and short-circuit coil 62 loses its magnetism and allows lever 72 to move "off" position through spring 74. For hand operation the single-pole knife-switch 75 acts in a same manner, of course it being understood that similar switches can be placed anywhere on the line of rope-runway. For instance, wires can be carried down to the lower terminal where cars are being dumped, and whenever too many cars come down for proper distribution and handling the operator at lower terminal can stop the supply by closing the switch for a short space of time. To prevent his leaving it "closed" for longer time than necessary to stop the motor, a spring or weight is attached to the lever so that it will open when the handle is released. In same way a signal can be given by the operator by closing the circuit, when a bell 76 will ring. (See Fig. 7.)

77 is a brake-wheel on driving-shaft 78 of the motor X. Band 79 is kept against the wheel by spring or weight 80 and lever 81. The electromagnet 82 through its plunger 83 counteracts springs or weight 80 whenever the current rushes through the motor. Wires 84 and 85 are in direct circuit for the armature-current, and whenever the circuit is opened electromagnet 82 loses its magnetism and allows the spring or weight 80 to act on the band 79, which causes a braking action on wheel 77. In the sketch the brake 77 is shown keyed onto the shaft 78. It will be seen in Fig. 7 that I have embodied a side view and cross-section of the braking mechanism, illustrating plainly the individual parts of the electromagnet and the brake-band lever and circuit-magnet with the motor and starting-box.

What I claim is—

1. In a cable mine-haul, the combination with the cable-driving mechanism having a clutch, of a buffer removably positioned in the path of a car and means connecting the buffer and said clutch operative only by impact upon said buffer.

2. In a cable mine-haul, the combination with the cable and its driving mechanism, of a buffer normally in the path of a car and having connections through which it controls said driving mechanism, and means moving said buffer from the path of a car.

3. In a safety device for cable-car haul, the combination with a suitable source of power and means controlling said power, of an obstruction within the line of travel, and means connecting said power-controlling means and the obstruction operative only by a defective connection between a car and the cable.

4. In a safety device for cable-car haul, the combination with a cableway, a cable, suitable grips on the cable and a car having means to be engaged by said grips, of an obstruction in the path of the grips operative only by a defective connection between the car and grip to stop the cable.

5. In a safety device for cable-car haul, the combination with a cableway, a cable, suitable grips on the cable, and a car having means to be engaged by said grip, of an obstruction in the path of the grips operative only by a defective connection between the car and grip, and means connecting said obstruction to a suitable source of power operating the cable, whereby said power is cut off when a car with a defective connection with the grip strikes said obstruction.

6. In a cable mine-haul, the combination with a suitable driving mechanism, of an obstruction in the cableway operative only by the weight of a "wild" car, and means connecting the driving mechanism and said obstruction whereby the driving mechanism is stopped when the obstruction is thus operated.

7. In a cable mine-haul, the combination with a suitable driving mechanism, a suitable clutch in said mechanism, of means connected to said clutch and positioned in the cableway, and operative by the weight of a car to operate said clutch, whereby the cable may be stopped.

8. In a cable mine-haul, the combination with two horns in the path of a car, of means in the path of a portion of the car moving said horns from the path of the car.

9. In a cable mine-haul, the combination with two horns in the path of a car, a driving mechanism, and means connecting said horns and driving mechanism whereby the driving mechanism is stopped when a car strikes said horns.

10. In a safety device for a cable mine-haul, the combination, with two horns positioned in the path of a car, of a lever in the path of the cable, and means attached to the cable constructed to strike said lever and thereby remove the horns from the path of the car.

11. A safety device for cable mine-haul,

comprising two horns, an operating-lever connected with said horns, track devices operated by the wheels of a car and means to restore the parts to a normal position.

12. A safety device for a cable mine-haul, comprising two horns, normally in a vertical position, an operating-lever connected with said horns to swing said horns outward when it is operated.

13. A safety device for a cable mine-haul, comprising two horns normally in a vertical position, an operating-lever, rods connecting said lever and horns to swing the horns outward, and a track device connected to said rods to restore the parts to a normal position.

14. A safety device for a cable mine-haul, comprising two horns normally in a vertical position, an operating-lever, rods connecting said horns and lever, a track device, and a clutch constructed to positively connect the track device and operating-lever.

15. A safety device for a cable mine-haul, comprising two resiliently-mounted horns, a bell-crank lever, rods connecting said lever, and horn, an operating-lever connected to one of the arms of said bell-crank lever, a clutch connected to said operating-lever and a track device connected with said clutch.

16. A safety device for cable mine-haul, comprising two resiliently-mounted horns, a three-arm lever, rods connecting said lever, and horns, and operating-lever connected to one of the arms of said three-arm lever, a track device connected to the three-arm lever, a clutch connected to said operating-lever and a track device connected with said clutch.

The foregoing specification signed this 7th day of March, 1904.

ALEXANDER PALMROS.

In presence of—

JOHN L. WAGNER,

I. E. SANDS.