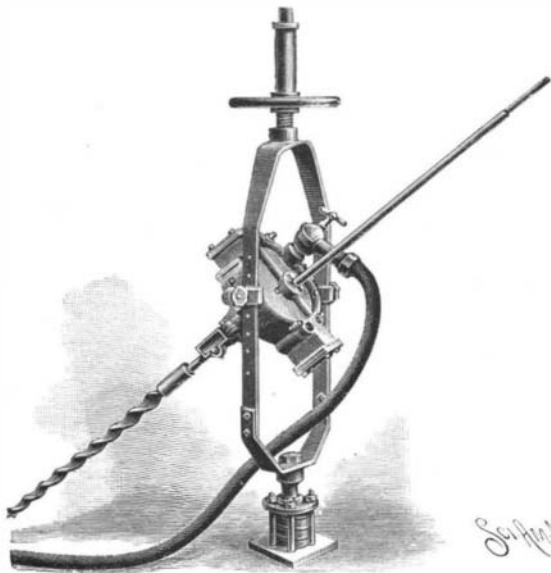


AN IMPROVED DRILLING MACHINE.

The illustration represents a machine more especially designed for drilling coal, rocks, etc., in which a small rotary engine is arranged centrally on the drilling shaft to drive and feed it, the engine being driven by compressed air, steam, or other motive agent. The improvement has been patented by Mr. H. H. Wilderman, of Belleville, Ill. The drill shaft is mounted to slide and turn in a hollow shaft journaled centrally in the engine cylinder, and on this hollow shaft, within the cylinder, is fastened an oval-shaped piston, whose outer ends extend close to the inner surface of the rim of the cylinder. On the rim of the cylinder are trunnions to facilitate supporting the machine in operative position. The piston has internal cavities to contain the lubricant, and apertures through which it may pass outward by centrifugal force to lubricate the cylinder when the machine is running, and the motive agent passes into the cylinder at opposite sides to press on both ends of the piston. The drill shaft is held in

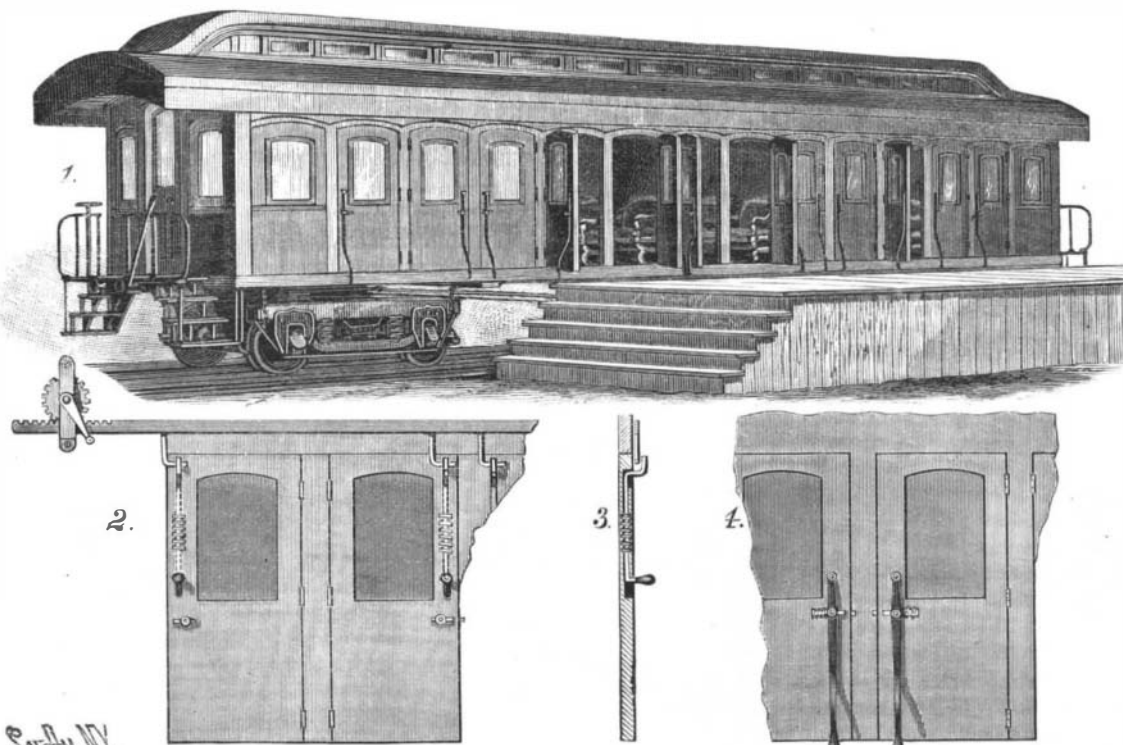


THE WILDERMAN AIR DRILL.

the hollow shaft by keys engaging longitudinal grooves, so that the drill shaft is free to slide while receiving a rotary motion. The shaft has screw threads engaged by half nuts sliding in a casing with a conical head fitting into a two-part sleeve secured by a set screw on a hub on the end of the cylinder, there being a coiled spring at the back end of the conical hub of the casing. By this construction, when the drilling tool strikes a harder substance than the ordinary feed is arranged for the hub of the casing is pushed backward on the spring, retarding the forward movement of the drill shaft while still permitting its rotary motion. This feed mechanism stops all crowding of the machine and prevents choking down in very hard material, or the breaking of the drilling tool and connected parts, the feed of the drill varying automatically according to the hardness of the substance to be drilled.

AN IMPROVED RAILWAY COACH.

A passenger car so constructed as to afford ready entrance and exit at its sides is shown in the accompanying illustration. Opposite each seat is a door in the side of the car, and means are provided whereby all of the doors may be simultaneously locked or unlocked, while any one of the doors may be unlocked without disturbing the others. Fig. 1 is a view in perspective of the car, Fig. 2 being a partial side elevation, looking



TILLSON'S RAILWAY COACH.

from the inside, Fig. 3 a vertical section through one of the doors, and Fig 4 a partial exterior view.

In connection with this construction it is designed, where deemed desirable, to have steps extend along each side of the car from end to end, such steps being auxiliary to the usual end platform steps, but this feature of the improvement is not represented in the illustration. The doors at the sides are hung in pairs, so that when both doors of a pair are open their outer faces come together, the doors thus not interfering with each other, and each door has a horizontal spring-actuated latch, operated from the inside by an attached knob, or from the exterior by means of a lever which extends downward in position to be grasped by a person at the side of the car, as shown in Figs. 1 and 4. Above the latch is a vertical bolt, sliding in a groove in the door, as shown in Figs. 2 and 3, and to be operated only from the interior of the car, the upper end of the bolt being carried inwardly and upwardly, to form a socket between it and the door, while its lower end is bent outward and provided with a knob. A rack bar, held to slide over the doors on each side of the car, has toothed surfaces near one end engaged by a pinion journaled in suitable brackets and turned by a crank arm, and each of the bars has downwardly projecting L-shaped arms, adapted to engage the upper ends of the vertical bolts, as shown in Fig. 2. The rack bars may be operated independently, or the pinions may be connected to actuate them simultaneously on each side of the car, the movement of the bars in one direction, when the doors are closed, locking all the doors, while by a reverse movement the doors are all unlocked. Each door may be independently opened by drawing down its vertical bolt, which is thus disengaged from the rack arm, the bolt being normally pressed up by a spring.

It will be seen that, with this construction, should a car take fire, or any other accident take place, all the passengers have a convenient exit at hand, and any necessity for crowding through the end doors or forcing a way out of the windows is avoided.

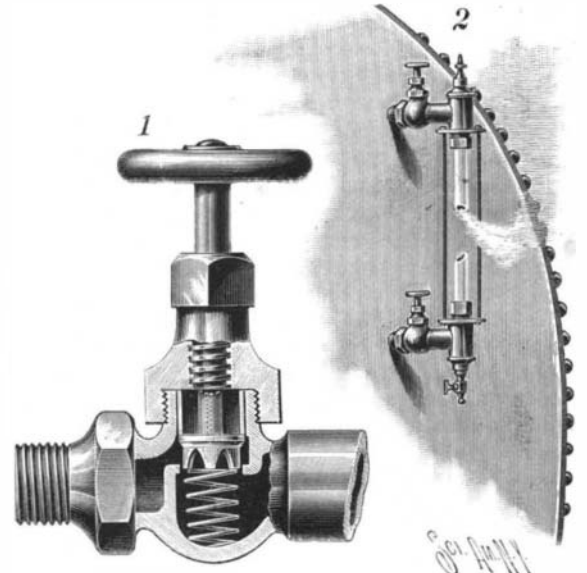
Further particulars relating to this improvement may be obtained of the patentee, Mr. Jesse P. Tillson, Union City, Ind.

A SAFETY VALVE FOR WATER GAUGES.

The illustration shows a simple form of valve, patented by Mr. John Fishburn, and designed to automatically seat itself in case of accident to the gauge glass, to prevent the escape of steam, water, etc., Fig. 1 representing one of the valves in section and Fig. 2 showing the application of the improvement. Attached to the stand glass are the usual top and bottom T's provided with globe valves, each of the latter having a valve seat on which is adapted to be seated a check valve, held normally off its seat by a spring in the bottom of the valve. A valve stem engages the upper end of the valve to force it to its seat against the tension of the spring. In the check valve for the upper globe valve is arranged a small opening or aperture, indicated in dotted lines in Fig. 1, through which steam can pass from the boiler when the valve is seated, causing an equalizing pressure beneath the check valve, the upper end of this aperture being closed by the lower end of the valve stem. Both valves are normally held off their seats by the springs, permitting steam and water to enter the gauge, but should the glass break, the equalizing pressure is removed, and the valves immediately seat themselves by the force of the steam and water from within the boiler, the escape of steam and water being prevented.

When a new glass is to be inserted, the valve stems are screwed down to hold and lock the check valves to their seats.

Further information relative to this improvement

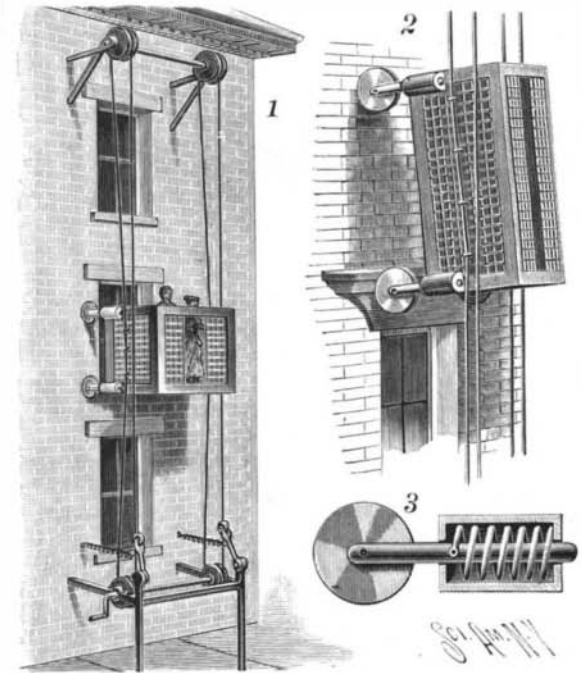


FISHBURN'S SAFETY VALVE FOR WATER GAUGES.

may be obtained of Mr. John A. Cameron, Warden's office, State Penitentiary, Walla Walla, Washington.

AN IMPROVED FIRE ESCAPE.

The device shown in the illustration is of simple and inexpensive construction, designed not to injure the building to which it is attached, and affords special facilities for rescuing women and children. On the ground near the building, beneath a vertical row of windows, is located a windlass having end sheaves on a shaft and an operating crank, and in a line therewith at the top of the building, on a shaft journaled in suitable brackets, are corresponding sheaves, wire hoisting ropes passing over these top and bottom sheaves, to carry the cage, as shown in Fig. 1. The cage is open on the side facing the wall, and is fast-



BRUCE'S FIRE ESCAPE.

ened to the hoisting rope by hooks or staples in such way as to hold the cage close up against the wall. To enable the cage to travel over window caps and cornices, as shown in Fig. 2, clearer wheels are attached to its inner corners, these wheels being journaled in yielding bearings, as shown in Fig. 3, preventing undue friction of the cage against the wall in the up and down movement of the cage. The entire device is of steel or iron, so that it cannot be burned. That the tension of the hoisting rope may at all times be maintained, an idle wheel on a pivoted arm of the windlass is arranged to be drawn against the rope by a spring. The device may be supplied with any desired form of brake mechanism, or the cage may be lowered by slowly turning the crank.

Further information relative to this improvement may be obtained of the patentee, Mr. R. N. Bruce, Sperryville, Va.

THE New York Sun explains the reason why most of those engaged in the electric business are young men, in the fact that the development of electricity as a factor in practical life came so suddenly that electricians have not had time to grow old, and many of the responsible men in the telephone and electric lighting business are yet below 40. Every problem presented by the application of electricity to every-day life is now the subject of study by a score of young men trained in a practical school, yet acquainted with the latest discoveries in the theoretical science.