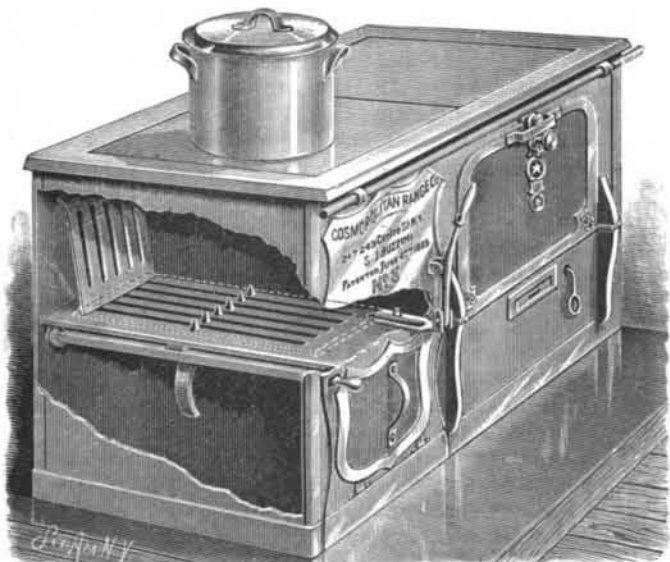


A GRATE FOR FURNACES, RANGES, ETC.

The illustration represents a grate, patented by Mr. Salvatore J. Buzzini, designed to be reciprocated horizontally to free the grate and fuel from the accumulation of ashes, the grate being made to swing down readily at one side, to dump the contents of the fire box into the ash pan when desired. The grate preferably lies below a bed plate of the fire box, and has on its upper surface a number of teeth-like projections, which, as the grate is reciprocated, serve to break up the bed of fuel resting on it. The bed plate of the fire



BUZZINI'S RANGE AND STOVE GRATE.

chamber also has at its ends downward projections to enter between the grate bars and prevent fuel being carried beneath the bed plate by the reciprocating grate, to jam or interfere with the free motion of the grate, which is reciprocated by means of a lever fulcrumed on the front of the range and connected below with the grate. At one margin the grate is hung upon a bar journaled at its ends in the main structure, the rotating or turning of this bar similarly moving the grate, upon the opposite side of which is arranged another bar, on the top of which rests a toe from the other side of the grate. The grate is dumped by swinging this bar laterally from under the supporting toe of the grate.

For further information relative to this invention address the Cosmopolitan Range Co., No. 247 Centre Street, New York City.

AN IMPROVED CASING FOR STEAM PIPES.

The Wyckoff patent steam pipe casing shown in the accompanying illustrations is made of double thicknesses of eight thoroughly seasoned one inch white pine staves to each section. The staves of the inner course are jointed together and wound with

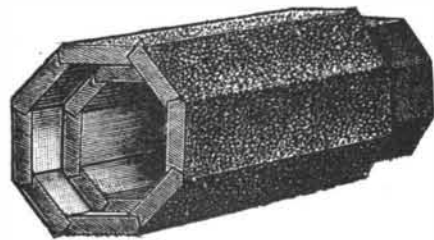


Fig. 1.

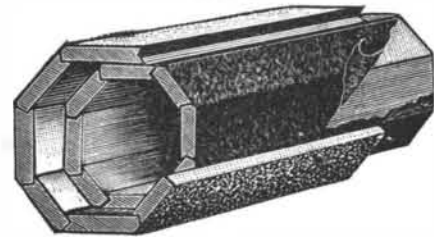


Fig. 2.

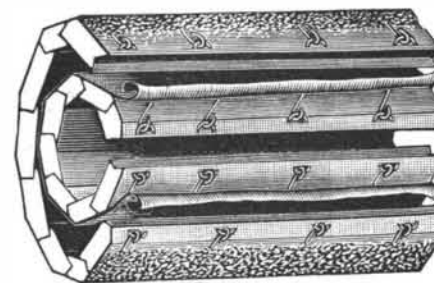


Fig. 3.

THE WYCKOFF STEAM PIPE CASING.

galvanized steel wire, then wrapped with two thicknesses of heavy corrugated paper, after which another casing of staves is put on the outside and wound with galvanized steel wire. The outer casing is then coated with asphaltum. Fig. 1 represents a section of such casing complete, there being two staves removed from the casing as shown in Fig. 2, to disclose the lining be-

tween the inner and outer courses. To cut the casing lengthwise, where this is necessary in putting it around pipes in position, the asphalt coating is first removed, when the binding wires are cut by a file or otherwise, and their ends fastened down by a common blind staple. This allows the outside casing to be laid open, as shown in Fig. 3, a similar process being followed in opening the inner casing. Different sections of this casing are conveniently joined by cutting off, at the ends, a small portion of the inner and outer casings, whereby a lap joint is readily formed, and in calculating the sizes of casing required; proper allowance should be made for the pipe couplings.

It is said that in comparative tests of this casing with one made of solid wood, both round and square, in the same line of pipe, the sectional casing has proved greatly superior. The solid wood casing rapidly became checked, and so heated throughout as to cause material loss of heat, while the sectional casing, owing to the interposed non-conducting layers, remained perfectly cool on the outside. This improved steam pipe casing is made by Messrs. A. Wyckoff & Son, Elmira, N. Y.

Progress of the Great Tunnel under the Hudson River.

In view of the efforts now being made to span the North River with an unsightly cantilever bridge, it is pleasant to record the progress making by the silent workers *under* that noble stream, where, burdened with a pressure of several atmospheres, they burrow their way surely to make what will be in no sense a disfiguring connection between New York and New Jersey. In a total distance of 5,400 feet, there is now complete from the Jersey shore 3,340 feet, with a progress of 10 feet per day, working with three shifts of men in 24 hours.

The last air lock is now 1,200 feet from the heading, and a new one will be placed nearer to the work. This lock will be longer, having a length sufficient to take in three loaded cars instead of the two at present. Three tracks have been substituted for two, to remove the core. Twin hydraulic elevators have also been put up for more rapid removal of loaded cars, and negotiations are pending to substitute electric transit for the cars in lieu of the patient mule. The work is now within about 800 feet of the rock formation.

What is the Temperature of Ice?

In our number for February 14 last we published the following, except that, in the last paragraph but one, an error was made which we now correct.

Authorities differ widely upon this question. A careful investigator recently made some experiments looking to a solution of this, and has sent us the following: January 23. Atmospheric temperature + 40° F.

(1) In a block of inferior ice, full of bubbles and fissures, an auger hole was bored 6 inches deep. In the cavity thus formed a chemical thermometer was dropped, the borings being used to pack the orifice around the instrument. When fifteen minutes had elapsed, the temperature within the ice was found by aid of a lens to be + 30.5°.

(2) Equal parts of ice and salt being mixed in a wooden pail, they formed a solution at the bottom, in which the thermometer read -10°. In the center of the pail a quart tin cup was placed, nearly full of filtered water. The cup was supported above the bottom of the pail, and in it was suspended a second chemical thermometer, while the water was allowed to freeze into a solid mass around it.

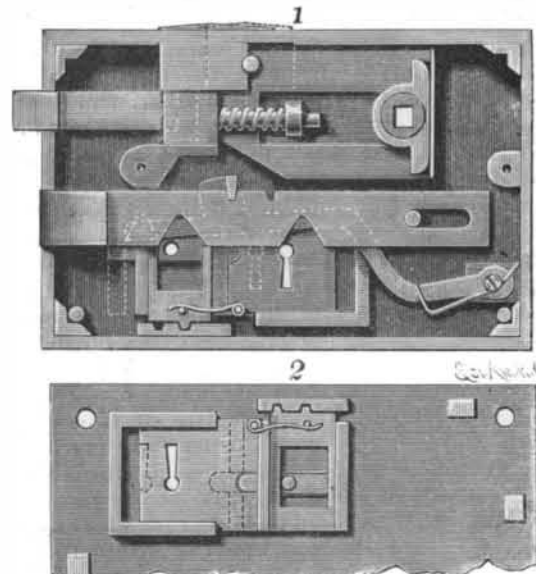
In thirty minutes the water in the cup was converted into ice. At the end of an hour and a half the relative temperatures indicated by the two thermometers had not varied, and now read, respectively: That in the freezing mixture, -5°; that in the ice in cup, 0°. These readings were taken in the office, where the temperature was 74°.

Both thermometers were carefully compared with a valuable standard instrument and with each other, before and after the experiments, and their readings were corrected for variation at different points.

AN IMPROVED LOCK.

The illustration represents a lock so constructed that it is impossible to unlock it from one side when it has been locked on the other side. Fig. 1 is a face view of the lock with the cover plate removed. Fig. 2 being an inside face view of a portion of the cover plate. The locking bolt is supported on its inner end by a pin, sliding in a slot in the bolt, on the under side of which are V-shaped notches, adapted to pass the bit of the key, the outside and inside key holes being arranged a short distance apart, in line with the notches. The bit of the key also operates on the under side of a lever, shown partially in dotted lines, and moving in a vertical slot in the locking bolt, the lever being normally pressed down by a spring. A vertically arranged plate in the casing, forming a rectangular key aperture, is fitted to slide in guideways in a longitudinally sliding plate having a key hole connected with

the back of the casing, the vertical plate having a lug adapted to engage notches in a bar in the lower side of the casing. A similar arrangement is provided on the inside of the cover plate, but the positions of the movable plates are such that when the bolt is thrown out, the key aperture of one of the plates registers with its proper outside key hole, and that of the other is disconnected from its key hole, and *vice versa*. The latch, shown in the upper part of the lock casing, has a notched shank and a spring-pressed sliding head, the head being recessed to receive the inner notched



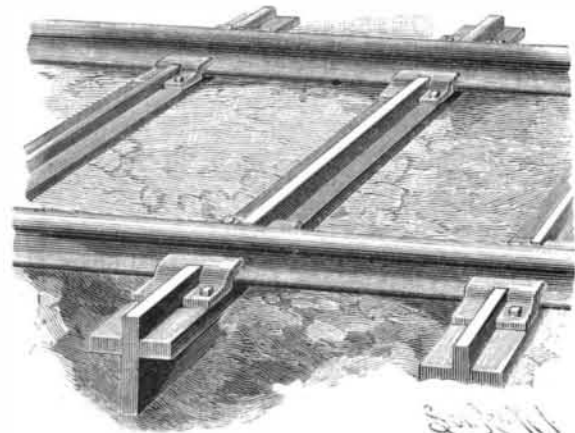
ROGERS' LOCK.

end of the shank of the latch, which may be conveniently removed and replaced at any time to turn it over when it is desired to reverse the latch.

This lock has been patented by Mr. G. T. Rogers, No. 107 Adams Street, Jefferson City, Mo.

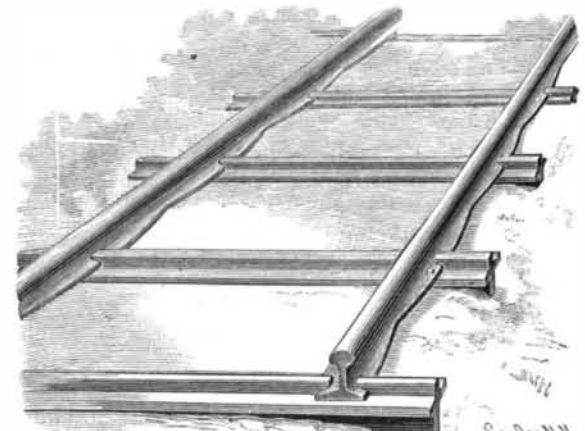
A NEW RAILROAD TIE, RAIL FASTENER, AND RAIL.

The accompanying illustrations represent improvements recently patented by Mr. Michael A. Glynn, of Havana, Cuba, designed to facilitate the laying of railroad rails, and locking them firmly in position, the tie being also readily placed in position and having some degree of elasticity, while it is intended to be inexpensive to manufacture. The tie is cross shaped in section, and the longitudinal rib above its broad portion has a slot near each end to receive a chair in which the rail is seated. The chairs have inwardly extending lugs which fit closely upon the flanges of the rails, and a broad base which rests upon the broad portion of the sleepers. The slots in the ribs of the sleepers are shaped to correspond with the



GLYNN'S RAILROAD TIE AND RAIL FASTENERS.

shape of the chairs, which are slipped into the slots from the side, thus preventing any vertical or lateral movement. A sufficient number of spikes are used in the chairs to prevent creeping of the rails. A modified form of chair is also provided, made in two parts, one to be placed on each side of the rail. The improved



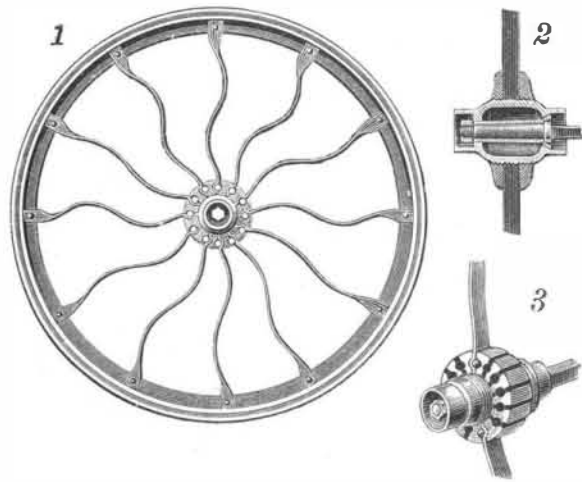
GLYNN'S RAILROAD RAIL.

rail, which forms the subject of one of the patents, has scalloped flange, and the sleeper has a dovetailed slot just wide enough to receive the widest portion of the rail flange. When the wide portion of the rail flange is in the slot, the rail cannot be moved laterally, and the ribs of the sleepers overlap the flange to prevent all vertical motion. An occasional spike is used to prevent creeping. With this construction the rails and sleepers are designed to be quickly adjusted in position.

Further information relative to this invention may be obtained of Messrs. Perkins & Co., No. 228 Produce Exchange, New York City.

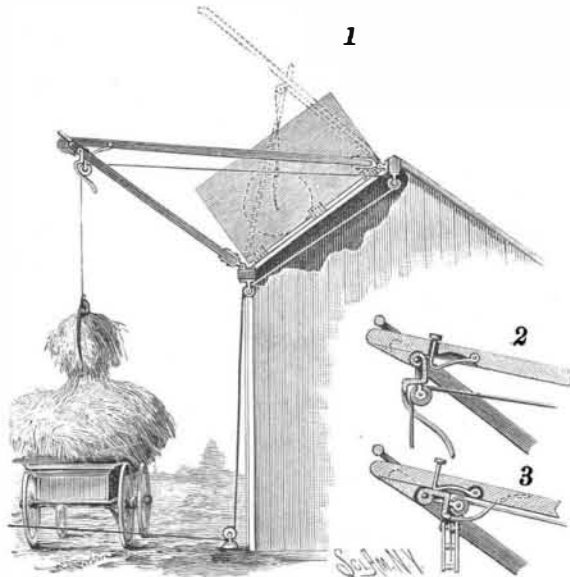
AN ALL-METAL SPRING VEHICLE WHEEL.

The wheel shown in the illustration, patented by Mr. James Carpenter, is very light, but is designed to



CARPENTER'S VEHICLE WHEEL.

be exceptionally strong and durable, having more spring than wheels made in the ordinary way, and being, therefore, less liable to wear or breakage from use on rough pavements or hard roads. The felly is T shaped, and between it and the metal tire is a thin strip of paper or similar material, making the tire set firmly, and deadening any sound which might be made in use, the tire felly and strip being united by rivets in the usual way. The wheel is thus designed to be practically noiseless. The spokes are strips of spring steel bent into reverse curves, varying according to the amount of spring desired, their outer ends being bent at right angles to form flanges and riveted to the felly, the flanges of the spoke entering mortises in the standard of the felly. The inner ends of the spokes have a semicircular bend fitting in a corresponding opening in a rim of the hub, as shown in Figs. 1 and 3, where they are made fast by bolts or rivets, or they may be additionally secured by caps or bands screwed against both sides of the rim, the outer sur-



MACHIN'S HAY STACKER.

face of the hub being screw-threaded for such purpose. The hub is cast in the form of a hollow shell, with openings for the passage of the axle box, as shown in Fig. 2, and projecting ends to protect the nut and keep out dirt. The box is slightly tapering, with the taper end on the outside, where it is screw-threaded, and the outer head of the hub is screw-threaded on the inside, for engagement with the taper end of the box, the inner head of the hub being countersunk to correspond with the flaring end of the box. With this construction, each spoke is independent of the others, and any one can be readily taken out and another inserted in its place at any time, without interfering with the other parts of the wheel, the spokes being inserted from either side of the wheel. The wheel is adapted for all kinds of vehicles, from baby carriages and bicycles to the heaviest trucks, and for heavy trucks it is claimed that no other springs will be required than the spokes of the wheels. The construc-

tion of this wheel is inexpensive, and many sets made have already had quite extended use.

For further information relative to this invention, address or apply to the inventor, rooms 97 to 101, Potter Building, No. 38 Park Row, New York City.

AN IMPROVED HAY STACKER.

A device which can be readily set up in a field, to facilitate forming a hay stack, or attached to barracks or to a barn, to lighten the labor of removing the hay from the wagon and placing it where desired, is shown in the accompanying illustration, and has been patented by Mr. Miller Machin, of Bowen, Ill. Fig. 1 shows the device applied to a barn, the dotted lines representing the parts in their uppermost position, and Figs. 2 and 3 are views of parts in different positions. On the outer end of an arm pivoted to a ridge pole or other support is a head adapted to be engaged by a tripping lever pivoted on a short transverse rod, the ends of the latter rod being secured in the outer ends of long rods or levers pivoted at their inner or lower ends on the roof of the barn at each side. On the rod carrying the tripping lever is a support for a pulley, and a rope fastened to the rod extends downward under a pulley of the head block of a hay fork, thence through the forked end of the tripping lever, over a pulley, and inward over another pulley, and down to the barn floor, where it passes under a pulley mounted to turn in suitable bearings, and is extended to be attached to a pulling gear for a horse or other hoisting power. When the fork is inserted in the hay, and the rope is pulled, the fork rises with its load until the head block strikes the tripping lever, a further pull causing the side rods or levers to swing upward and inward, and swinging upward the central pivoted arm, as shown in dotted lines. When the operator now backs up the horse, or releases the pull on the rope, the hay may be placed where desired, the weight of the parts causing the levers to swing outward again into the normal position for raising a load. This device can also be readily applied to a number of stacking poles set in the usual manner on the ground, and fastened together near their upper ends.

A DOUBLE COMBINATION LOCK.

The lock herewith illustrated, which has been patented by Mr. John E. Farnsworth, has a series of levers to engage and disengage the locking bolt, cams actuating the levers, and gear wheels moving the cams at different rates of speed, making possible a great number of changes and preventing the opening of the lock without knowing the combination. As shown in Fig. 2, which represents the lock with the front plate removed, the locking bolt, B, has rack teeth on its under side meshing with a gear wheel, C, on the knob spindle, which has an indoor and an outdoor knob. At the inner end of the bolt is a plate, B², adapted to travel on top of a series of levers, one of which is shown at F, and all fulcrumed on a pin, A, the under sides of the levers being curved and adapted to ride on the peripheries of the cam wheels, E', F', G', Fig. 3, one of the cam wheels being shown in Fig. 6. The cam wheel, E', turns loosely on a shaft, H, extending through the casing and carrying pointers, H', and indicating on dials, I, Fig. 1, on the inside and outside of the casing. On the face of the cam wheel, E', is a pinion meshing in a gear wheel on the shaft, J, the gear wheel being connected by a pinion and sleeve with spindles, carrying each an inside and outside knob, while on the shaft is another gear wheel operating the pointer, L², on the dial. On the shaft, J, are also pinions, one of which meshes into a gear wheel of the cam wheel, F', and connected with the pointer, F⁴, of the dial. As shown in Fig. 1, the combination is 15-30-45, the pointer, H, be-

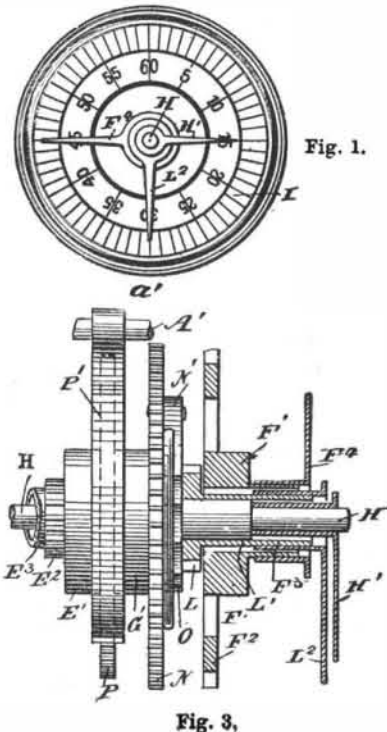


Fig. 1.

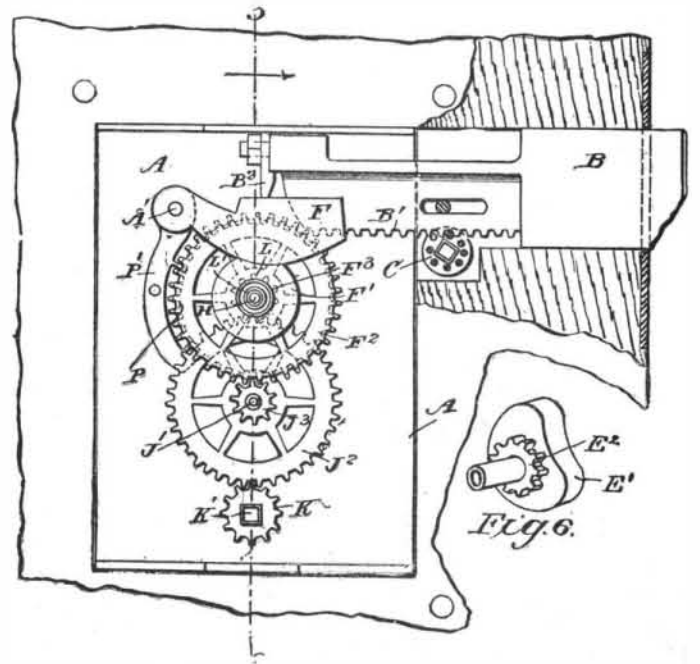


Fig. 6.

Fig. 3.

FARNSWORTH'S COMBINATION LOCK.

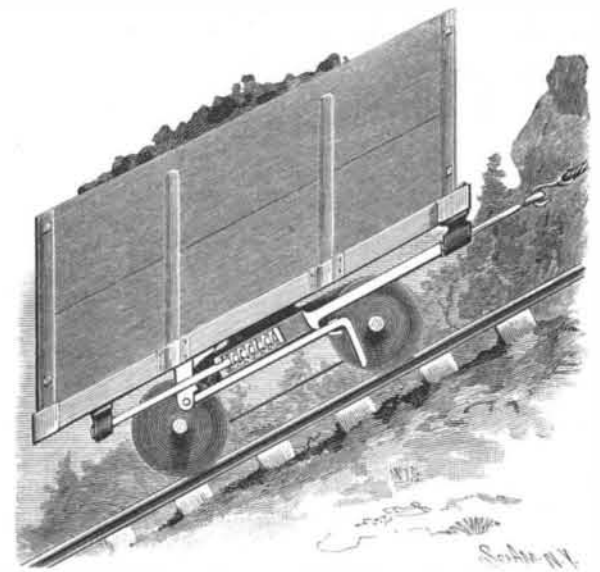
Fig. 2.

ing shifted only in the direction of the hands of a watch. When the knobs controlling the other pointers are moved in an inverse direction, one pointer moves faster than the other, owing to their being connected to the pinion by differential gear wheels. The bolt being in the innermost position, and the operator turning these knobs backward, the outward movement of the bolt is then prevented, and the other knobs cannot be turned. The bolt cannot be moved until all the pointers have come to their proper position. In order to change the combination the operator removes the front plate or the entire lock from the door and shifts the sets of pointers, care being taken to move the two pointers of each set, for the inside and outside dials, to the same numeral desired to form part of the combination.

Further information relative to this invention may be obtained of Messrs. Farnsworth & Williams, Bazine, Kansas.

A SAFETY DEVICE FOR INCLINED ROADS.

The device shown in the accompanying illustration is adapted for attachment to passenger cars as well as for other purposes, to give greater security in moving cars up and down an incline, only one cable being required. It is a patented invention of William Peach, M.D., of No. 76 Monterey Street, Allegheny, Pa. On the under side of the frame of the car is a sliding draw-



PEACH'S SAFETY DEVICE FOR INCLINED ROADS.

head, with a link to which the power cable is attached, and two rearwardly extending bars connected by a cross bar. Passing through this cross bar is a rod whose rear end is attached to the frame of the car, the other end of the rod being attached to a crosshead sliding on the rearward extensions of the drawhead. A spiral spring on this rod holds the drawhead back when there is no strain upon it. Hinged in bearings beneath the car is a U-shaped bar, whose side members have each a downwardly projecting hook, adapted to engage a cross tie of the track. These side members are connected by a cross bar, which rests in a hook on the under side of the sliding drawhead when the latter is drawn forward by the cable, the side hooks being then held up as shown in the illustration. A stop on the under side of the drawhead limits the distance it may be drawn out, but when the strain is removed, by the breaking of the cable or other accident, the spring causes it to be instantly drawn backward, permitting the hooks to drop between and clutch the cross ties of the track, stopping the car at any point where the accident occurs.