

chronometer. This style of Russian mountain differs from those that have hitherto been operated. It is due to an English builder, Mr. Thompson, who has put up numerous specimens in various countries.—*La Nature*.

AN IMPROVED BLOCK SIGNAL.

A block signal system, so arranged that a train entering a section of track will set a signal at the end of the section toward which it is moving to "danger," and set to "safety" a similar signal, by the same movement, on the section it is leaving, has been patented by Mr. George W. Peterson, of Leonardville, Kan., and is illustrated herewith. In connection with posts arranged at suitable distances apart at the side of the track, spring levers are mounted in alignment carrying signal disks, the posts carrying lights, and the tendency of the springs being to throw the signal disks out of line with the lights toward the track. The lower ends of the levers extend downward into cases, near the foot of the post, whence they are connected by double crank bars, links, other levers, and tripping bars, with wires extending through tubes secured to the ties midway between the tracks, the posts and signal disk levers at each end of a block or section being thus connected together. The engine is provided with an overhanging arm on its left side, mounted in such position that it will strike against and depress the tripping bar connected with this signal disk lever moving mechanism, thus closing or setting to safety the signal for the section of track it is passing from, and setting to danger the signal at the farther end of the block the train is just entering, to warn the engineer of a train approach-



Fig. 4.—RUSSIAN MOUNTAINS OF THE BOULEVARD DES CAPUCINES (1888).

secure fastening, is illustrated herewith, and has been patented by Mr. Henry E. Hathaway, of Merrill, Wis. One of the bars has a guiding clasp to embrace the

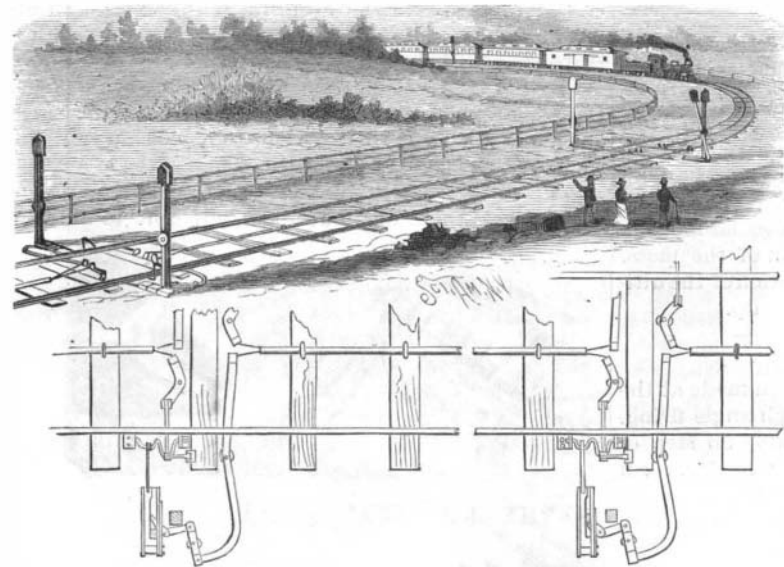
edges of and slide freely on the other bar, which has at its inner end a slotted offset portion with outwardly projecting lug and inclined bearing face. A stud on an independent clasp embracing the other arm of the clamp passes through the slot, and on this stud is pivoted a cam which operates against the inclined bearing face of the lug at the extremity of the first arm. The cam has a handle for convenience in operating it, and the bars slide freely one upon the other when not set in use, the construction being such that when the jaws are adjusted or closed upon the parts to be clamped, the moving of the handle down will slightly draw the jaws of the clamps inwardly and firmly bind the bars one upon the other, preventing any longitudinal movement.

Pumping Machinery.

In the course of a paper on this subject lately read at a meeting of the Association of Birmingham Students of the Institution of Civil Engineers, by Mr. F. W. Hewett, he said that one of the first contrivances for raising water by steam pressure—or, as it was stated at the time, for raising water by fire—was Captain Thomas Savey's patent, exhibited before the Royal Society in 1699, when Sir Isaac Newton was president. The valves were all worked by hand. A most important advance was made by Newcomen, who must have been contemporary with Savey; but little was known of this gentleman except his invention. When James Watt's beam engine was invented, the conception of making the condenser apart from the steam cylinder and keeping the steam cylinder as hot as possible was the basis of its mechanical success. The energy of Bolton, his partner, soon brought this pumping engine into extensive use; and as the demand increased, so the machine developed. The supremacy of the Cornish pumping engine had remained undisputed from the moment Watt perfected it; and it had scarcely been approached for deep drainage and working against a constant head of water. The velocity of the water through the valves of ordinary pumps should not exceed 4 feet in a second at the most, and the pumps should generally work well at 50 feet per minute—bucket speed. The velocity of the water in the delivery pipes should be as consistent as possible.

Curious Wants at Druggists' Counters.

The *National Druggist* gives the following amusing specimens as fair samples of every-day experience: "Send me some of your essence to put people to sleep with when they cut their fingers off. I want something to take tobacco out of my mouth. Send me a baby's top to a nursing bottle. Something for a sore baby's eye. Enough ipecac to throw up a girl four years old. Enough anise seed to take the twist out of a dose of senna. Something for a woman with a bad cough and cannot cough. Something, I forget the name, but it is for a cure for a swelled woman's foot. For a man with a dry spit on him. For a woman whose appetite is loose on her."

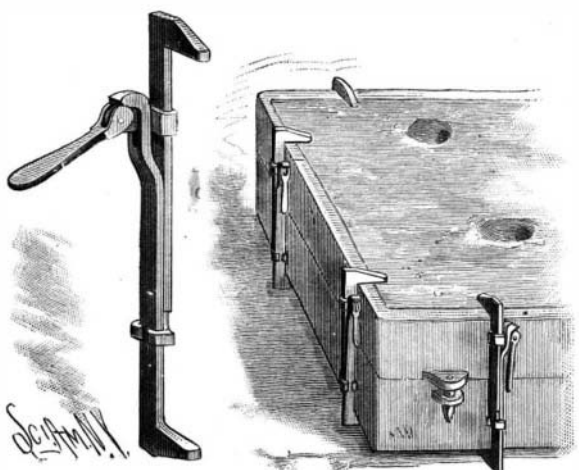


PETERSON'S BLOCK SIGNAL.

ing in the opposite direction. Similar signals are arranged on the opposite side of the track for use by trains moving in the opposite direction, the connecting wires passing through the same tubes centrally between the tracks.

AN IMPROVED CLAMP.

A clamp especially designed for use in foundries, for clamping flasks and moulds, and by carpenters and others, having a quick and easy adjustment, with a

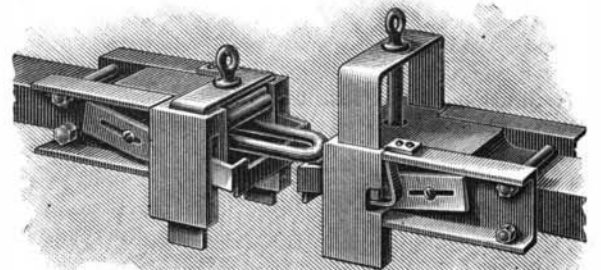


HATHAWAY'S CLAMP.

AN IMPROVED CAR COUPLING.

The invention illustrated herewith provides a coupling in which the link is held up and guided into the drawhead, while the coupling pin is held in position for automatic engagement therewith, and has been patented by Mr. William O. Rutledge, of Galveston, Texas. A side metallic casing is secured to the drawhead, in recessed portions in the forward part of which are guides for the depending arms of a U-shaped frame, having an aperture for the coupling pin in line with the opening in the drawhead, so that when the frame is dropped the pin will extend across the recess receiving the end of a link. The frame is held in elevated position by a spring catch on each casing, having its bent end projecting through a notch in the guide. Through slots in the front of the casing pass the legs of a U-shaped piece, whose crossbar extends over the front of the drawhead, the legs being connected to the casing by pins projecting through slots, and adapted to slide thereon, the forward portion of the legs being beveled so that the crossbar is

lowered as it is pushed back by a similar piece on the opposite drawhead, thereby guiding the link into position for engagement by the coupling pin. Upon the drawheads being brought together, the parts being in position as shown in the illustration, the piece with sliding arms, which guides the link into the right hand drawhead, will be pushed back by the similar piece on the other drawhead, when a lip or projection on the casing releases the spring catch, causing the pin-carry-

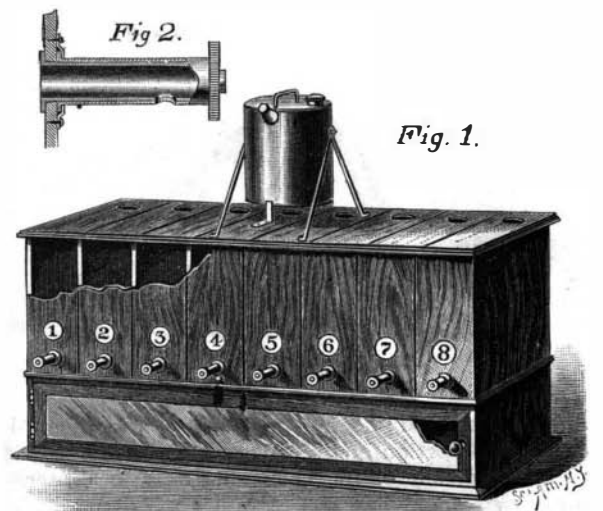


RUTLEDGE'S CAR COUPLING.

ing frame to fall, and engagement with the coupling pin is effected. This inventor has also applied for a patent for an uncoupling device.

AN IMPROVED POWDER AND SHOT CABINET.

An invention providing convenient means for handling powder and shot, in the form of a cabinet, in which a dealer may keep handily and separately the various articles generally called for, is illustrated herewith, and has been patented by Mr. Augustine La Point, of Westington Springs, Dakota Ter. The cabinet has a lower compartment with a glass door, adapted to receive and display cartridges, gun caps, etc., and the upper compartment is divided by vertical partitions into eight or more lockers, one for each size of shot, which may be poured in through a properly capped opening at the top. The different sizes are indicated by numbers on glass sections in the front of each locker, through which also the sizes may be seen. To withdraw the shot a

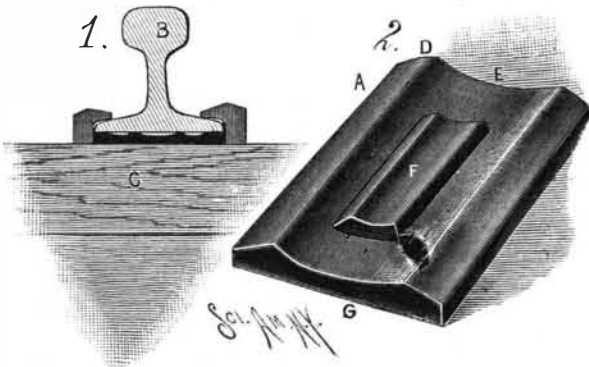


LA POINT'S POWDER AND SHOT CABINET.

tube, as shown in Fig. 2, is inserted in the bottom of and projects from the front of each locker, the tube having its outer end sealed and an aperture in its under side, a cylindrical casing being slid over the tube and turning readily thereon, such casing having at its outer end an aperture corresponding with the aperture in the tube. This casing is revolved by a disk with milled periphery, and permits the shot to escape when it is turned so that the apertures are in register. A powder can is pivoted between brackets on the top of the case, the can having an aperture with screw cap for admitting the powder, and a spout from which the powder is poured as the can is tilted.

AN IMPROVED RAILWAY RAIL PAD.

A device intended to lessen the noise made by railway trains, prolong the life of the rolling stock, and reduce the wear upon bridges and trestle work, is illustrated herewith, and has been patented by Messrs. H. J. Fackenthal and Lewis Wallace, of No. 761 North Thirty-ninth Street, Philadelphia, Pa. It consists of an elastic pad, A, preferably of rubber, of the width of the rail, B, at its base, and of a length equal to the width of the tie, C. Its upper longitudinal edges, D, are beveled, and the portion intervening is concaved in cross section, as shown at E, while it has a central rib, F, the highest points of which are in alignment with the outer longitudinal edges of the pad. This pad not only forms a

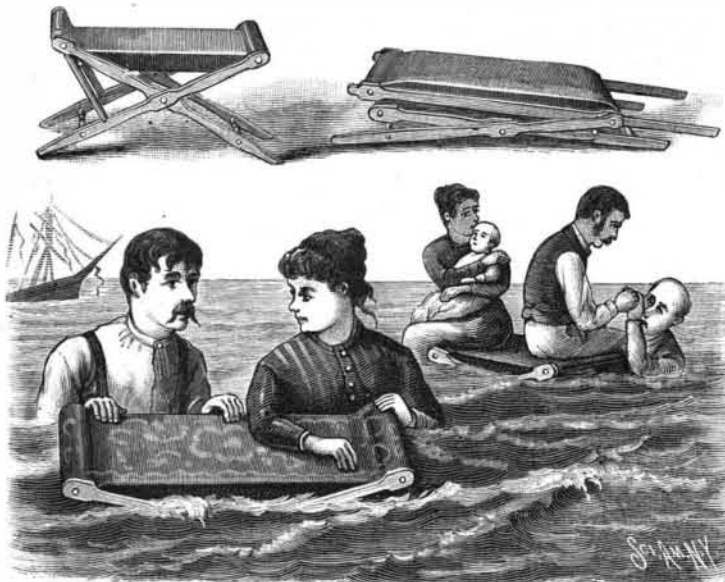


FACKENTHALL & WALLACE'S RAIL PAD.

cushion to give elasticity to the rail, but serves to keep it in constant close engagement with the spikes, and when the latter become loose, and are again driven, the surface of the pad becomes more straightened, becoming perfectly flat by successive readjustments of the spikes.

AN IMPROVED LIFE-PRESERVING CHAIR.

A chair which, when unfolded, can be used on a vessel or steamer as an ordinary chair, but which, in case of accident, can be folded up and employed as a life preserver, being so constructed that it will support several persons in the water, is illustrated herewith, and has been patented by Mr. James A. Ashworth, of Yonkers, N. Y. The back and seat of the chair are formed of a single piece, preferably of water-proof material, in one or more pockets of which a buoyant substance, usually cork, is confined and secured. This water-proof cover is secured around the top cross bar of the frame of the chair back by a double row of stitches, and buoyant material is secured within this covering to the lower end of the back of the chair frame, where rows of stitches are placed each side of the cross bar and around the hinge portion sufficiently to give great strength with flexibility, the covering being carried forward and firmly stitched around the forward cross bar of the seat, and similar buoyant mate-



ASHWORTH'S LIFE-PRESERVING CHAIR.

rial being secured in one or more pockets in the body of the seat portion of the covering material. To the outer side of one of the back rails, near its center, is pivotally secured one end of a strap or band, which when not in use is passed loosely over the chair back and hooked by a loop or ring over a button on the other back rail. In case of accident the chair is made

into a life preserver by folding the cork back forward over the cork seat, the hinge spaces at the rear end of the seat permitting this, and the chair is then firmly secured in its folded position by means of the strap attached to one of its back rails, these rails and the legs affording a convenient grasp or hold for persons in the water. These chairs can also be constructed without the back, in the form of a folding stool, as shown in one of the small views.

For further information relative to this invention address the inventor, or Mr. George Ashworth, 19 Smith Street, Danbury, Conn.

Progress of Electrical Science.

Professor Elisha Gray, in a lecture preceding a series of interesting electrical experiments given at Evaston, on the 10th of May, said, among other things too good to omit, but which for lack of room must be deferred, that those of us who are just crossing the meridian of life can well remember the first telegraph wire that was strung in this country. To-day it is difficult to find a corner of the earth so remote as to be out of sight of one. You will find them even in the bottom of the seas and oceans. The last twenty years have seen more advance in the science of electricity than all the 6,000 historic years preceding. More is discovered in one day now than in a thousand years of the middle ages, so that literally, "a day is a thousand years." We put it to all sorts of uses. We make it carry our messages, drive our engine, ring our door bell, and scare the burglar.

We take it as a medicine, light our gas, see by it, hear from it, talk with it, and now we are beginning to teach it to write. If Job lived in this age, and the question were put to him as of old, "Canst thou send lightnings, that they may go and say unto thee, 'Here we are?'" he could say, "Yes;" and they can be made to say it in the vernacular. A friend of mine says in verse:

Time was when one must hold his ear
Close to a whispering voice to hear—
Like deaf men, nigh and nigher;
But now from town to town he talks,
And puts his nose into a box
And whispers through a wire.

In olden times along the street
A glimmering lantern led our feet
When on a midnight stroll;
But now we snatch, when night comes nigh,
A piece of lightning from the sky
And stick it on a pole.

The question naturally arises in contemplating this subject, "What is it?" I can imagine the last man on the last day asking this same question, "What is it?" At one time, not long ago, it was supposed to be a fluid, by some two fluids, a positive and a negative. But in this day there are few who do not believe it to be simply a mode of motion; not matter, but a condition of matter; and not a mechanical, but a molecular motion. By mechanical motion is meant a motion of the mass, and by molecular motion is meant a motion of the ultimate particles of which the mass is made up.

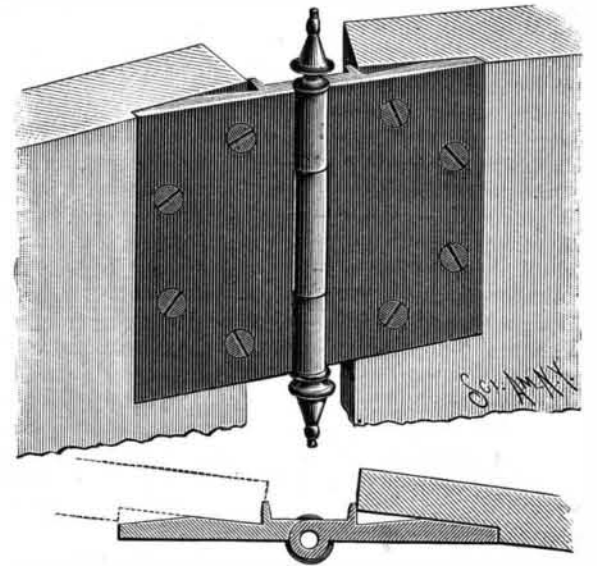
Fifteen Mile Guns.

Some important experiments have been made at the Shoeburyness school of gunnery in high-angle firing. A London correspondent writes: Probably no step of recent years is likely to lead to greater results, for if the experiment should be repeated with the same success, it is undeniable that war ships will have to be as fully protected on their decks as they now are on their broadsides. The experiments were made with the 9-inch or 23-centimeter gun used as a howitzer. An elevation of 87 degrees was given and battering charges were used with Palliser shells. Out of four shots three fell within a space of 500 feet by 80 feet, representing the deck of a first-class ironclad, and the range attained was 12 miles! Now, if it be really possible, three times out of four, or for that matter once out of four times, to throw a 9-inch shell upon the deck of a ship in midchannel between Dover and Calais, another proof will have been given that in the tedious duel between gun and armor the gun has much the best of it. What is very important, too, is that the heavy charges and the high angle did not strain either gun or carriage in the least, and one of the officers present has said that he believed the gun would stand 45 degrees of elevation without injury, while with 42 degrees a range of 15 miles would be secured. Now, at 15 miles, a ship is "hull down," so it comes to this, that we can throw a 9-inch shell on to the deck of a ship before we can see it! Surely this is the most marvelous thing yet attempted in gunnery, which of later years has been so fruitful in surprises.—A. & N. Register.

We are indebted to Professor A. N. Talbot, of Champaign, Ill., for a copy of the proceedings of the third annual meeting of the Illinois Society of Engineers and Surveyors.

AN IMPROVED HINGE.

A hinge by the use of which a door or shutter or similar piece of work may be thrown in or out to compensate for shrinkage or warpage, without inserting wedges, is illustrated herewith, and has been patented by Mr. Charles H. Beer, of No. 317 East 125th Street, New York City. The under or engaging faces of the hinge have a longitudinal shoulder, with inclined planes emanating from the center and inclined therefrom. Four or more screw apertures are provided in each leaf, and when four are employed, two of them are in the outer inclined plane and two at each side of

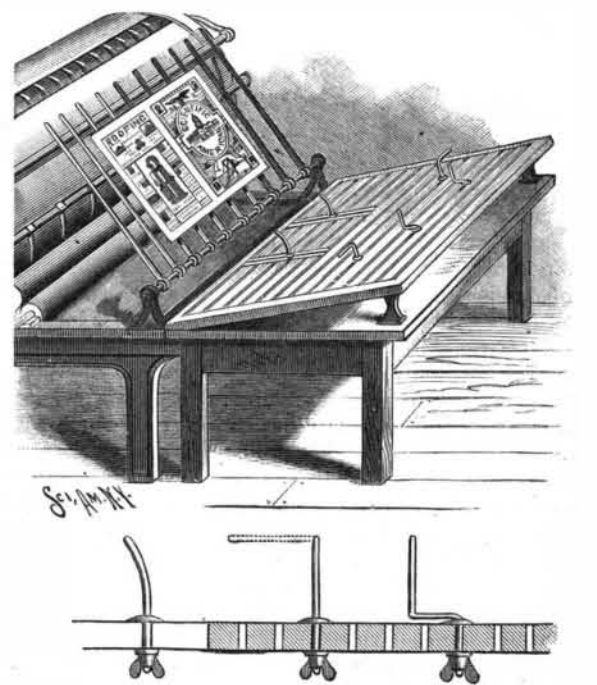


BEER'S HINGE.

the center in the other inclined plane, so that by loosening one set of screws, when the hinge is screwed in position, and tightening the other set, either inclined plane may be brought into positive engagement with the door or frame, which may be thus thrown out or carried inward as the occasion may demand.

IMPROVED RECEIVING-TABLE FOR PRINTING PRESSES.

A receiving-table for cylinder printing presses, designed to facilitate the accurate piling of the sheets without the use of the ordinary form of jogger, is illustrated herewith, and has been patented by Mr. Frank W. Baltes, of Portland, Ore. Upon a table of the usual construction is set at a slight angle a frame in which are mounted strips so placed as to leave slots or openings between them of about three-sixteenths of an inch in width. The strips furthest from the press run entirely across the frame, but those adjacent to the op-



BALTES' RECEIVING-TABLE FOR CYLINDER PRESSES.

posite side of the frame are divided into three sections, being divided by other strips to form slots or openings extending from the inner edge toward the center of the frame. In these slots are mounted backwardly curved guiding fingers, other sets of differently formed fingers being mounted at the sides and toward the outer edge of the frame, as shown in the illustration, to be adjusted as desired on the frame according to the size of the sheet being printed. The outwardly extending arms of the side fingers may be adjusted, as shown, to serve as stops for the fly, or turned to rest in lines parallel with the fly fingers. As the fly descends, the inner edge of the sheet will strike against the backwardly curved faces of the fingers nearest the press, the sheet then coming to place between these fingers and the other fingers on the frame.