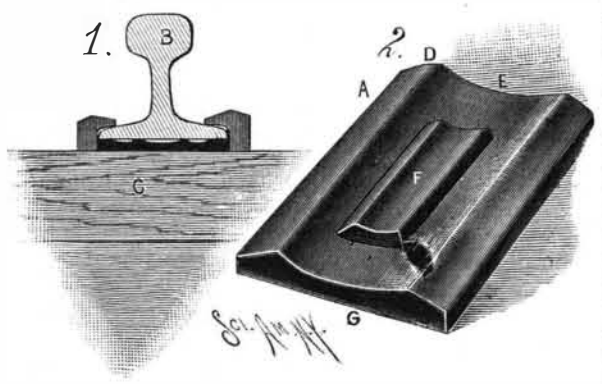
tube, as shown in Fig. 2, is inserted in the bottom of and projects from the front of each locker, the tube having its outer end sealed and an aperture in its under side, a cylindrical casing being slid over the tube and turning readily thereon, such casing having at its outer end an aperture corresponding 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. Fackenthall 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

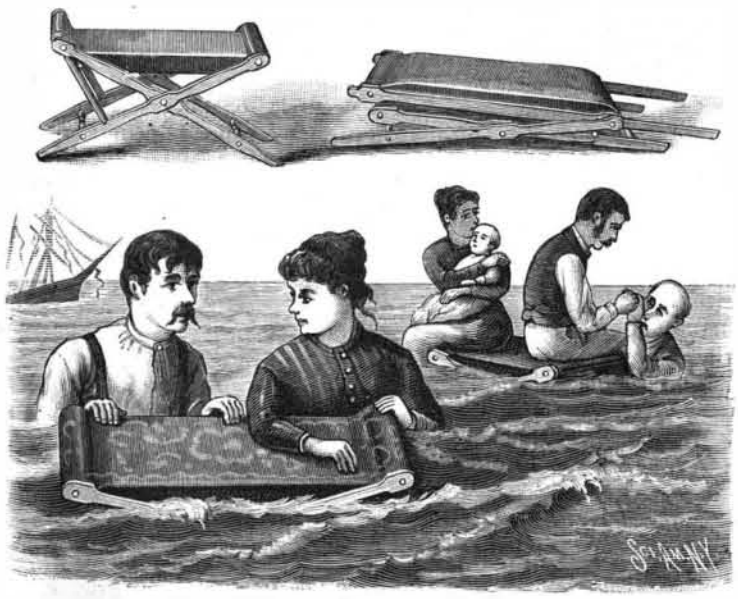



FACKENTHALL & WALLACE'S RAIL PAD.

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 material 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.



ASHWORTH'S LIFE-PRESERVING CHAIR.

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.

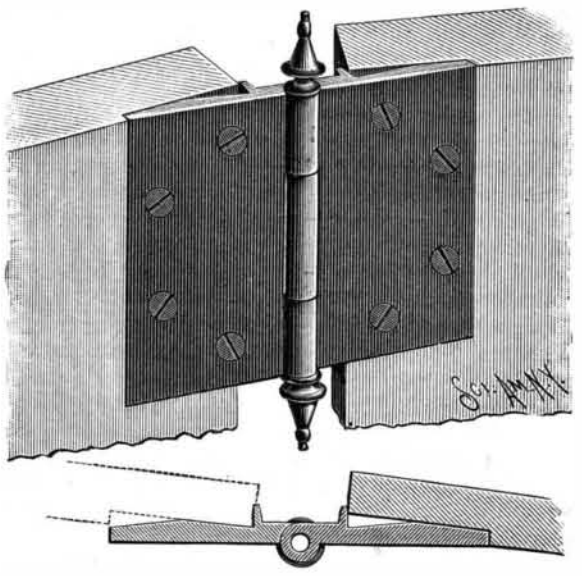
### Fifteen Mile Guns.

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 37 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

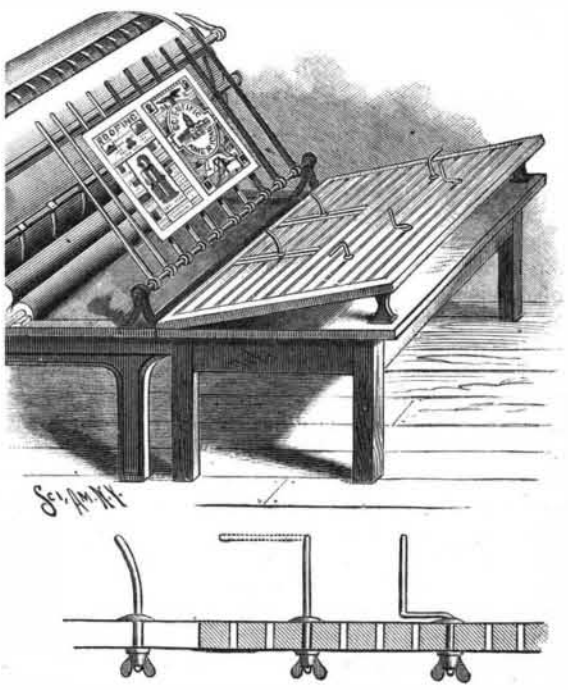


BEER'S HINGE.

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 opposite 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.



BALTES' RECEIVING-TABLE FOR CYLINDER PRESSES.