

SEAL LOCK.

The invention herewith illustrated consists mainly of a seal for car doors, provided with a receiving wire or holder for retaining the seal after it is broken. The holder is placed in line with the hinge of the hasp, and the seal is applied to lugs attached to the plate and hasp as shown. These lugs are correspondingly perforated for the passage of the sealing wire, the perforations being countersunk to form opposing cutting edges, so that the opening of the hasp will cut the sealing wire. The holder is attached at one end to the plate of the hinge and at the other to the hinge pin, so that it requires no extra attachment, except a staple, to hold its lower portion. In applying the seal,



ALLEN'S SEAL LOCK.

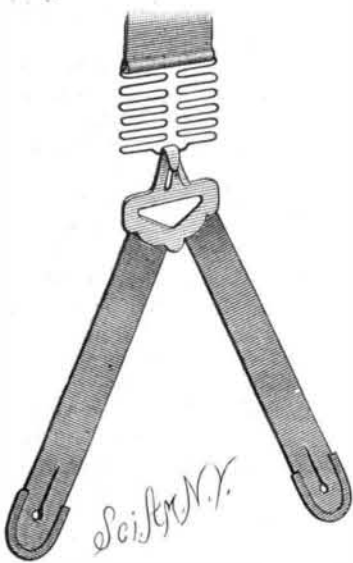
the wire is passed through the perforations and tied next to the lugs. The ends of the wire are then brought out, one on each side of the holder, and the seal applied outside of the latter. The seal is then closed with pinchers, which at the same time impress into the seal a figure indicating the station at which the car is locked. When the hasp is opened, the wire is cut and the seal drops to the bottom of the holder, where it will be retained. In case the car is opened several times, there will be as many seals upon the holder, each with a different mark, so that the seals show the number of times and places at which the car was opened.

This invention has been patented by Mr. S. E. Allen, of Winston, N. C.

METALLIC SPRING FOR SUSPENDERS.

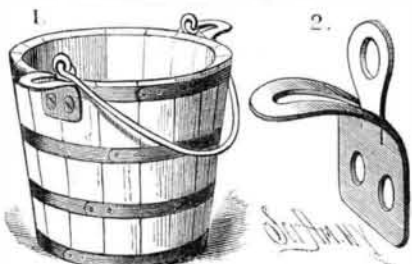
The spring is formed of wire bent to form two parallel series of flat loops, as clearly shown in the engraving. The shoulder strap is secured to the upper loop, and the ends or button pieces are provided with a hook, by which they are connected with the lower loop. This forms an elastic and durable spring of neat appearance.

This invention has been patented by Mr. John M. Sauder, of Harrisburg, Pa.



IMPROVED PAIL EAR.

This pail ear provides a support by which the milkman can readily hold the pail while milking, thereby preventing it from coming in contact with the ground, and also guarding against its being tipped over. The ear is formed of sheet metal, bent and perforated as shown in the enlarged view, Fig. 2. The curved arm



WING'S IMPROVED PAIL EAR.

projects outward away from the pail, and forms a convenient support, which may be received upon the knees of the milkman, and which will readily sustain the pail without the necessity of exerting a great pressure upon the sides. This pressure, in the case

of sheet metal pails, is destructive, besides involving an undesirable amount of labor in holding the pail while milking. The vertical apertured ears receive the bail by which the pail is carried.

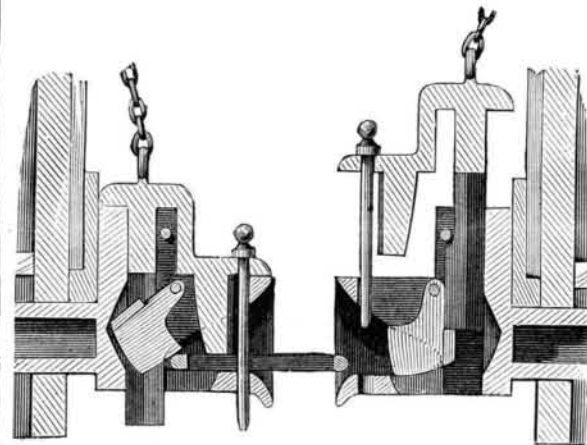
This invention has been patented by Mr. George S. Wing, of Alexander, N. Y.

Compression of Water.

For the measurement of very high pressures, M. E. H. Amagat has adopted the principle of the manometer with differential pistons. In order to obtain accurate results, the condition had to be realized of maintaining the pistons in complete action while keeping them perfectly airtight. The reading of the volumes of compressed fluid was effected by the process already indicated by Prof. Tait, of Edinburgh. Water and ether have been studied at zero and at the two respective temperatures of 20° and 40° C. Respecting the variation with pressure, it is shown that the coefficient diminishes gradually with the increase of pressure, and this takes place throughout the whole scale of pressures, contrary to the opinion of some physicists. At 3,000 atmospheres the volume of water was reduced one-tenth, and its coefficient of compressibility one-half.

CAR COUPLING.

The drawhead herewith illustrated is provided with a recess in its top and with apertures in the bottom. Swinging upon a transverse pin in the top of the drawhead is an angle piece, provided at its angle with inclined side lugs. On top of the drawhead is a plate, shaped as represented in the engraving, and having a downwardly projecting lug, formed with a longitudinal slot and groove to receive the angle piece. The front of the plate is perforated to receive the coupling pin. This plate and pin are supported in a raised position, as shown in the right hand view, by the lower end of the grooved lug resting on a shoulder formed on the angle piece. The en-



HOOVER'S CAR COUPLING.

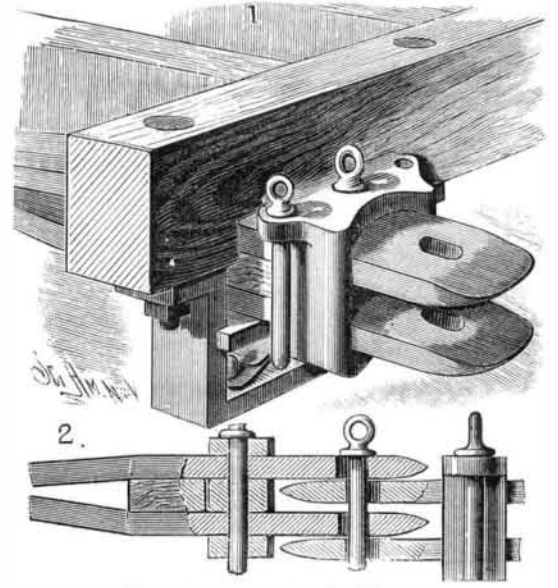
tering link of the other car strikes the front end of the angle piece and swings it inward, allowing the top piece and its pin to drop and couple the cars. This is shown in the left hand view. When the plate is raised, the angle piece automatically swings under the lug and adjusts the parts ready for coupling. Just back of the hole for the pin in the top plate is a downwardly projecting arm, of such length as to rest upon and hold the link in a horizontal position, to insure its easy entrance into the opposite drawhead. The plate may be operated from any desired place on the car by attaching a chain to the eye secured to its top. This coupling, which is the invention of Mr. George W. Hoover, of Keithsburg, Ill., is very simple in construction, and automatic in operation.

New Retting Process for Flax.

M. Parsy, at a recent meeting of the Industrial Society of the North of France, published a very interesting paper on his new method of retting flax, according to which the pectose that envelops the cellulose fibers in the green plant is transformed into pectic acid, which constitutes in retted flax the brilliant part of the fiber. This transformation can also be effected by placing the flax in a closed vessel (autoclave), in which water at 150° C. is introduced for the space of a few minutes only, and which is followed by steam at the same temperature. The whole operation only lasts one and a half hours, during which the flax loses from 20 to 25 per cent of its weight, as by the ordinary retting process, but on leaving the apparatus it contains less water, and is consequently more easily dried. M. Parsy can, by modifying the process, give the bluish or yellowish color to flax. For the blue he employs the water of a preceding operation, slightly acidulated by the organic acids of the flax which go in solution; for the yellow he employs water slightly alkaline. At the same sitting another gentleman came forward, stating that he was also the inventor of a new retting process, of which, no doubt, we shall hear at some future time.

CAR COUPLING.

The car coupling herewith illustrated is the invention of Mr. H. A. Springer, of El Moro, Colorado. In a recess in the end sill of the car are placed two similar drawbars, whose forward portions are held apart by a block, as shown in Fig. 2, and whose rear ends are brought together and pinned to the end of a drawbolt provided with the usual spring. The buffer block is made with mortises to receive the drawbars, to which it is detachably secured by a pin. The face of the buffer is concaved and the sides of the top are extended to receive apertures, in which extra pins are carried. The front of the drawbars is supported by a carrier which is pressed upward by a



SPRINGER'S CAR COUPLING.

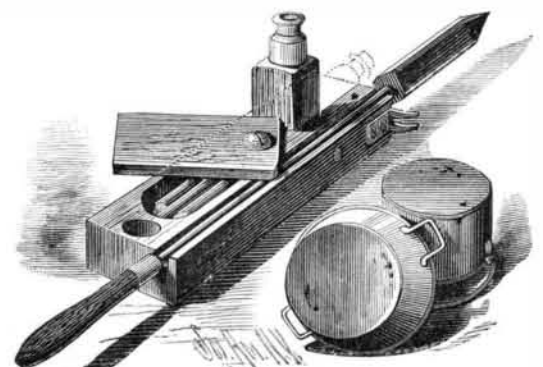
spring and is adapted to slide upon the vertical sides of a yoke suspended from beneath the car. This coupler will couple as well upon a curved as a straight track, as the eyes in the drawbars will register at almost any angle; the tapering points of the bars, together with the concaved face of the buffer, admit of ready coupling when one car is higher than the other. Should a drawbar break, another can easily be put in its place. The coupling pin is not liable to breakage, as the strain is distributed along its length.

Disasters at Sea.

Twenty-six shipwrecks were reported during the first week of September last, twenty-two being British owned. Four were British steamers. Off the British Isles, nine vessels (all British, including three steamers) went down. Out of twenty collision cases reported, three vessels (two British and one Swedish) sank, the British sinking off the British Isles. Four vessels were destroyed by fire. Total wrecks for year, 932.

SOLDERING CASE.

This case forms a compact and convenient receptacle for the various articles constituting a solderer's kit. Formed in the top of the block is a compartment to hold the solder, and also a groove extending along one side to receive the shank of the soldering iron. Pivoted to the top is a lid which, when placed parallel with the block, serves to hold the solder and soldering iron in place, and which, when turned to one side, allows either the solder or iron to be removed. When not in use, the acid bottle is held in a recess in the upper end of the block, but when needed it is placed in a hole in the upper face of the block. As here illustrated, the acid bottle is secured in the end of a piece pivoted at its opposite end in a right angle recess formed in one corner of the block. The pivoted end of this piece is beveled, so that when the bottle is needed it may be turned to an upright position. When not needed, the piece is folded down parallel with the block, as indi-



MORNINGSTAR'S SOLDERING CASE.

cated by the dotted lines. Upon one edge of block is a hook for holding the heated soldering iron.

This useful soldering case is the invention of Mr. Sylvanus Morningstar, of Newhamburg, Ontario, Canada.

Cast Glass Rails.

Friedrich Siemens, of Dresden, has succeeded in casting glass in the same way as metal is cast, and obtaining an article corresponding to cast metal. This cast glass is hard, not dearer in production than cast iron, and has the advantage of transparency, so that all flaws can be detected before it is applied to practical use. It will be much less exposed to injury from atmospheric influences than iron. The process of production is not difficult, the chief feature being rapid cooling. The hardness and resisting power of this cast glass are so great that experiments are being just now carried out at the Siemens glass foundry at Dresden with the purpose of ascertaining whether the material could be employed for rails on railways.

A sample of these glass sleepers recently tested at the Anderston Foundry Company (Limited), Glasgow, resisted a falling weight of 3¼ cwt., falling upon a rail placed upon the sleeper set in sand ballast, commencing at 6 inches and rising by succeeding increments of 6 inches up to 9 feet 6 inches—the *maximum* elevation to which the test ram could be elevated—without effect until the blow had been repeated for the sixth time. Cast iron sleepers are expected to withstand a similar test up to 7 feet only.*

The cost of glass sleepers will be considerably less than that of either cast iron or steel, while the material is practically imperishable as regards climatic changes and influences, or the ravages of such insects as the white ant.

FLOODS IN INDIA.

West of the River Jumna, the Northwestern State Railway runs parallel to the Himalayas for some hundreds of miles, and crosses all the five rivers of the Punjab. The country between the hills and the railway is more or less subject to floods throughout the whole of this distance. In the neighborhood of Umballa there are several mountain torrents whose wide sandy beds are dry for nine months of the year, but during the remaining months, whenever there is heavy rain in the lower ranges of the Himalayas, they become broad, rapid rivers, which are eventually lost in the sands of the Bikanir deserts.

The railway crosses the beds of these streams on iron girder bridges, apparently wide enough to carry off the waters of any flood. On the 3d of July an extraordinary spate came down the Markunda and other neighboring rivers between Umballa and the Jumna, and as the bridges were unable to pass all the water, the floods spread all over the country. The railway embankment, which is generally eight or ten feet high, acted as a dam and kept the water back, so that it accumulated, and at last ran over the top of the bank in places. Wherever this happened, a breach in the embankment was invariably caused. Some of the smaller bridges, and culverts, too, were washed away, and holes twenty feet deep scoured out in the places where they had been. In one place there was an almost con-

tinuous breach in the railway for more than a mile; ten miles further on there were others very nearly as extensive, and lesser breaches between these two points. But, although the bank was gone in so many places, the rails, with their cast iron sleepers, were left hanging in festoons in the air, and were only actually broken in one spot. Of course, all running of trains

the breaches, the repair of which will take a considerable time. The above account is by Captain William Pitt, R.E., who has also furnished the sketch.—*London Graphic.*

TUNNELING BY FREEZING.

Poetsch's ingenious system of sinking mine shafts

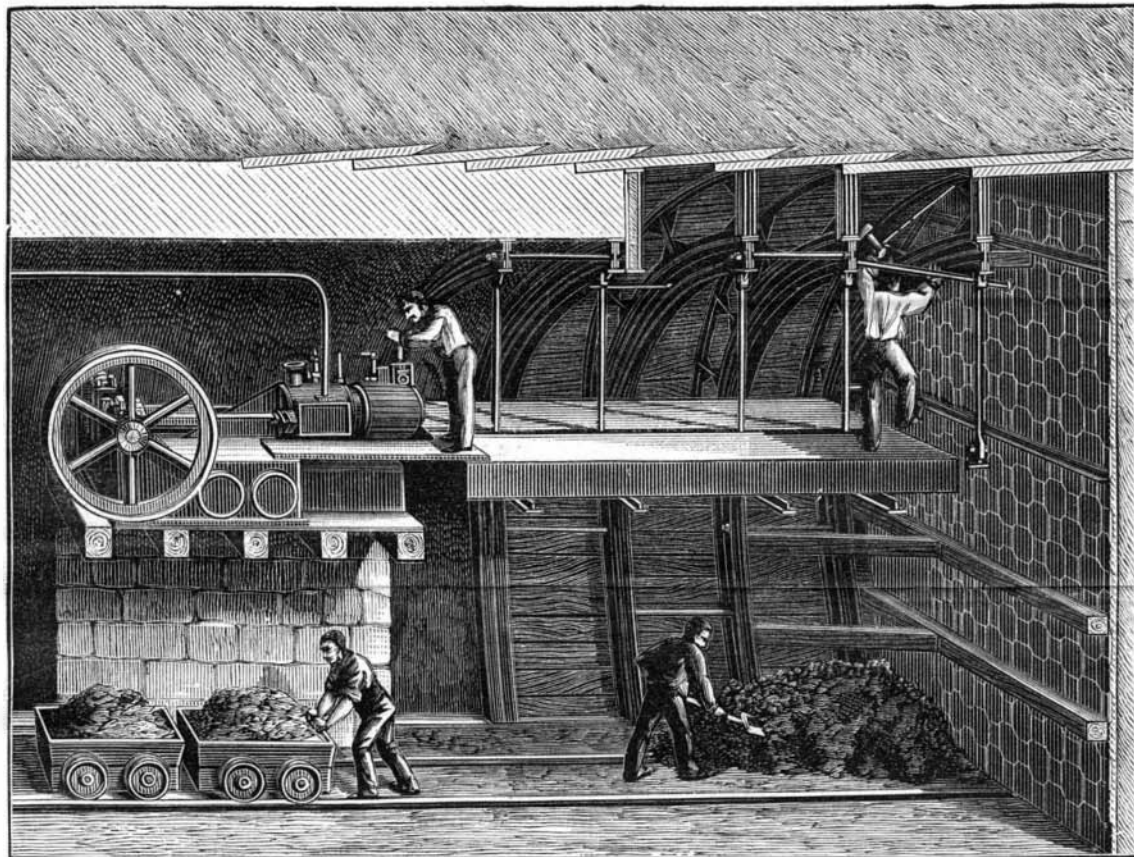


Fig. 1.—TUNNELING BY FREEZING.

through watery earth by freezing the latter is already known to our readers. An attentive examination of the frozen strata having shown that their respective slopes had but little influence upon the total hold of the mass, it was concluded that no special difficulty would be met with in applying this method of the driving of a tunnel. This opinion has held good in practice, and, although merely the principle of the method has been employed in the tunnel that has just been opened at Stockholm (Fig. 1), we have here an interesting example of the practical solution of the question of tunneling in shifting earth. The tunnel in question is designed to unite two quarters of the northern part of the city that are separated by the crest of a hill which renders communication between them particularly difficult. In order to overcome this difficulty, Capt. Lindmark, of the Swedish Engineers, proposed to tunnel the hill. The total

length of the work is 755 feet, the width is 13 feet at the springings, and the height 12½ feet under the key. In order to avoid taking possession of private property at the approaches to the mouths, the line was carried in the direction of the axis of a street; but this latter was already laid out and was quite narrow, and in certain parts, especially near the western extremity, the foundations of the tunnel came under those of the houses (Fig. 2). Such a work therefore presented peculiar features, and required the greatest precaution in order to prevent the subsidence of the structures above.

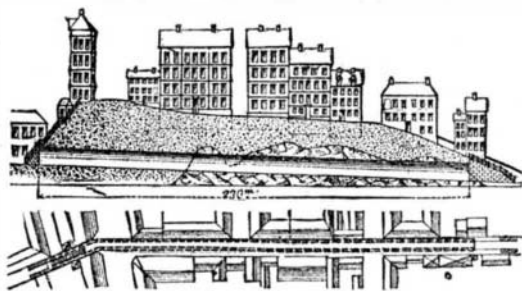


Fig. 2.

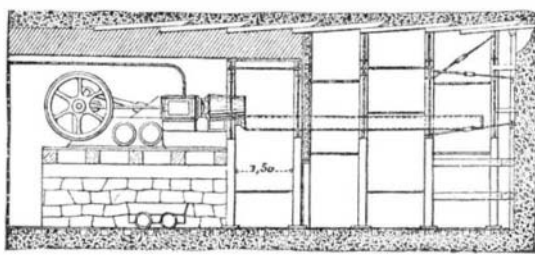


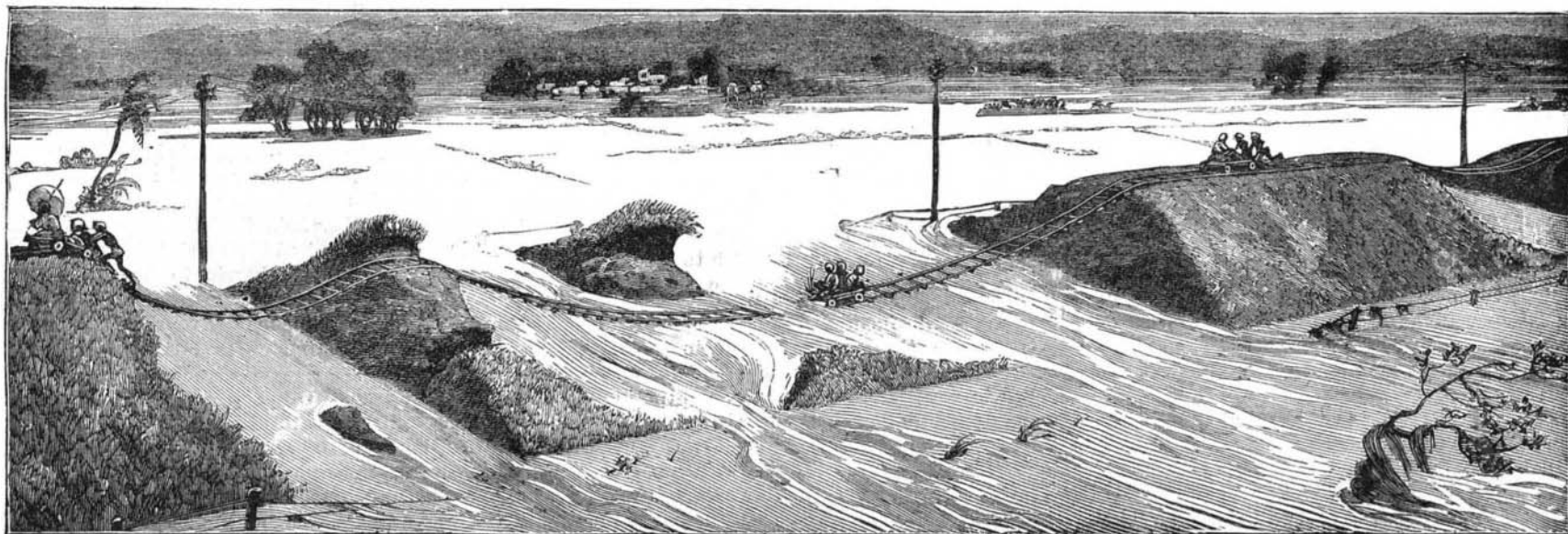
Fig. 3.

The direction heading at the base of the tunnel was for the most part excavated in granite by means of dynamite. The widening out of the western part of the work met with no serious obstacles, but it was entirely otherwise with the eastern. The ground met with near the mouth consisted of coarse gravel intermingled with blocks of stone and cemented with a clay that became liquid through infiltrations of water, and caused the sand to flow through even the smallest apertures. Moreover, at fifteen yards from the mouth, the line passed under two five-story houses (Fig. 2), built upon the opposite sides of the hill, and at so slight a distance from each other that the archbutments of the tunnel had to be built under their foundations, which latter extended down to within ten feet of the arch.

Mr. Lindmark, in the first place, thought of the method devised by the Austrian engineer Rziha, which consists in supporting the sides of the excavation with two centerings, one consisting of voissiors of Vignole rails connected by bolts and stays, and the other of cast iron, formed of pieces of double T section, upon

it, was destroyed in places, and many villages were wholly or partially washed away.

To restore through traffic, it has been necessary to construct an entirely new portion of line to one side of



CARRYING MAILED ACROSS THE NORTHWESTERN STATE RAILWAY, INDIA, DURING THE RECENT FLOODS.