

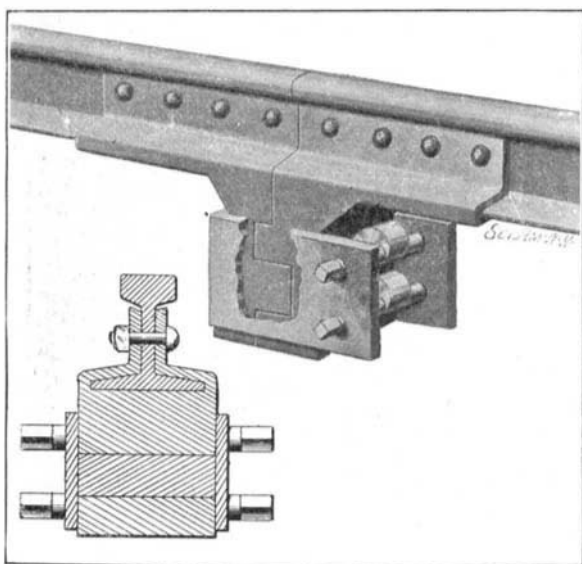
of this type at Port Arthur; but soon after the opening of the blockade, the sister ship "Yenesei" either struck a mine or was blown up by the premature explosion of one of her own mines. The "Amur," however, was more successful, and, indeed, she struck the most serious blow of the whole war in the sinking of the 15,000-ton "Hatsuse," which was one of the finest and most modern of the Japanese warships.

When it became evident to the Russians that Port Arthur was doomed, they sank such of the ships as had not been destroyed by the Japanese mortar batteries, and with a view to rendering the docks and slips useless, they sank the "Amur" and other ships, inside the dock or at the slips and blew up the dock caisson. One of our photographs shows the "Amur" sunk and lying heeled over on her starboard side. The work of the explosives is distinctly visible on her bridge and decks, marking the havoc either of the Japanese shells or of charges of high explosive used by the Russians to render the ship impossible of salvage.

Subsequently to the surrender of Port Arthur, Gen. Stoessel has referred more than once to the terrific effect of the 11-inch high-explosive shells. He states that it was quite impossible to find any protection against these, the bomb-proofs and the heaviest parapets and emplacements being utterly wrecked by their explosion. To be convinced of this, it is only necessary to look at some of the photographs taken in the forts and at various gun positions, after the capitulation. It will be noticed that not only are the guns dismounted and the carriages blown to pieces, but the very earthworks and massive concrete foundations and parapets have been blown up, torn apart, and scattered in a perfect chaos of wreckage. This is particularly noticeable in the photograph showing an empty gun carriage. In this case the shell hole by which the projectile entered is distinctly visible in the steel plating, and evidently, as it burst beneath the gun, it lifted the massive piece entirely from its trunnions, and threw it so far as to be out of range of the camera. Other views show some of the heavy ordnance, probably 10-inch of the Krupp pattern, Port Arthur containing a large number of guns from the Krupp works. One of these is apparently a howitzer, and the other a mortar for high-angle fire, of the same general type as that used by the Japanese. It will be noticed that a free use was made of sandbags in building emplacements and shelter for the gun positions. It must be admitted that the havoc shown in these illustrations appears to verify the most dramatic descriptions that have reached us from the various correspondents who have visited Port Arthur since its surrender.

#### A NEW TYPE OF RAIL JOINT.

In the accompanying engraving we illustrate a rail joint designed to connect the abutting extremities of two rails without the use of bolts or nuts. The device comprises two jaw members adapted to be fitted on to the rails, and a clamp for drawing and securing these members together. The latter are each formed with a body portion, from the top of which flanges project upward, closing over the base of the rail, as indicated in the cross section. The body portions are provided with projections arranged to interlock when the members are drawn together. The clamp consists of a plate bent to U-shape, and adapted to be fitted over the body portions of the two jaw members. Mounted in the open end of the clamp are two shafts, each formed with an eccentric swell. The ends of these shafts are



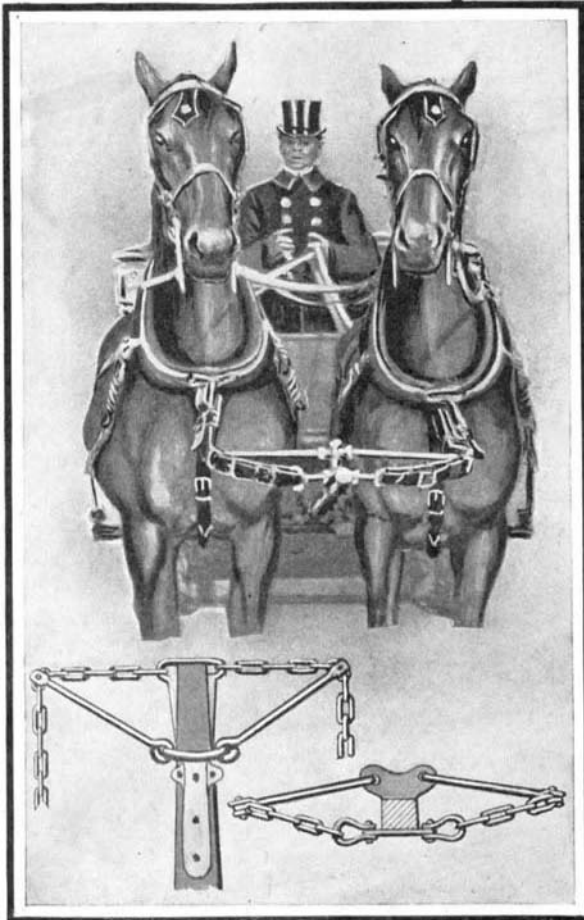
A NEW TYPE OF RAIL JOINT.

squared, so that they may be rotated by the application of a wrench, when the cam swells will press the jaw members firmly together. To prevent creeping of the rails, bolts may be passed through the flanges of the jaw members and the rail webs; but the joint proper, it will be observed, is made without the use of bolts, screws, or wedges, and can be very quickly con-

nected or disconnected by means of a wrench. The body portions of the jaw members make a very solid support for the ends of the rails, thus doing away with the pounding and wear common to all railways in which no metal supports are provided for the joints. A patent on this rail joint has recently been granted to the inventor, Mr. William J. Forsythe, of Teotitlan del Camino, Oaxaca, Mexico.

#### IMPROVED BACKING HARNESS FOR TEAMS.

There are some inventions which at the very first sight excite surprise that the older forms which they displace should not have been abandoned long ago. The improved backing harness shown in the accompanying engraving, which has been patented by Mr. T.



IMPROVED BACKING HARNESS FOR TEAMS.

H. Brigg, 3 Park Grove, Shipley, England, represents a very successful attempt to get rid of the serious disadvantages attending the old method of harnessing a team by a strap, running diagonally from the collar to the end of the pole—a method which, because of its unscientific and clumsy features, should have been abolished long ago. In moving any object either by pushing or pulling, if we wish to utilize the power to its full effect, it must be applied in the line in which the object is to be moved. Moreover, if the power be applied obliquely to the line of motion, there will be a loss of power proportional to the angle thus formed between the line of motion and the direction in which the power is applied. In the old method of harnessing, the obliquity of the pole strap to the pole renders it necessary for the horses, in backing to a curb, or in retarding a heavy load on a down grade, to throw their bodies well away from the pole. This is a bad arrangement for two reasons: First, that the team is not pulling in the direction in which the load is to be moved or retarded, and therefore a certain percentage of their energy is wasted; and, secondly, the outside forelegs and the outside shoulder muscles of the team are subjected to twisting strains that are injurious to the horse and prevent him from using his strength to the best effect. The backing harness herewith illustrated effectually remedies these two defects of the old system. The pull in backing is directly parallel with the pole; it is therefore no longer necessary for the team to throw themselves away from the pole, and they are enabled to exert their power in a natural position, in the proper direction, and therefore to the best effect.

The device consists of a pair of strong pivotal arms, which are attached to a clamp bolted above the pole a short distance from its outer end. Attached to their outer ends are two lengths of chain or two straps, one of which is connected to an eye-piece attached at the forward end of and beneath the pole, and the other to the ring of the horse's collar. When the horses are pulling forward these arms hang loosely, and therefore will not strike the horses' heads when the pole is jerked sharply upward on uneven roads. When the horses begin to back, the arms swing upward until the forward lateral chains are taut, and each horse is thereby enabled to exert a direct pull parallel with the pole. The device has been applied with equal success to light pleasure vehicles and heavy commercial conveyances such as trucks, wagons, and drays.

#### A Huckleberry Growing 165 Feet in the Air.

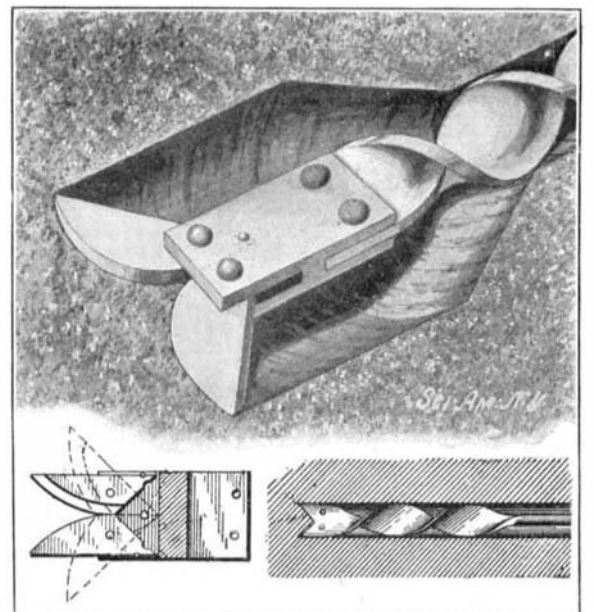
At Brookdale, Santa Cruz County, California, a fine but shallow-rooted specimen of the Sequoia, or California redwood, was blown over in a recent storm. The tree is estimated to be over 330 years old, measures 175 feet from butt to tip, and 60 feet in circumference. Ten feet from the top of the tree, and at a distance of 165 feet from the ground, was found a hole somewhat less than 2 feet deep. It had once been the nest of a woodpecker. In this hole had grown a sturdy, three-stalked huckleberry bush, 2 feet tall. Its roots, extending 6 feet into the heart of the tree, had absorbed the sap of the redwood. Decay had set into the tree, but the huckleberry had flourished, flowered, and borne fruit. The common theory is that the huckleberry seed had clung to the moist side of a tan-oak acorn, and was thus carried by the woodpecker to his nest. It is evident from the gnarled, woody stalks that the bush is many years old. The shrub has been topped and transplanted to the native soil of its species, but it has sickened and is already shedding its leaves.

#### To Prevent Rails from Spreading.

An ingenious device, the scope of which is to prevent railroad metals spreading under the influence of atmospheric heat, and thereby eliminate accidents attributable to this cause, has been designed by Mr. G. W. North, traffic manager of the North Wales Narrow Gage Railway. The contrivance comprises a flat iron bar which is attached over the ties but under the metals. There are two iron struts fitting outside the rails and under the shoulder forged on the bar. The struts are at an angle, and constructed so as to fit the bottom outside flange of the rail. Inside the rails there is a clip piece of wrought iron fitting closely over the inner side flanges, having struts on both inner and outer rails, so that on any curve the railroad cannot spread outward or the gage become altered. The danger on railways, especially on curves, is the tendency of the rails to spread at the head, thus widening the distance between the rails, and unless constant vigilance is maintained at such points, a derailment is bound to occur sooner or later.

#### REAMER FOR ENLARGING BLAST HOLES.

In mining operations, where holes are bored for the purpose of blasting, some of the efficiency of the blast is lost by the escape of gases at the time of the explosion, through the opening leading to the surface. It has been sought to overcome this difficulty by enlarging the bore of the hole at the bottom where the explosion takes place, so as to afford a relatively restricted outlet, which conduces to a more complete inclosure of the gases generated. The accompanying engraving illustrates a reamer, which may be attached to the ordinary drill for thus enlarging the hole. The device consists of two cutting blades or bits pivotally mounted in a frame, which is provided with a socket for the reception of the end of the drill, to which it is secured by screws. The bits are of approximately triangular shape, terminating in sharp points at their outer extremities. In practice a hole is first drilled with a common drill. These drills are usually formed with oppositely-disposed separated points, which form a conical base or nipple at the bottom of the opening. When the reamer is applied to the drill, the bits pressing against the conical base are forced outward, so



REAMER FOR ENLARGING BLAST HOLES.

that in their rotation they will form an enlarged chamber, as indicated in the illustration. When the chamber has been reamed out to a sufficient depth, the drill and reamer may be readily withdrawn, for the bits will return to their normal folded position. Mr. Henry C. Bramer, of Cheswick, Penn., is the inventor of this novel reamer.