Digging Wells.

The Massachusetts *Ploughman* some time since had the following directions in regard to digging wells:

The old way of digging a well and stoning it up so as to leave it about 3 feet in diameter, is a very good one if the water is to be drawn up with buckets; but if only with a pump, it is a very poor way; for if, as is the usual custom, the well be covered at the top, it leaves a very large space for dead air, which often becomes so bad that it affects the quality of the water, and also makes it unsafe to enter the well. When a well thus stoned has only a pump in it, the covering should be under water, or very near it; but if it is known that only a pump is to be used, the expense of stoning may be saved, and the water kept in a much better condition. This is done by digging the well in a dry time, and when dug as low as possible a cement pipe, some 2 feet in diameter and 2 or 3 feet long, is sunk at the bottom, and worked down as low as possible by digging out the inside. The pipe should be covered over with a flat stone, through the middle of which a two-inch hole has been drilled; directly over this hole stand up drain pipe, then begin to fill in the hole. When filled as high as the top of the first piece of drain pipe, put on another, being careful to have it straight with the other and the line perpendicular; continue filling and adding drain pipe until it is as high as the surrounding ground; or if the pump is not to stand directly over the well, then when it is filled within 4 feet of the surface put in the pump pipe and lead it off in a trench to where the pump is to stand. When it is found that the pipe is all right, finish filling the well, leaving some durable mark that the position of the well may be known.

A well of this kind is reliable and permanent, requiring no repairs; the water is cool and free from impurities that open wells are subject to; no insects or animals can find their way into it, and the cost is not more than one-half that of a well that is stoned. If dug, as it should be, when the springs are low, a constant supply of water that is as pure as the underground springs is secured. As the well is always full, there is no chance for bad air to injure the water, and, in fact, but little danger of being polluted by surrounding cesspools compared to that of open wells.

The Victims of Car Coupling.

Notwithstanding the great number of automatic couplers invented, probably most railroad men to-day are not convinced that there is one that meets the requirements. Even if they were, they would hesitate to adopt one which might not couple with the cars of their connections. Thus to the necessity of finding an efficient apparatus by which cars may be coupled without going between them there is added the further necessity of uniform and simultaneous action by the railroad companies concerning a matter not well understood, and regarding which opinions at present are likely to be very diverse.

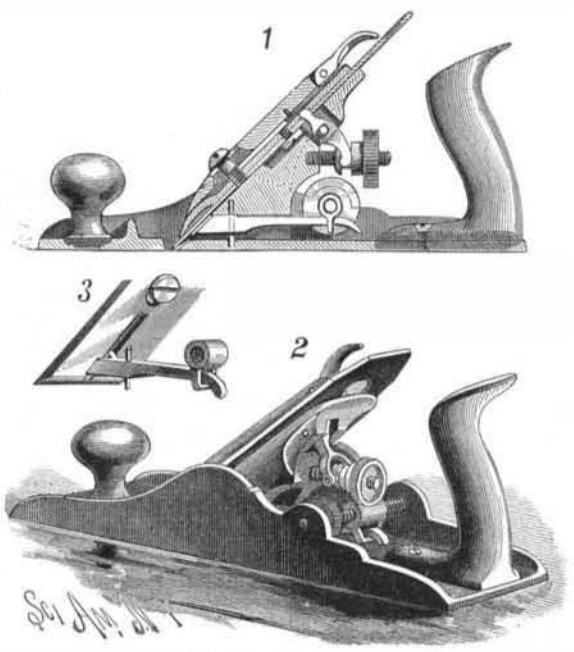
But the crushing and mangling of men by the thousands calls for some effort, at least, to prevent it, even if the way is not quite clear and action will be difficult. It justifies extraordinary methods, efforts, and expenditures. If it is true, as it probably is, that the railroad companies do not generally know of apparatus that will prevent the coupling slaughters, they should lose no time in finding out, in testing whatever has any promise with such thoroughness and completeness that they will all thereafter know what can and what cannot be done by the appliances offered for their use.

If they had had to pay for the killed and maimed brakemen, as they do for killed and maimed passengers, they would have been terribly exercised about the matter long ago; for the stockholder, not coming in contact with the victims, feels such things only in his pocket; and the pressure of the stockholder to save money *plus* the humanity of the operating officer is certainly more effective than the humanity alone. But even a modification of the employers' liability law, which would give the employe substantially the same rights as the passenger, might not greatly help in this matter; for, as we have said, the sufferers in car coupling are largely guilty of "contributory negligence," which would exonerate the company, even if a passenger were a victim. This kind of contributory negligence, though a good reason why the victim should not receive damages, is not always a good reason why the employer should not pay them.

This matter should not be allowed to rest, but its agitation by the inventors of car couplers alone is hardly likely to be fruitful. The railroad men should take it up, and they should need no other incitement than the regiments of men their cars have crippled and the companies of them they have killed.—*Railroad Gazette.*

BENCH PLANE.

Fig. 1 is a vertical longitudinal section, Fig. 2 is a perspective view, and Fig. 3 shows the arrangement for securing the lateral movement of the plane iron of a bench plane for which letters patent were recently issued to Mr. N. E. Curtis, of Mauston, Wis. In the upper surface of the bed piece is a groove to receive the screws which clamp the plane and cap iron together. This groove is long enough to permit the greatest required range of longitudinal movement of the plane iron, while it holds the sides of the screw head so closely as to admit of little or no lateral motion of the iron at that point. Fulcrumed in the bed piece is a lever, the short arm of which enters a hole in the cap iron; the long



CURTIS' BENCH PLANE.

arm is engaged by a milled nut on a screw threaded stud projecting from the back of the bed piece. By turning the nut the plane iron is adjusted longitudinally in the usual way. The plane iron and cap iron are held in place by a clamping lever similar to others in use; but the distance between the screw and the lower end has been shortened, and the distance between the screw and cam lever pivoted in the upper end has been increased, thereby securing greater leverage and increasing the firmness with which the plane iron is held in place.

A lever is fulcrumed in a mortise in the lower portion of the bed piece, so as to swing in a plane parallel with the face of the plane body. One arm of the lever is beveled and provided with a tongue entering a groove in the back of the plane iron. The long arm extends beyond the rear of the bed piece, and is moved by a traveling nut carried upon a screw journaled transversely in the plane body and having a milled head. By turning the screw in one direction or the other the lever is correspondingly moved, and the plane iron, by means of its engagement with the lever, is swung laterally, the clamping screw being the center of motion.

This construction enables the user to readily and accurately adjust the cutting edge of the plane iron so that it will be parallel with the face of the plane, and also enables him to quickly place the cutting edge at any desired height.

ON the Pennsylvania Railway the average consumption of fuel for all passenger trains is 56 pounds per train mile.

A PHOTOGRAPHIC REVOLVER FOR AMATEURS.

The apparatus which we are about to describe, and which is manufactured by Mr. E. Enjalbert, is very ingenious, very well conceived, and will, we believe, meet with great success. It is a true pocket revolver with barrel, stock, and cock, but instead of serving to throw deadly leaden balls it is designed for taking very small photographic negatives four centimeters square. Upon pulling the trigger the sensitized plates succeed one another, and the operator can thus suddenly take ten successive photographs without touching his weapon. These small photographs may be afterward enlarged, and serve as useful documents for tourists, amateurs, and artists.

With this little revolver there is no longer any focusing to be done, no more plates to be changed, and instantaneous views are obtained by an exposure of one-fiftieth of a second. The apparatus is always hermetically closed to the light, and it permits of following objects in motion with great facility, and without its being necessary to take accurate aim as with an ordinary revolver, since it is merely a question of taking such a general view as is comprised within the field of the objective.

The apparatus consists of five principal parts, which are shown in detail in the annexed figure.

1. *The Barrel.*—In this is adjusted the rapid, rectilinear objective, which consists of two achromatic menisci that are symmetrically arranged to give a focal distance of 0·042 mm. The revolver may be used from a distance of 4·5 meters, since, owing to the combination of the lenses' curves, the different planes are then all in focus. The ever tedious operation of focusing is thus avoided. The diaphragms accompanying the apparatus are placed in the very interior of the objective, between the two lenses.

2. *The Camera.*—This consists of a cylinder, H, that contains a shutter, A, and a frame holder, C. It is into the front end of this chamber that the barrel is screwed. The shutter, A, is capable of revolving freely upon its axis. It contains an aperture, B, equal to a quarter of its surface, and carries a small clockwork movement that gears with the pinion of the axis of the camera. This clockwork movement, when its spring expands during its revolution, necessarily carries along the shutter. The spring is wound up by revolving the cylinder, G, when it is in place. At this moment, in fact, it catches and holds the end of the axle, which enters a square aperture in its center. Upon pulling the trigger the two teeth seen at K are thrust forward. The first of these, which, when at rest, stops the shutter, now frees it and allows it to make one revolution that opens and instantaneously closes the apparatus. The shutter, on reaching the lower end of its travel, abuts against the second tooth. The shuttle-motion that occurs in the rear when the trigger is freed disengages this second tooth, and allows the first to engage with the starting notch again, so that the shutter is then ready to operate anew if the spring is sufficiently taut.

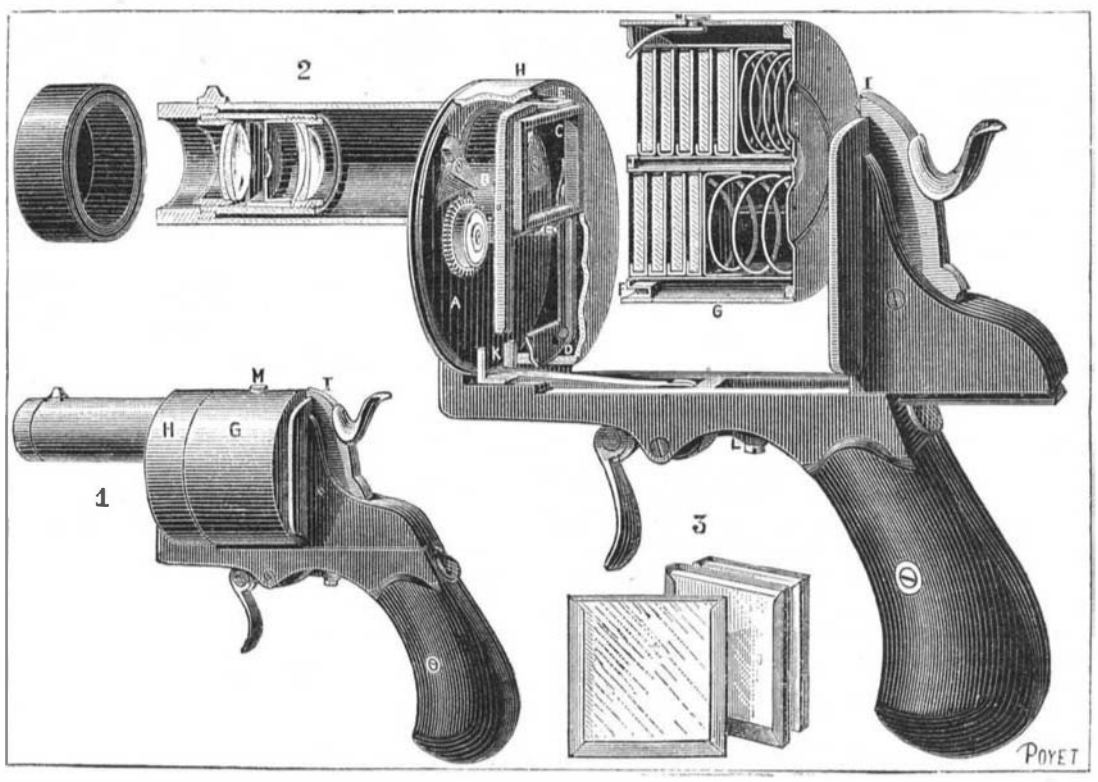
The frame holder, C, is hinged beneath, at D, and terminates above in a bent tooth, E, which causes it to advance or recoil a distance equal to the thickness of one of the frames, according as it has in front of it the upper or lower case. This motion is obtained by means of the rabbet, F, at the bottom of the cylinder.

3. *The Plate Cylinder.*—This is divided into two rectangular compartments in which slide two plates that are thrust forward by spiral springs. The upper case contains the sensitized plates held in their frames (shown of actual size in Fig. 3), while the lower one collects them in measure as they have been exposed.

The cylinder, G, revolves through the friction of its edges against the chamber, H.

When the upper case is opposite the aperture, C, the tooth, E, forces back the frame holder, the first frame enters the open space in front of it, and the glass is thus in place for the operation. In order to remove this glass and substitute the succeeding one for it, the cylinder is made to perform one entire revolution. The first glass remains in the aperture, C, in the camera, when the cylinder begins to revolve. Then, the revolution continuing, when the second compartment comes opposite this glass the tooth, E, enters the rabbet, F, and the glass naturally enters the said compartment. The revolution still continuing, the cylinder takes its position again, and the second glass, now become the first, is, in its turn, made to enter the camera.

3. *The Movable Breech*, which is fixed upon the stock by a dovetail, serves to shove the cylinder, G, up against the camera, H. It carries a spring cock, whose extremity, I, enters a recess in the back of the cylinder and prevents the latter from revolving, and also indicates the position of the cases when they are well opposite the objective.



ENJALBERT'S PHOTO-REVOLVER

(Fig. 1.—One-half actual size. Fig. 2.—Slightly reduced. Fig. 3.—Sensitive plates—actual size.)