IMPROVED SAFETY NUT.

That a safety nut so simple and so obviously efficient as the one shown in the annexed engraving should be among the recent inventions in this line instead of being among the first, is a curious example of the manner in which inventors often overlook the simplest means of accomplishing an end. The principle on which this nut operates will be understood by reference to the engraving. Two nuts are represented on each bolt, simply for the purpose of showing the difference between the nut when loose and when screwed down. In practice only one nut is required to each bolt.

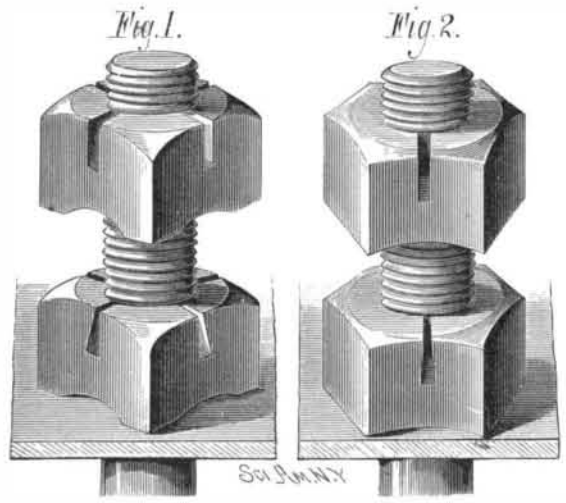
The square nut shown in Fig. 1 is concaved on its under side, so that it touches its bearings only at the corners and in the outer face of the nut there are two slots at right angles to each other. When this nut is screwed home the outer portion is contracted so as to clamp the bolt tightly.

The hexagonal nut shown in Fig. 2 has but a single transverse slot, and the nut is made concave on the under surface, so that when the nut is screwed home it will contract the outer portion and so clamp the bolt.

This nut may be removed and replaced by means of the wrench, but it will not become accidentally loosened, and the bolt to which it is applied will always remain tight, as the nut possesses a certain amount of elasticity. The action of this nut is such as to prevent stripping the threads of either bolt or nut.

As only one nut is used with each bolt, and as no washer or other extra appliance is required, it is obvious that a great saving is effected by this invention.

We are informed that several of the leading railroads have adopted this nut, and use it on the tracks, engines, cars, and machinery. The Atwood Safety Nut Company manufacture this article in a variety of forms.



THE ATWOOD SAFETY NUT.

Further information may be obtained by addressing J. W. Labaree, Secretary and Treasurer, Room 2, Agawam Bank Building, Springfield, Mass.

Petroleum Prospects.

The total oil production of the Pennsylvania oil regions for the month of October was 2,094,608 barrels. The conditions in the producing field are gradually giving warrant for permanently higher prices of crude. The confidence of the trade is daily becoming more fixed in the definiteness and limit of the Bradford field, as the last of the several "rich streaks" in the region are being worked.

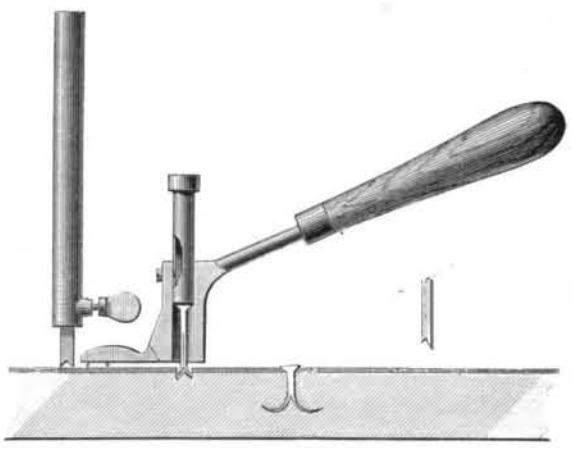
We entertain an increased belief that the coming year will exhibit a continued falling off in the volume of production, notwithstanding all the modern improvements in drilling and the great energy with which they are employed.'

For the past few weeks the markets of both crude and refined seem to have been rigorously and artificially held by the refining interest. The refined has been quoted at 12 cts. for four weeks without change—and as a consequence the exporter has taken oil very sparingly. The exports of last year to November 1, as compared with the exports of this year to November 1, show a decrease of 1,269,646 barrels in crude equivalent. The falling off of production, taken together with the increased demand which must result from the present reluctance of exporters, unite in warranting us in the belief above expressed, in enhanced prices for the coming year.

Our figures show a decrease in production for last month, compared with the preceding month, of 933 barrels per day, notwithstanding the number of wells drilled was slightly greater than in the preceding month. It will be noticed, too, that the average per well of the new wells for last month is a little less than that of the new wells for the month before; besides, it is generally recognized that the force of the gas in the region is gradually becoming less, and pumping is more commonly resorted to. As nearly as we can ascertain, about one-eighth of all the wheels of the Bradford region are now pumping. We believe, however, on the whole, judging the character of the Bradford producing field, that the falling off of production will be quite gradual. Our reason for this is that the Bradford field is essentially different from its predecessor—the Butler field. The wells in the Butler field were often close together, many of them were very large and fell off rapidly; while the wells of the Bradford region are smaller, farther apart, much greater in number, have a greater area from which to draw oil, and consequently decline very much more slowly. —*Stowell's Reporter.*

TOOL FOR DRIVING AND CLINCHING NAILS.

A novel method of making a nail hole and driving and clinching the nail is shown in the annexed engraving. The instrument for making the hole has a notched end which leaves a ridge in the center of the hole at the bottom. The nail driving tool consists of a socket provided with a suitable handle, and containing a follower which rests upon the



TOOL FOR DRIVING AND CLINCHING NAILS.

head of the nail to be driven, and receives the blows of the hammer in the operation of driving the nail. The nail is split for one half its length, and the two arms thus formed are slightly separated at the point, so that when they meet the ridge at the bottom of the hole they will be still further separated and will clinch in the body of the wood.

This invention was recently patented by Mr. Charles P. Ball, of Danville, Ky.

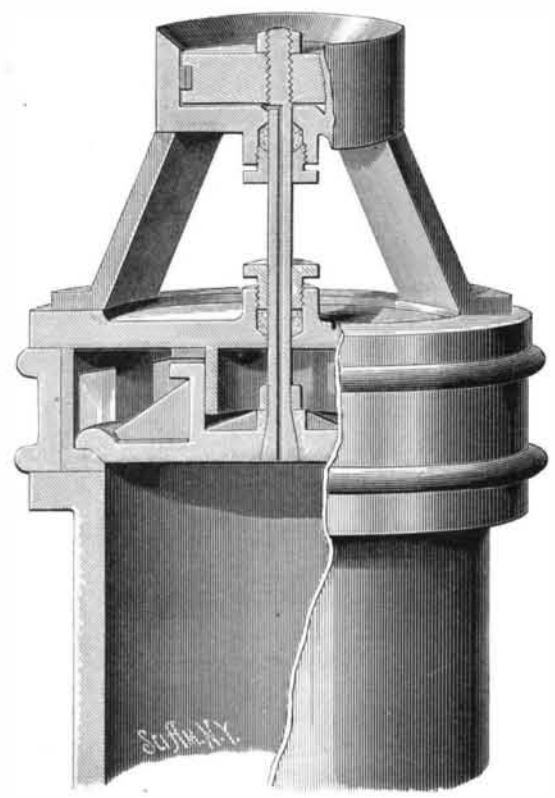
AUTOMATIC BALANCE ATTACHMENT FOR VALVES.

It is well known that in all air compressors and water pumps the pressure in cylinder of air compressors or in working barrel or cylinder of pumps is much greater at the point of opening the delivery valves than the actual pressure in the air receivers of compressors or in water column of pumps, because of the difference in area between the top and bottom of delivery valves. In some air compressors a hundred and twenty-five pounds pressure to the square inch is required in the cylinder to eighty pounds in the receiver, and in some instances a hundred pounds pressure is required in the cylinder to eighty pounds pressure in the receiver or column.

The engraving shows an invention designed to remedy this defect in air compressors and pumps, to provide a device which will enable the compressors and pumps to operate with equal pressure on both sides of the delivery valve.

The invention consists of an auxiliary valve arranged outside of the cylinder, where it is not subjected to back pressure, and connected with the delivery valve by a hollow valve stem.

In the engraving, which is a sectional view, the cylinder of an air compressor is represented, on the end of which there is a ring containing delivery ports, through which the air from the cylinder is forced into a receiver or conducting



AUTOMATIC BALANCE ATTACHMENT FOR DELIVERY VALVES OF AIR COMPRESSORS AND WATER PUMPS.

pipe. This ring is provided with an inner flange or valve seat on which rests the delivery valve. These parts are similar to those seen in some of the air compressors in common use, and with this construction and arrangement one hundred pounds pressure to the square inch in the cylinder is required to open the valve against eighty pounds pressure in the receiver or in the conducting pipes.

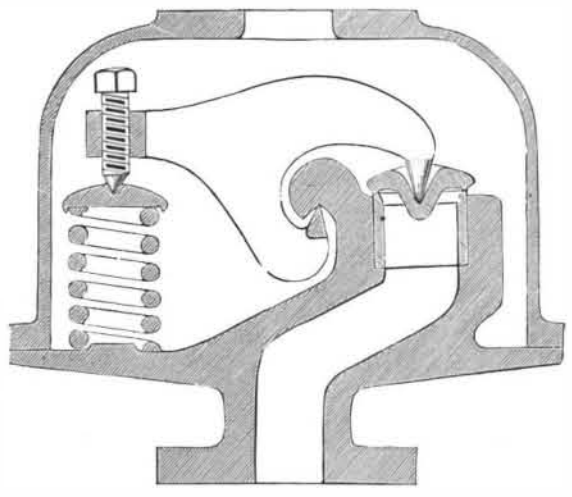
A drum having an open end is connected with the cylinder head by inclined standards, and contains a piston connected with the valve by means of a rod that extends centrally through the cylinder head. On the outer end of this rod is screwed an adjusting nut, by means of which the piston may be adjusted. This rod is bored longitudinally, establishing communication between the compressor cylinder and the drum containing the piston.

It will be seen that the upper face of the piston is exposed so as to be subjected to atmospheric pressure only, and when the compressor is in operation a portion of the air in the compressor cylinder passes through the hollow rod into the space beneath the piston, and there exerts sufficient pressure, in combination with the pressure on the inner face of the valve, to open the valve against an equal pressure in the receiver or conducting pipes, so that when the pressure in the cylinder equals the pressure in the receivers the valve is opened and held in place until the piston in the cylinder starts on the return stroke, when the pressure under the piston is immediately relieved through the hollow rod and the main valve closes.

The space between the valve and its seat is made as shallow as possible, so that the space may be quickly filled and exhausted. The piston may be adjusted to regulate this space. This invention was recently patented by Messrs. Samuel B. Connor and Henry Dods, of Virginia City, Nevada.

IMPROVED SAFETY VALVE.

In the annexed cut we have represented a steam safety valve, which is the invention of M. Schmidt, M.E., of Zurich, Switzerland. It consists of a lever terminating in two prongs, one of which extends downward and rests upon



IMPROVED SAFETY VALVE.

the cap, closing the top of the tube through which the steam escapes. The other prong extends upward and catches under a projection of the steam tube, and forms the fulcrum for the lever. The opposite end of this lever is provided with an adjustable screw pressing upon a plate that rests on the top of a spiral spring, which keeps the valve closed by pressing the outer end of the lever upward. As soon as the pressure of the steam overcomes the pressure of the spiral spring the valve will be raised, permitting the steam to escape. The apparatus is contained in a case having a central aperture for the escape of steam.

Raising Sunken Vessels.

An experiment recently took place in the East India Dock Basin, Blackwall, London, by permission of Mr. J. L. du Plat Taylor, the secretary of the Dock Company, for the purpose of testing and illustrating the mode of raising sunken ships by means of the apparatus patented by Mr. William Atkinson, naval engineer, of Sheffield. The machinery employed consists of the necessary number and size, according to the power required, of oval or egg-shaped buoys constructed of sheet iron, having an internal valve of a simple and effective character. Captain Hales Dutton, the dock master, who assisted during the operations, had placed his small yacht at the inventor's service for the occasion. The vessel was moored in the basin, and a set of four buoys were attached to it, one on each side near the bow and the stern. Air was supplied from a pump on the quay by a pipe communicating with a small copper globe resting on the deck of the vessel, and from which place proceeded four other flexible tubes, one to each buoy, thus distributing the air to each one equally. The vessel being flooded and in a sinking condition, the buoys were attached and the valves opened; they rapidly filled with water, and the vessel immediately sank in about 30 feet. Upon the first attempt an air chamber in the stern had been lost sight of, causing the vessel to come up to the surface stern uppermost; this being rectified, the vessel was again sent to the bottom, and allowed to remain a short time to allow her to settle down. When the order was given to work the pump, the vessel was brought to the surface, perfectly level, in about three minutes. The apparatus used, although only models, and on a comparatively diminutive scale (the buoys measuring 3 feet 4 inches in height and 2 feet 6 inches in diameter), was estimated to be capable of lifting a weight of nearly 20 tons, and that it needed, as represented by the patentee, only a corresponding increase in the lifting power to deal successfully with vessels of any tonnage.