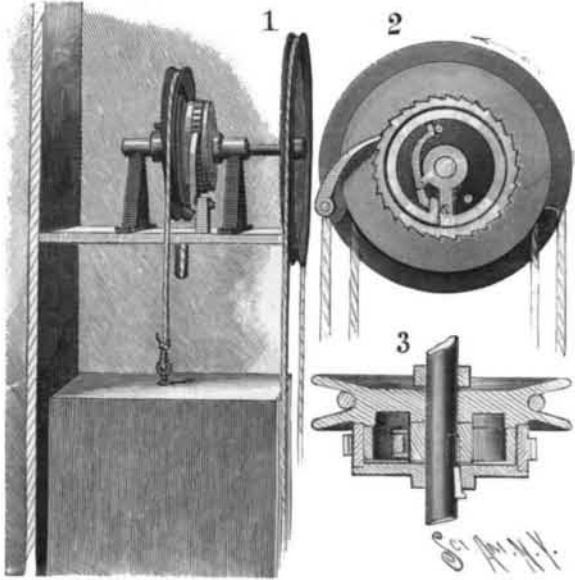


**A NEW DUMB WAITER SAFETY CLUTCH.**

The illustration represents an improvement in the hoisting apparatus for dumb waiters, which has been patented by Anton Larsen, of One Hundred and Thirty-fourth Street and Brook Avenue, New York City. The construction is strong and not liable to get out of order, and the arrangement is such that the cage, with its load, will be safely held at any point when one lets go of the hoisting rope. Fig. 1 shows the application of the improvement, Figs. 2 and 3 being sectional views. At the top of the usual dumb

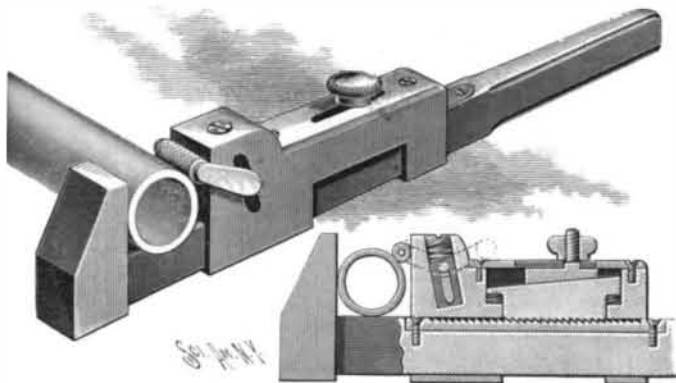


LARSEN'S DUMB WAITER SAFETY CLUTCH.

waiter well is journaled a shaft on which loosely turns the pulley carrying the counterbalanced cage rope or cable, the hoisting pulley being secured on the outer end of the shaft, and the hoisting rope passing over it with two downward runs, either of which can be taken hold of to pull the load up or draw it down. On the shaft, near the cage-carrying pulley, a disk is secured by a key, as shown in Fig. 3, and on the inner face of the disk are two lugs, one adapted to engage an arm at one end of a spring friction band, while the other is adapted to engage a lever fulcrumed on the band. The arm of this spring band extends inwardly, and is secured by a screw to the cage-carrying pulley, the arm also having an opening for the passage of the hoisting shaft. The band is fitted within a ring-shaped ratchet wheel engaged by a pawl, as shown in Figs. 1 and 2. The arrangement is such that a downward pull on one run of the hoisting rope causes the lug on the disk to engage the lever to effect an opening of the spring band, and move it out of frictional contact with the inner face of the ratchet wheel, as shown in Fig. 2, when motion is transmitted to the cage-carrying pulley in the direction indicated by the arrow. At the moment that the pull on this run of the rope is released, the friction band moves back into its normal position, or into strong frictional contact with the inner surface of the ratchet wheel, which is held against rotation in an opposite direction by the pawl, thus holding the cage, with its load, stationary in the well. The spring band is sprung into position in the ratchet wheel, and is adapted to engage it with a force more than that of the highest load to be carried by the cage. This is the fifth patent which this inventor has obtained through the SCIENTIFIC AMERICAN patent agency.

**A COMBINED PIPE AND MONKEY WRENCH.**

This wrench, which has a roller jaw fulcrumed in arms on its movable jaw, has been patented by



DIXON'S PIPE AND NUT WRENCH.

Thomas Dixon, of Highland Avenue, McKeesport, Pa. One of the figures in the engraving shows the wrench in use, and the other is a sectional view. Within the movable jaw is a recess in which is a block having on its bottom teeth adapted to engage teeth in the top of the wrench handle, springs normally holding the teeth of the block up out of such engagement, and permitting the movable jaw to slide on the handle. The top surface of the block is inclined, and is engaged by a longitudinally sliding wedge to move the block down

against the tension of the springs and into engagement with the teeth on the handle, a thumb nut on a screw projecting upwardly from the wedge facilitating its ready adjustment as the movable jaw is to be moved forward or backward or fixed in any desired position relative to the outer jaw. The tool is adapted for use as a pipe wrench by the addition of a roller jaw journaled in arms on a transverse shaft or pin which slides in bearings near the front end of the movable jaw, a spring resting on the shaft being engaged by a screw block. As shown by the dotted lines in the sectional view, the roller jaw is moved to a rearward position when the tool is to be used as a monkey wrench, being swung forward only when it is desired to use the wrench as a pipe wrench.

**The Vital Statistics of Egypt.**

The vital statistics of Egypt, as recently published by the Lancet, are full of matter for reflection. In the first place, the rate of increase can be paralleled in no European country at any period since records have been kept. It represented 1.79 per cent in the year 1894!—births reaching nearly 42 per 1,000, while deaths only reached 24 per 1,000. If there be any fraud in the return, it must go to diminish the asserted increase, not to enlarge it, for the motive would be to evade conscription. A death rate of only 24 per 1,000 in a country which ignores sanitation is startling; but the wonder grows immeasurably when we observe that in Alexandria and Cairo, where laws of health are enforced as strictly as may be, deaths represent 86 per cent of births, while in the rural districts they are but 54 per cent. It is the consequences, however, which interest us. In 1894 the population of Egypt below the Second Cataract was estimated at 8,000,000; the census of 1882 showed 6,469,710. A rise of 1,500,000 in twelve years! Authorities have hesitated hitherto to credit the population of 12,000,000, in the time of Rameses II, which Champollion and the French savants made out upon such evidence as they could find. But these extraordinary returns make it quite probable. The land under cultivation then was vastly more extensive than now. But the encroachment of the desert can be repelled, if an irrigation system equal to that of old be once more established. Egypt, therefore, has a boundless expansion. But if the people multiply at such a rate under the pax Britannic, so they must in varying degrees elsewhere, and not in all our colonies is there surplus land for them to occupy. But meanwhile the birth rate of Europe steadily lowers. Any one can draw conclusions.

**Measurement of Hallucinations.**

PROF. SCRIPTURE, IN SCIENCE.

A typical case of the application of the method is found in measuring hallucinations of sound. The person experimented upon was placed in a quiet room and was told that when a telegraph sounder clicked, a very faint tone would be turned on, and that this tone would be slowly increased in intensity. As soon as he heard it he was to press a telegraph key. The experimenter in a distant room had a means of producing tone of any intensity in the quiet room. In the first few experiments a tone would be actually produced every time the sounder clicked, but after that the tone was not necessary. It was sufficient to click the sounder in order to produce a pure hallucination. The persons experimented on did not know they were deceived, and said that all tones were of the same intensity. The real tone could be measured in its intensity, and since the hallucination was of the same intensity, it was also indirectly measured. Similar experiments were made on other senses. For example, in regard to touch, a light pith ball would be dropped regularly on the back of the hand to the sound of the metronome. After a few times it was not necessary to drop the ball. The person would feel the touch by pure hallucination.

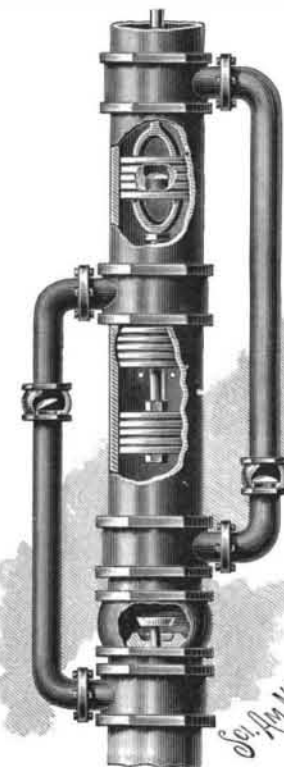
Similar experiments were made on taste. Of six bottles two contained pure water and the other four a series of solutions of pure cane sugar—the first one-half per cent, the second one per cent, the third two per cent, and the fourth four per cent sugar, according to weight. A block was placed in front of them so that the observer could not see them, although he was aware that they stood near him, because he saw them when he received his instructions. It was required of him to tell how weak a solution of sugar he could positively detect. The experimenter took a glass dropper and deposited drops on his tongue, drawing first from the two water bottles, and then from the sugar solutions, in order of increasing strength. The sugar in the solutions was detected in the first trial. Proposing to repeat the test, the experimenter proceeded as before, but drew from the first water bottle every time. The result was that when the pure water had been tasted from two to ten times the observer, almost without exception, thought he detected sugar. A test on olfactory hallucinations was conducted similarly, with the result that about three-fourths of the persons experimented upon perceived the smell of oil of cloves from a pure

water bottle. In another set of experiments the subject was told to walk slowly forward till he could detect a spot within a white ring. As soon as he did so, he read off the distance on a tape measure at his side. The spot was a small blue bead. The experiment was repeated a number of times. Thereafter the bead was removed, but the suggestion of having previously traversed a certain distance was sufficient to produce an hallucination of the bead. It is to be clearly understood that the persons experimented upon were perfectly sane and normal. They were friends or students, generally in total ignorance of the subject, who supposed themselves to be undergoing some tests for sensation. One case was found, however, of a suspicious observer who expected deception and who declared that he had waited every time till he was sure of the sensations; the results were just as hallucinatory as usual. The value of the method and the experiments lies mainly, I think, (1) in pointing out a method of determining the portion of a sensation due to the suggestion of circumstances rather than to the stimulus; (2) in application to mental pathology; (3) in beginning a scientific treatment of hypnotism and suggestion.

**LEFEBVRE AND UPTON'S FORCE AND LIFT PUMP.**

This is a pump designed to throw or lift a continuous stream of water, having a plunger barrel containing two reciprocating plungers separated from each other by a packing fixed in the barrel. A suction pipe having a valve extends from the lower end of the pump barrel, and a valved pipe leads from the suction pipe above its valve to the barrel above the uppermost plunger, while a second valved pipe leads from the suction pipe below its valve to the barrel between the upper plunger and the fixed packing.

The improvement has been patented by Julian L. Lefebvre and Charles S. Upton, of Eureka Junction, Washington, and in the illustration parts are broken



LEFEBVRE AND UPTON'S FORCE AND LIFT PUMP.

out to show valves, plungers and fixed packing. The plungers are rigidly connected by a stem which passes through the packing, and the upper plunger rod extends upwardly through the discharge pipe to connect at its outer end with a power mechanism. The upper plunger is made with two cylindrical parts screwed together, and has a valve which opens upward on the down stroke of the plunger and closes on its upward stroke. When the plungers are on the up stroke, as shown in the engraving, water drawn in through the suction pipe passes into the lower part of the pump barrel and also up the pipe at the left, past the valve

therein, and into the space between the fixed packing and the upper plunger, the water above the upper plunger being at the same time forced out through the discharge pipe. On the down stroke of the plungers the water previously drawn in at the lower end of the barrel section is forced by the lower plunger up through the pipe at the right into the discharge pipe, and the water in the pump barrel above the fixed packing is also forced through the valve in the upper plunger to the discharge pipe. Just below the fixed packing are air openings in the pump barrel to permit air to pass in and out on the up and down movement of the lower plunger. The pump is not liable to get out of order and the several parts may be readily taken apart for repairs when necessary.

M. GROSHEINTZ (says the Gas World) has been investigating the action of coal gas on rubber tubing. He found when a pressure gage was connected to the gas supply by means of a rubber tube and the stopcock closed, in twelve hours there was not only no pressure, but actually a defect of pressure indicated by the gage. Then he found that the tube had gained weight, for it had absorbed and, as it were, dissolved the gas; and then he found that the greatest sinner in this respect was the purest rubber, black rubber, which contains  $\frac{1}{2}$  to  $1\frac{1}{2}$  per cent of solids; next came red rubber, with its 11 or 12 per cent; and the best of all was the ordinary gray rubber, with its 52 to 55 per cent of added solid material. The last will endure the longest time before allowing gas to permeate it so as to produce a smell in the apartment.