

**IMPROVED HIGH SPEED DRY AIR COMPRESSOR.**

We illustrate herewith a new and very compact form of air compressor, designed for obtaining any desired pressure per square inch for driving rock drills, transmitting messages, forcing sand blasts, and, in general, all pneumatic purposes. The perspective view, Fig. 1, shows the engine side of the machine; Fig. 2 represents a section of the compressing cylinders. Motion is imparted to a forked rod which is attached to the center, *g*, of the plunger pistons, *J*, in such a way that facility is afforded for the adjustment of said pistons relatively to the discharge valves of the compressor in order to meet disturbances consequent on wear and for tightening up the driving connections.

It will be observed from the section, Fig. 2, that there is in reality but one piston, each end of which works in a separate compression cylinder. Each end is tightly packed; and in each end face is a valve, the stem of which is surrounded by a coiled spring, *I*. At the compressing end of each cylinder is an enlargement, *H*, formed by the extension of the cylinder. This is constructed to form a seat for the outlet valve, *G*, which is held up to the shoulder by the spring, *e*, which surrounds its stem. At *d* is the air outlet.

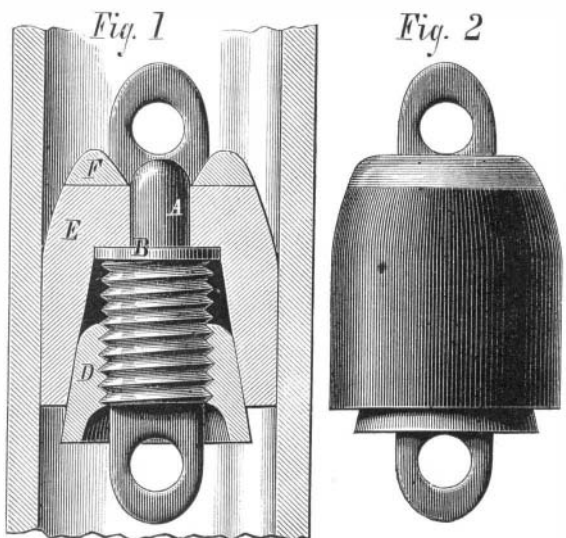
When the piston makes an inward stroke, its valve, *I*, of course closes, and the air is compressed before the piston and against the valve, *G*. As soon as the pressure on the latter exceeds the oppositely acting pressure of its spring, the valve opens; and the compressed air then escapes through the outlet, *d*. As soon, however, as the pressure is sufficiently reduced, the valve spring reacts; and as the piston at the end of its path projects for about  $\frac{1}{8}$  inch into the enlarged portion, the valve comes back directly against it and follows it until once more forming a flush joint with the shoulder. Meanwhile the valve in the piston opens, and air enters between the same and the valve, the piston continuing its rearward stroke until past the orifice, *f*, which opens directly into the air, and thus a full supply is insured, ahead of the piston, before it begins another compressing stroke. Of course the reverse operation is going on in the opposite cylinder; and in this way the action is rendered continuous.

It will also be noticed that there is not only an absence of ports and passages, but that no water whatever is used in the air cylinder; so that the danger of wear from gritty particles in the same is entirely obviated. The water necessary for cooling is applied only on the outside in the jacket, *C*. Any kind of water may be used without injury to the compressor. As the areas of opening in the inlet and outlet valves are very large, they require but a slight motion to admit or release the air, consequently the machines may be run at a high rate of speed, from 175 to 200 revolutions, and are made light in weight when compared with the amount of work they are capable of performing.

For further particulars, address the manufacturers, Messrs. Guild & Garrison, 34 to 44 First street, Brooklyn, E. D., N. Y.

**KENYON'S ADJUSTABLE RUBBER BUCKET FOR CHAIN PUMPS.**

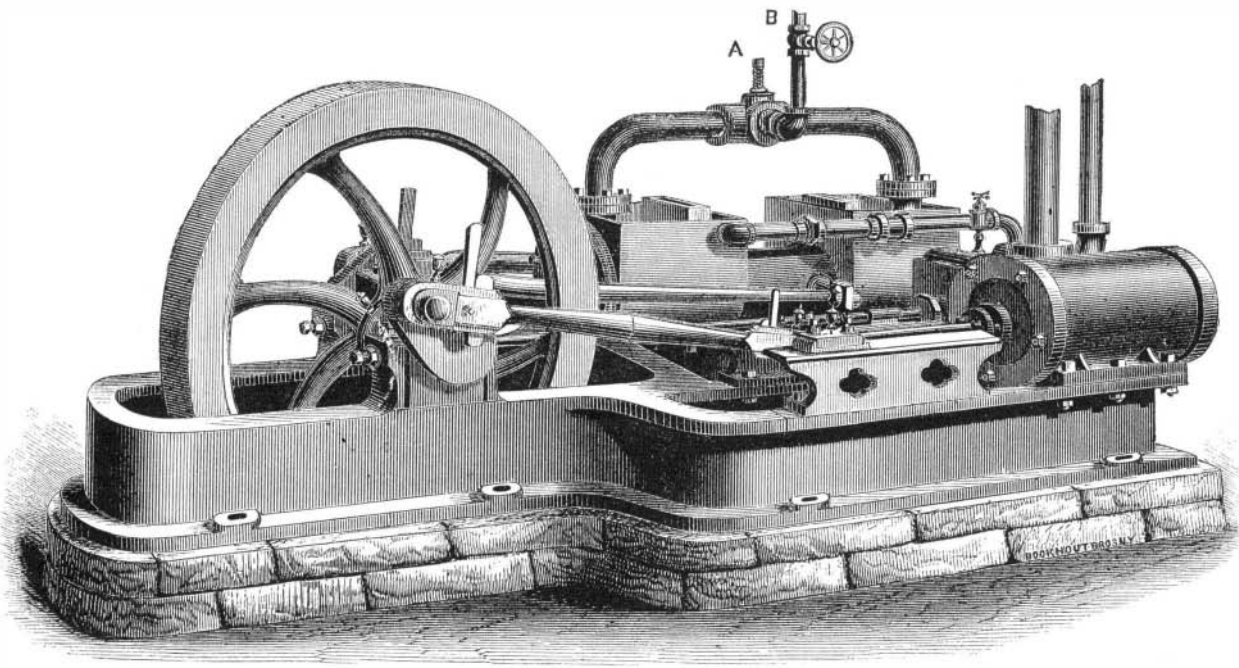
The annexed engraving represents a new rubber bucket for chain pumps, which may be adjusted so as to accurately



fit the tube, and also so as to take up wear. It acts both as a suction and forcing piston, and is claimed to raise water from deep wells at a small expenditure of power. Fig. 1

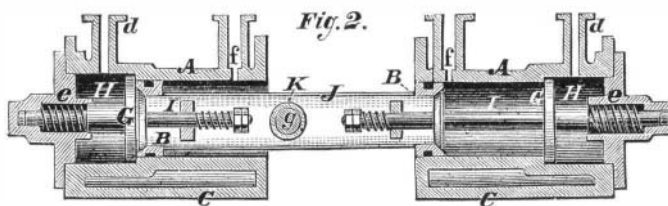
represents an exterior view, and Fig. 2 a sectional view of the device.

The link, *A*, is provided with an eye at each end, for attachment to the chain; and on its upper portion is formed a collar, *B*, which receives and sustains the downward pressure of the columns of water, and thus prevents the said pressure forcing the rubber downward and expanding the same. On the link and below the collar is a screw thread, on which moves the cone, *D*. *E* is a rubber packing, which



**GUILD & GARRISON'S AIR COMPRESSOR.—Fig. 1.**

can be expanded outward to fit the pump tube by moving the cone, *D*, inward; or it may be adjusted so as to enter a smaller tube by moving said cone in the reverse direction. A metal washer, *F*, is placed on top of the rubber packing, and prevents the same from being forced out of place by the cone, *D*. This washer has a longitudinal slot, whereby it may be slipped over the link eye. It is then rotated a quarter turn, so that it cannot come off; while the pressure of the rubber prevents its turning backward. The cone, *D*, is easily moved by grasping the rubber packing in one hand



and turning the link, *A*, by means of a wrench held in the other.

Patented April 17, 1877, through the Scientific American Patent Agency. For further particulars, address the inventor, Mr. Thomas Kenyon, P. O. box 103, Hamilton, Butler county, Ohio.

**Marvels of Man.**

While the gastric juice has a mild, bland, sweetish taste, it possesses the power of dissolving the hardest food that can be swallowed; it has no influence whatever on the soft and delicate fibers of the living stomach, nor upon the living hand, but, at the moment of death, it begins to eat them away with the power of the strongest acids.

There is dust on sea, on land; in the valley, and on the mountain top; there is dust always and everywhere; the atmosphere is full of it; it penetrates the noisome dungeon, and visits the deepest, darkest caves of the earth; no palace door can shut it out, no drawer so secret as to escape its presence; every breath of wind dashes it upon the open eye, and yet that eye is not blinded, because there is a fountain of the blandest fluid in Nature incessantly emptying itself under the eyelid, which spreads it over the surface of the ball at every winking, and washes every atom of dust away. But this liquid, so mild, and so well adapted to the eye itself, has some acidity, which, under certain circumstances, becomes so decided as to be scalding to the skin, and would rot away the eyelids were it not that along the edges of them there are little oil manufactories, which spread over their surface a coating, as impervious to the liquids necessary for keeping the eyeball washed clean as the best varnish is impervious to water.

The breath which leaves the lungs has been so perfectly divested of its life-giving properties that to rebreathe it, unmixed with other air, the moment it escapes from the mouth, would cause immediate death by suffocation; while if it hovered about us, a more or less destructive influence over health and life would be occasioned; but it is made of a nature so much lighter than the common air that the instant it escapes the lips and nostrils it ascends to the higher regions, above the breathing point, there to be rectified, renovated, and sent back again, replete with purity and life. How rapidly it ascends is beautifully exhibited every frosty morning.

But foul and deadly as the expired air is, Nature, wisely economical in all her works and ways, turns it to good account in its outward passage through the organs of voice, and makes of it the whisper of love, the soft words of affection, the tender tones of human sympathy, the sweetest strains of ravishing music, the persuasive eloquence of the finished orator.

If a well made man be extended on the ground, his arm at right angles with the body, a circle, making the navel its center, will just take in the head, the finger ends, and feet.

The distance from top to toe is precisely the same as that between the tips of the fingers when the arms are extended.

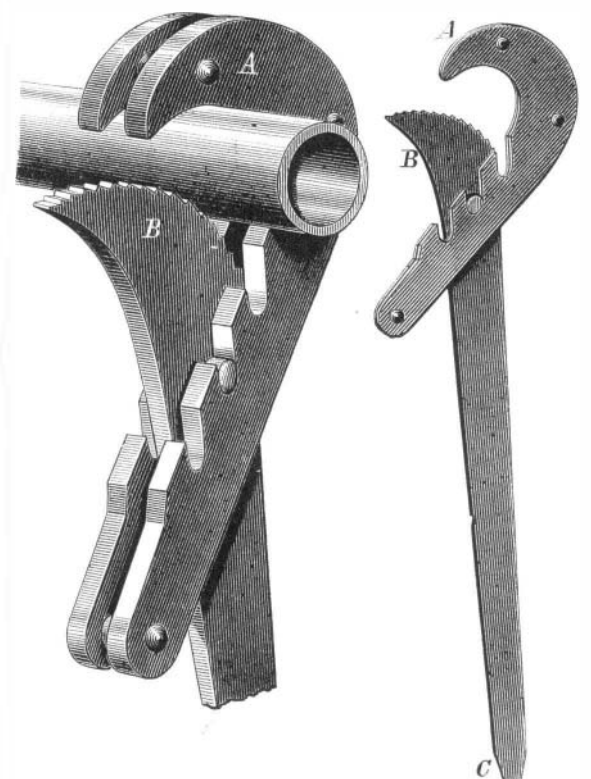
The length of the body is just six times that of the foot; while the distance from the edge of the hair on the forehead to the end of the chin is one tenth the length of the whole stature.

Of the sixty-two primary elements known in Nature, only eighteen are found in the human body, and of these, seven are metallic. Iron is found in the blood, phosphorus in the brain; limestone in the bile; lime in the bones; dust and ashes in all! Not only these eighteen human elements, but the whole sixty-two, of which the universe is made, have their

essential basis in the four substances, oxygen, hydrogen, nitrogen, and carbon, representing the more familiar names of fire, water, saltpeter, and charcoal; and such is man, the lord of earth! a spark of fire, a drop of water, a grain of gunpowder, an atom of charcoal!—*Hall's Journal of Health.*

**COMBINED PIPE TONGS, WRENCH, AND SCREWDRIVER.**

The annexed engraving represents one of those useful tools which combine in themselves the capabilities of a number of constantly needed implements, and thus reduce both the cost and the bulk of the mechanic's working kit. At the same time, tools of this description are always handy to have about the house or the farm; as they afford a means of quickly doing many a little job of timely repairing, which may save more difficult work in the future. The present device is a combination of pipe tongs, wrench, and screwdriver, which implements the gas or steam fitter constantly requires. *A* is a double jaw or clamp, curved at one end to extend around the pipe or nut, as shown, and which has its parts laterally connected by stay pins. On the longitudinal portion of this jaw are notches which receive the pivot pin of the single jaw, *B*, which enters between the parts of jaw, *A*, and has an eccentrically shaped clamping end, which is serrated so as firmly to bind upon the object grasped. The lower end, *C*, of the shank of jaw, *B*, is tapered to form a screwdriver. When this portion is in use, the single jaw is drawn out, and the double jaw is reversed to form a handle.



Patent pending through the Scientific American Patent Agency. For further particulars, and for tools, address the inventors, Messrs. States & Cook, Topeka, Kansas.