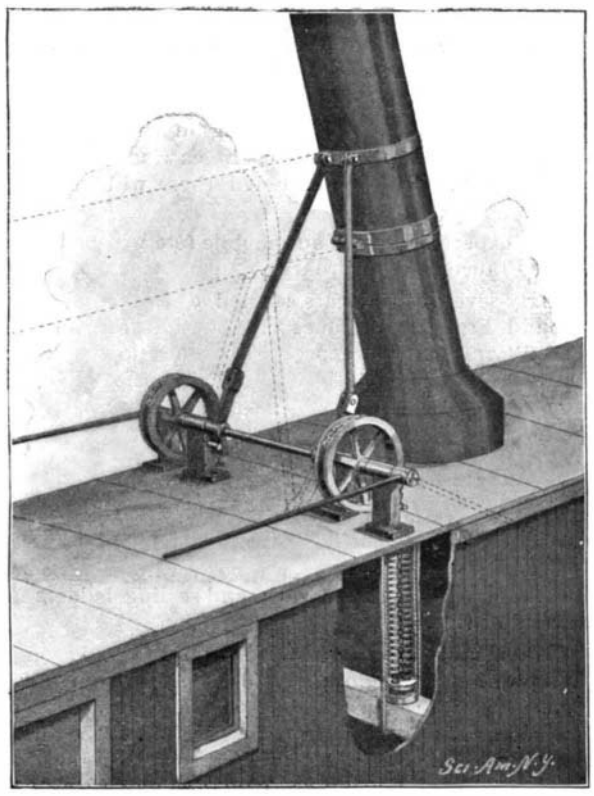
A NOVEL DEVICE FOR RAISING AND LOWERING SMOKESTACKS.

In passing under bridges the crew of a steamer often find it necessary to lower the smokestack, an operation which entails the expenditure of no little time and labor. A device has been invented by John D. Dailey, One Hundred and Thirty-third street and Southern Boulevard, Harlem River, New York city, which provides a simple means for lowering a smokestack or



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mast, and for automatically returning it to its normal position.

The smokestack is composed of a fixed lower section and a hinged upper section, connected by means of links with the swinging arms of a rock-shaft. Fitted on this rock-shaft are two grooved wheels, over which chains pass downward into wells. To the end of each chain a sliding block is secured, and coiled about the chain, between the block and well cover, is a spring.

When it is desired to lower the upper section of the stack, the rock-shaft is operated by means of levers secured to its ends. The stack will then be brought to the position shown by dotted lines in the illustration, the springs being thereby compressed. When the levers are released after the vessel has passed the bridge, the springs in expanding will return the upper hinged portion of the smokestack to its normal position.

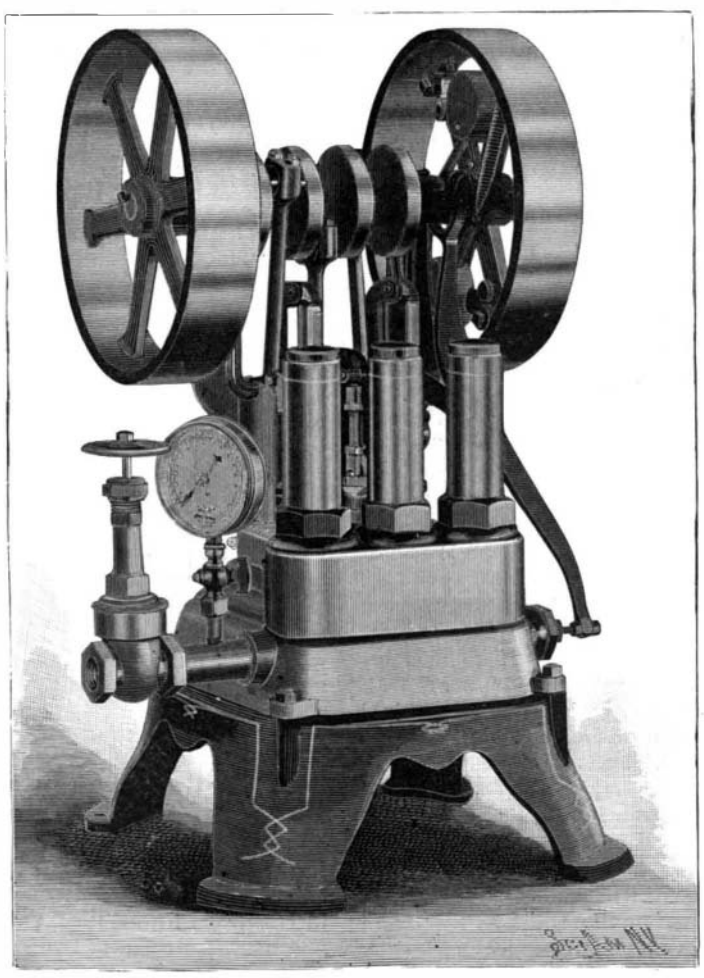
THE JOHNS HYDRAULIC ENGINE—A COMBINED WATER AND AIR MOTOR.

One of the most ingenious and efficient hydraulic motors which has yet appeared is being made by the Elmira Manufacturing Company, of Elmira, N. Y. The operative principle of the engine is certainly unique, embodying as it does a combination of hydraulic and air pressure. In addition to the power given by direct pressure of any given head of water, the engine employs the pressure produced by suddenly checking the momentum of the water flowing to the cylinder. In other words the principle of the hydraulic ram is applied to the hydraulic engine without any loss of water.

The motor which forms the subject of our illustrations is a three-cylinder vertical engine, having a three-throw crank shaft, with cranks set at an angle of 120°. The three cylinders have a common supply chamber, from which separate inlets lead to the valves for each cylinder, a check valve being provided to prevent back flow from the momentum of the water in the supply pipe. Above each inlet is an air chamber. Back of the supply chamber, underneath the cylinders, is an exhaust chamber, and between this chamber and each of the inlets are ports which lead to the bottom of the cylinders and are put successively into communication therewith. An outlet passage is carried down to the exhaust chamber and is coupled with the exhaust pipe at a point so as to trap the water in the exhaust chamber at the end of the return stroke of each piston without, however, exerting back pressure.

The inlet and exhaust piston valves controlling the cylinder ports are coupled with rocking levers. Cam-arms reciprocating with the pistons engage these levers so that each piston, when nearing the top of its stroke, by means of its cam-arm, actuates the valve for the next cylinder in order, holding the valve open while it pauses at the top of the stroke, and closing the valve quickly on its descent. Upon the quick closing of each valve the water will be suddenly cut off from the corresponding inlet, but will continue to flow from the supply chamber past the check-valve into the air-chamber, compressing the air until the momentum of the water is checked. The check valve is then closed so as to maintain the air within the air-chamber in its compressed state. Upon the next opening of the valve the compressed air in the air-chamber will force the water under this increased pressure into the cylinder during the upstroke of the piston, this increased pressure gradually diminishing until the normal pressure of the water supply has been reached. The check-valve will then reopen, and the water will again flow from the supply chamber through the inlet to begin the cycle anew.

The nearness of the air-chambers to the cylinders and pistons gives an elastic action to the flow of the water, which, with its accumulated extra air pressure, adds greatly to the efficiency of the motor—an efficiency of about fifty per cent over the power obtained from the simple pressure and quantity of water alone. The elasticity of the water in following the piston allows the engine to run at a higher speed than the ordinary hydraulic motor. In the hydraulic motors commonly in use the power depends upon the volume and pressure of the water alone; but in the motor described there is the additional power obtained from compressed air. It develops a much greater power with the quantity of water used than in any other form of water motor. The engine is built in all sizes from one-quarter horse power up, there being no more limit to size than where steam is used for motor power. The company has its New York office at 159 Greenwich Street, and is glad to give further information to anyone desiring it.



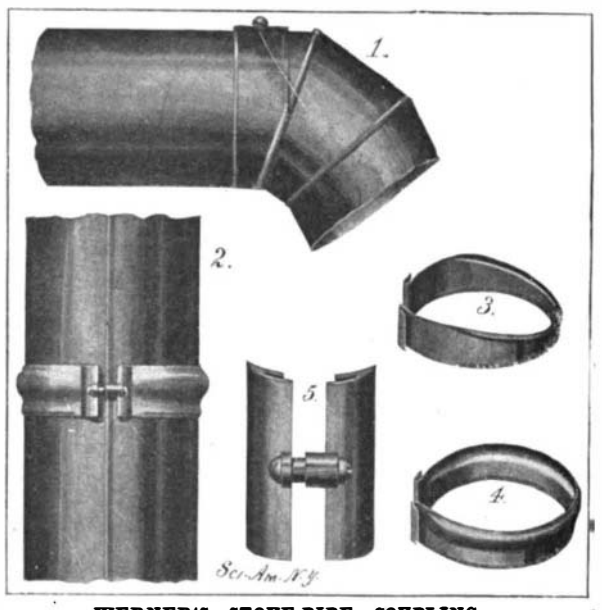
THE JOHNS HYDRAULIC ENGINE—A COMBINED WATER AND AIR MOTOR.

AN IMPROVED STOVE-PIPE COUPLING.

An efficient form of coupling for stove-pipes has been invented by Jacob J. Werner, of Hebron, Neb., which is so constructed that the adjacent ends of stove-pipe and elbow sections may be rigidly held together without the use of riveted joints, supporting screw-hooks, or the like.

Of the accompanying illustrations, Fig. 1 is a side elevation of the coupling applied to a stove-pipe and elbow. Fig. 2 is a front elevation of a stove-pipe with the clamping-band applied. Fig. 3 is a view of a form of clamping-band used on straight sections of pipes. Fig. 4 is another form of band used on straight pipes. Fig. 5 is an enlarged front elevation of a tightening device used on the band.

The clamping-band used is swaged to give a suitable cross-section such as an ogee form, the top and bottom edges being bent inwardly. The ends of the band have exterior flanges standing at a slight angle to each other, sufficient flare being thereby given to the band to insure a tight binding on the large and small ends of the pipe-sections. These flanges are made to fit into grooves formed in two bars, hammered in place on the ends of the band to interlock with the flanges. The ends of the band are held tightly together by means of a clamp or tightening device comprising a pin which extends longitudinally from one of the bars referred to, has an internal screw-thread, and is fitted to slide in a tube secured to the other bar. A screw engages the threaded pin and is adapted to abut with its head against the outer end of the tube. Hence, by turning



WERNER'S STOVE-PIPE COUPLING.

the screw, the diameter can be made larger or smaller, and the ends of the band can be drawn so tightly together that the pipe-sections are rigidly joined. The swaged body of the band fits on the correspondingly swaged small end of the pipe; and the bent edges of the clamping-band fit snugly upon the pipe to prevent any escape of smoke or gas from the joint between the sections. The elbow-band is similar to the one described, but differs therefrom in having a reduced middle portion and in having a bead adapted to engage a bead between the small end section of the elbow and the large end section of the pipe, so that the elbow and pipe are not liable to be drawn apart. The reduced portion of the band fits snugly on the reduced or inner portion of the elbow section.

Lightning Strikes the Washington Monument.

It is not uncommon for the Washington Monument to be struck by lightning, but during the thunderstorm of July 14 a bolt of lightning struck the monument and burnt out the wires used to give signals to the elevator conductor. There are one hundred and eighty points at the top of the monument to catch the lightning, and the wire conductors run down the inside of the shaft. While it is not uncommon for lightning to descend with the aid of these conductors, no person has ever been injured in the structure from this cause.

SIR WILLIAM CROOKES is preparing a reply to the many severe criticisms which have been published regarding his British Association address of last year, in which he showed that the wheat supply of the world will fall short in the next century.