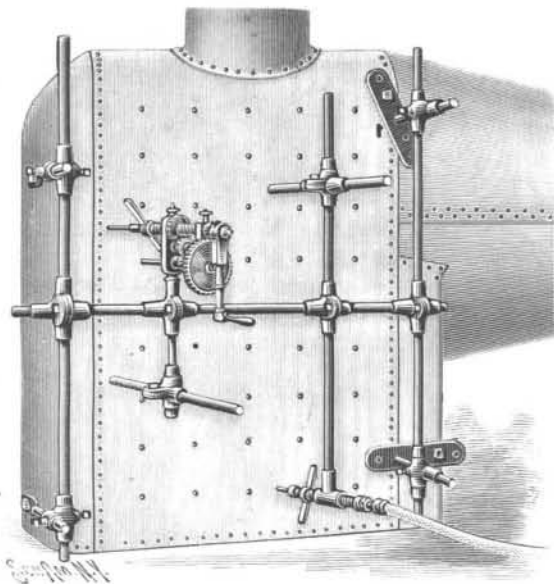


**AN IMPROVED DRILL.**

The illustration represents a drill especially adapted for making the rivet holes in boilers, drilling out rivets or stay bolts, and other similar work, and in which the drilling device may be pneumatically or hydraulically operated, or operated by a flexible shaft, and in which the feed will be automatic or may be manually effected. The improvement has been patented by William J. Hatton, of Escanaba, Mich. Two uprights are em-



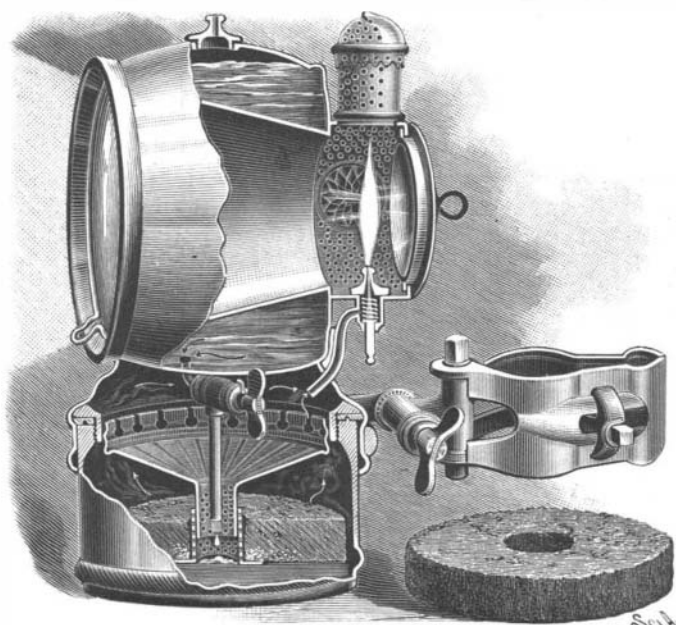
HATTON'S DRILL.

ployed, mounted in sockets, the sockets of one upright being adjustably connected with tie plates screwed or bolted to the boiler near one edge, while arms are adjustably attached to the sockets of the other upright, the arms having longitudinal openings through which bolts are passed into a side of the boiler, whereby the uprights may be held the desired distance from the surface to be drilled. Adapted to be moved up and down and adjustably secured on the uprights are sleeves or sockets which support the ends of a cross rod on which is an adjustable sleeve carrying a standard, there being at the lower end of the standard an adjustable socket in which is a pin to engage the surface of the article to be drilled, holding the drill in the desired position. The upper end of the standard is enlarged to form a bearing surface for a ratchet drilling mechanism, by which, as the ratchet arm is revolved, the drill is turned, a feed shaft moving the drill forward as the drilling continues. If at any time the automatic feed is not required, or a further feed is desired either backward or forward, such movement is effected by turning a hand wheel. In the lower portion of the engraving a slightly modified form of the device is shown, with the drill being operated by a flexible shaft, it being apparent that the drilling mechanism may be conveniently carried to any desired point on the boiler or the article to be drilled.

**AN ACETYLENE GAS LAMP FOR BICYCLES.**

Everyone who has seen acetylene gas burned under favorable circumstances will concede that no more perfect light was ever produced. It is clear, penetrating, steady, with an efficiency incomparably greater than can be obtained from any method of burning gas, and equal if not superior to that obtained from the electric arc, but without the unsteadiness of the latter. Ever since its possibilities began to be understood by the public, some five years ago, it has been earnestly hoped that the methods of production of the calcium carbide, and the means for burning the acetylene gas made therefrom by the simple addition of water, might be so perfected, and the cost made so reasonable, that this light would come into general use.

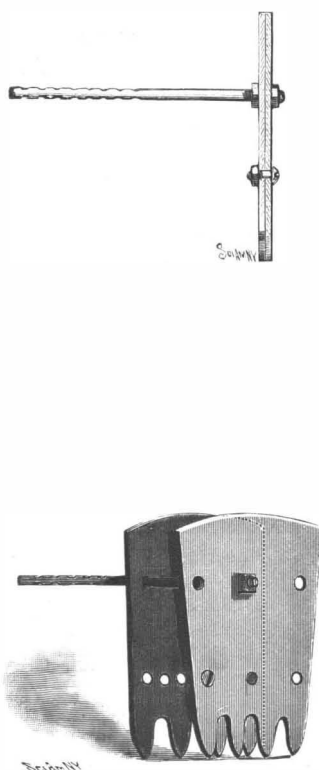
In the accompanying illustration we represent an



AN ACETYLENE GAS LAMP FOR BICYCLES.

acetylene gas lamp for bicycles, which is the result of some years of trial and experiment, and which seems to present many points of excellence—including the primary one of affording a brilliant and beautiful light, while also being entirely safe in use. This new lamp is being manufactured and put upon the market by the George H. Clowes Manufacturing Company, of No. 464 Bank Street, Waterbury, Conn. The gas is made from the carbide, as will be remembered, by the supply of water in just sufficient quantities, and for this purpose the outer portion of the cylindrical body of the lamp, in the front of which is the reflector, consists of a water chamber, to be filled through a cap-closed opening at the top, the valved outlet at the bottom of the water chamber being at the time closed by a thumb piece. The supply of water to the carbide is afterward effected by the adjustment of this valve, which at first is opened only about a quarter turn, but is afterward preferably regulated to produce a flame about an inch in height.

The water is fed down through a tubular feed of peculiar construction in approximately a drop by drop movement into a metal cup with perforated sides, and in the portion of the lamp surrounding this cup is placed a centrally perforated disk or cake formed of crushed calcium carbide, united with a mixture designed to keep the carbide from deteriorating, and remove the peculiar odor of exposed carbide. These charges, made into cakes, are styled carbophene, and are designed to be more easily handled and give a more satisfactory light than the raw carbide. These cakes, one of which is represented in the small figure, are furnished packed in air-tight boxes, two different



THE "ECONOMY" ADJUSTABLE FIRE BOX PARTITION FOR STOVES AND RANGES.

sized cakes in each box, and six of these boxes are placed in an air-tight cylinder, to insure that the carbophene shall always be in good condition for use. These cakes are respectively one and one and a half ounces each, costing thirty cents a case (two cakes in a box and six boxes in a case). Each ounce cake is designed to afford from three to six hours light. A few seconds after the supply of water is turned on the gas produced fills the space above the carbide, and the burner may be lighted at the top of the chimney cap or by taking off the reflector. The water feed is increased as the charge becomes exhausted, and the jolting of the lamp in rough riding increases the generation of gas, causing a higher flame. The lamp is conveniently attached to the fork of the machine by an improved form of adjustable bracket, by means of which the light may be readily thrown in any desired direction. Each burner is provided with a needle-pointed cleaner, with downwardly extending stem, by pushing upon which the point enters the orifice of the burner, the cleaner being then automatically withdrawn by a spring. As the gas is burned at a low pressure, and the burner hole is very small, this device affords ready means for keeping the burner always clear. The lamp, it is claimed, cannot explode, because the water valve, when entirely open, would not supply sufficient water to generate enough gas to effect an explosion. It is of handsome construction, easily charged, and, as there is no smoke, soot oil or disagreeable odor, the lamp can be kept clean with a white pocket handkerchief without soiling it.

**AN ADJUSTABLE FIRE BOX PARTITION.**

The accompanying illustrations represent an improvement which has been patented in the United States and all foreign countries, and which is designed to effect great economy in the consumption of fuel, while affording more complete combustion, it being possible with this readily applied device to reduce or increase the area of the fire in proportion to the amount of work to be accomplished. The device is the invention of W. G. Hamilton (deceased), of Colorado Springs, Col., and it is being introduced to the public by Carleton Gilbert (P. O. Box 2490), New York City. Of the two plates lying side by side and forming the partition, adjustably held in the fire box, as shown in the larger view, one is wider at the top than at the bottom, and has two horizontal rows of perforations, while the other has parallel vertical edges, an elongated horizontal opening near the top, and a lower row of perforations. After adjusting the plates to the width of the fire box, they are made fast in such position by a stove bolt passed through any two of the perforations of the lower rows, and a nut, as more plainly shown in the two small figures. To adjust the partition at the desired distance from one end of the fire box a rod is employed, threaded at one end and notched at regular intervals at the other end, to facilitate breaking off and thus shortening the rod as desired. This rod, with nut screwed on the end of its threaded portion, is passed through the elongated opening in one plate and any one of the upper perforations in the other plate, and a nut is screwed on the outer end, securing the rod in position and forming an additional clamp to hold the plates together. The word "Economy" faces



the end of the fire box which contains the fire, the notched end of the rod extending in the opposite direction engaging the end of the fire box, and preventing the partition from tipping over in that direction, the fuel holding it in place on the other side. In ordinary use the partition will probably be placed at about the middle of the fire box. The lower edges of the plates terminate in teeth, which are notched to facilitate breaking them off, as may be necessary when, in adjusting the partition in the fire box of a stove or range, the teeth of one plate come between those of the other, thus obstructing the draught space which the openings between the teeth are designed to provide. It thus may be necessary to break off all except the outer teeth, and, should the bottom of the fire box be lower at the center than at the outer edge, the outer teeth are broken off on each side, to make the partition properly fit the bottom. The partition, after having once been properly fitted in the fire box of any stove or range, may, without further adjustment, be readily taken out or replaced, and this may be done even when the fire is burning, in the case of placing the partition when the fire is burning it being supposed that the fire is low enough to enable the coals to be pushed to one end, while, when the partition is removed to obtain a larger fire, the burning coals are quickly spread over the grate. The improvement, aside from the economy thus effected, presents special advantages when one requires only a small fire, as is so frequently the case in warm weather.

The American Ornithologists' Union holds its 15th annual congress in New York on the 9th, 10th and 11th of November. The total number of active and associate members on its rolls is nearly 1,000, including almost every ornithologist of special note in the world.