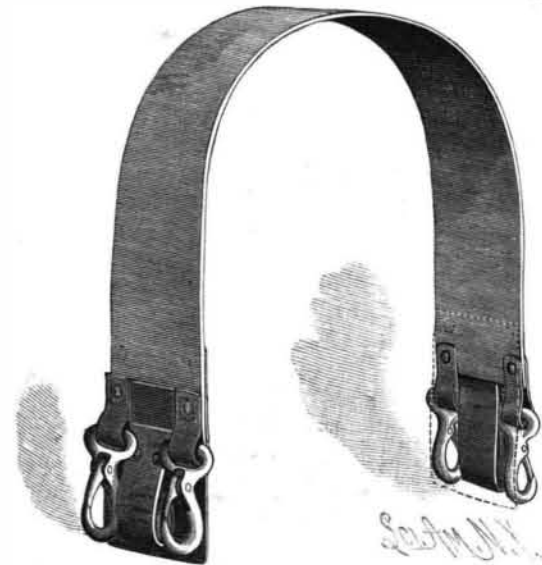


teeth. It is evident that this cutting tool, which may be turned either by hand or by means of the device above described, is well adapted to the work, and will effectually remove the rough edge from both the inside and outside of the tube.

This invention has been patented by Mr. E. Querol y Delgado, whose address is 142 Hull Street, Brooklyn, N. Y.

BACK BAND FOR HARNESS.

This back band is designed for use in harness in which chains form the traces. To each end of the back band, which is a broad piece of leather of sufficient



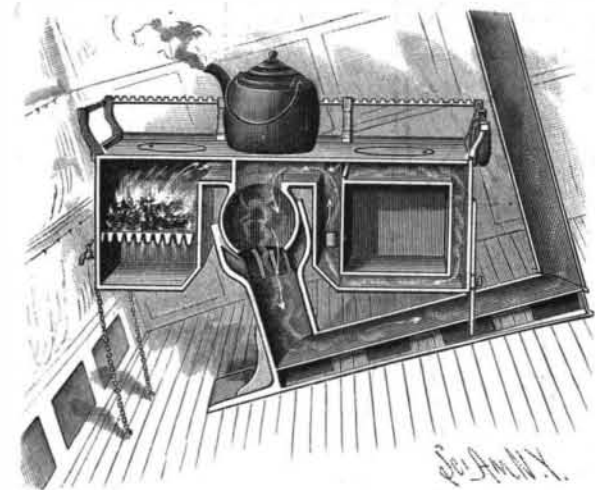
JOHNSON'S BACK BAND FOR HARNESS.

length to pass over the back of the horse, is riveted a metal plate formed with a T-head at one end, through which the rivets pass. The lower portion of the plate is folded upon itself to form the loop for the trace. To prevent the plates chafing the horse, they are covered with leather strips, which are, preferably, tongues formed at the ends of the back band. Snap hooks are attached to the ends of the band and to the plates by means of metal loops held to the band and plates by the same rivets that connect the plates to the band. The loops are covered with leather strips. By making the back band in this way, the loops in the plates take the wear of the traces and preserve the leather of the band, while the metal loops holding the snap hooks take the wear of the hooks, so that the durability of the band is greatly increased; and by the use of the snap hooks the band is made much more convenient than the ordinary band of this character.

This invention has been patented by Mr. Ike Johnson, of Honey Grove, Texas.

BALANCED COOKING STOVE FOR SHIPS.

This stove is designed for use on ship board, as it is accurately equipoised on its base, so that it will always maintain a horizontal position, no matter to what extent the ship may roll. The frame of the stove is constructed to form a fire box and ash pit at one end and a separate oven at the opposite end. The oven and fire box are separated by a central space or chamber inclosing the upper end of the base or support. The top plate, to which the fire box and oven are joined, is provided with a hollow ball, open at the top and bottom, and fitting in a hemispherical



BEKOFSKY'S BALANCED COOKING STOVE FOR SHIPS.

seat or cup of the base, thus pivotally supporting the stove. The base forms the chimney of the stove, and is connected at its bottom with a horizontal pipe which extends as far as convenient, and connects with a vertical pipe. Beneath the horizontal pipe is formed an air space that prevents burning the deck. The flame and products of combustion may, by properly arranging a damper, be made to pass directly to the chimney or to pass first around the oven. Between the fire box and oven are formed boxes, which may be closed by doors and which serve as warming ovens to be used

for heating plates, etc. From the top of the stove rise arms supporting rods notched in the upper edges, and on these are placed two movable weights formed with open hooks, so that they can be easily shifted, in order to be brought opposite any pan or kettle for properly counterbalancing and keeping the stove in an upright position. When the stove stands at an angle, the lower opening in the ball will be partially closed by the sides of the cup, which tends to interfere with the draught. To avoid this, the cup portion is formed with numerous side openings, sufficient in size and number, so the aggregate area of the openings will never be less than the sectional area of the support. At one end of the fire box may be formed a water-heating reservoir. On smooth water the stove may be chained to the deck by four chains, or four legs sliding in vertical grooves may be used instead.

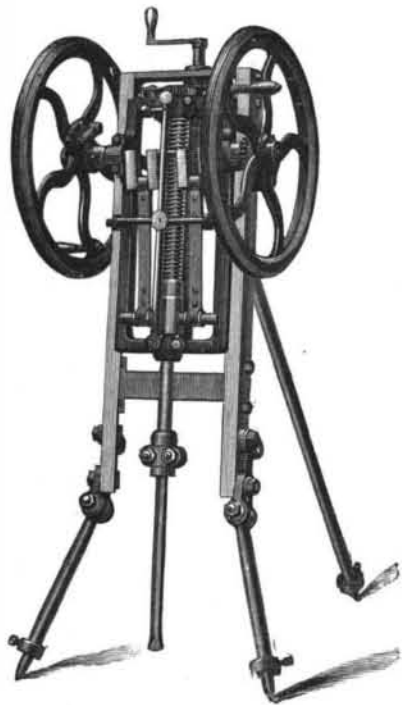
This invention has been patented by Mr. V. S. Bekofsky, Isaakieffsky, pl. n. 35, care Restaurant, Mrs. Michel, St. Petersburg, Russia.

THE INGERSOLL DUPLEX ROCK DRILLING MACHINE.

The engraving illustrates an invention which was patented in July, 1886, in the United States, Canada, England, France, and Germany. It is the result of many years' practical experience, and has several novel features.

The drill shaft is journaled to revolve, and to reciprocate vertically in bearings in a carriage, which is fitted to slide on the side bars of the frame. The hand crank wheels are mounted to revolve freely on the main shaft, with which they are connected by pawls and ratchets.

The main shaft is journaled horizontally in the drill carriage, and is provided with two cranks, which are connected by straps with the cross head of the drill shaft. The cross head is fitted to slide vertically on the drill carriage, and the drill shaft is journaled to rotate in the cross head, but it is provided with rigid



THE INGERSOLL DUPLEX ROCK DRILLING MACHINE.

collars above and below the head, whereby the head lifts the drill shaft. Around the drill shaft a powerful spring is coiled, to drive the drill into the rock. A feed screw, provided with a hand crank at the top of the machine, is journaled in the upper cross bar of the frame. On the feed screw is a nut journaled in the upper cross bar of the carriage, and provided with ratchet teeth. On the front of the carriage is a feed lever, whose upper end is provided with a pawl to engage the feed screw nut, and whose lower end has a screw point to be engaged by a wedging collar on the drill shaft at each throw thereof. The drill shaft is spirally grooved and provided with a splined ratchet wheel and a pawl, whereby the drill is rotated a little at each stroke, so as to take a new chip. The frame is mounted on a tripod, each leg of which has telescopic adjustment, and the hinge joints are so arranged that the drill may be set to work horizontally, or at any downward slant, and at almost any upward slant.

In operation, the feed screw is first to be turned until the drill point rests firmly on the rock to be drilled, then turn the crank wheels until the hole is drilled deep enough. The pawls on the wheels engage the ratchets on the main shaft and turn it forward, lifting the drill against the resistance of the spring. When the shaft cranks pass over center, the spring drives the drill into the rock with all its force, the ratchets of the shaft revolving freely forward ahead of the pawls on the wheels, and the shaft cranks throwing past their lower dead center. Then the pawls again engage the ratchets as before; so that two full revolutions of the shaft and two strokes of the drill are produced by each revolution of the drive wheels, thus permitting the operator to work moderately, and at a living speed,

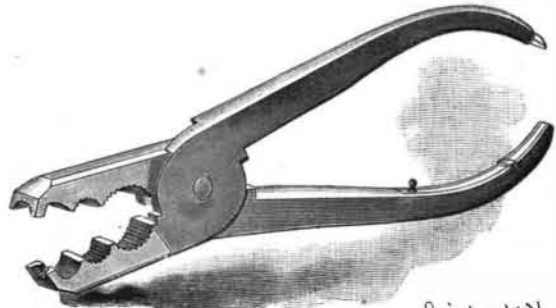
while the drill makes double the same speed without any jar on the machine. This is a new mechanical device, and it gives the name "Duplex" to the machine. While the feeding device may be adjusted to feed at different rates of speed, yet it is purely automatic when at work, and adjusts itself to the varying hardness of the rock in the progress of drilling each hole, so that, if a soft stratum be entered, the carriage will be fed fast enough to make each stroke do work; or if a hard streak be struck, the drill will not be forced ahead any faster than it has cut away. Practical miners will appreciate the value of this characteristic in the saving of drill points and in the saving of wear and tear on the machine.

Already the demand for these machines is very large, and it has become necessary for the manufacturers to provide them with engines attached to meet all requirements.

For further particulars, address the agent of the manufacturers and owners of the patents, Mr. W. X. Stevens, 705 G Street, N. W., Washington, D. C. Also see our Business and Personal column.

IMPROVED GAS PLIERS.

The engraving represents a combination tool embodying pliers having variously sized jaws, a wire



DAHL'S IMPROVED GAS PLIERS.

cutter, a lava tip turning attachment, a band for cleaning the slots of lava tips, a screw driver, and a stopcock or valve turning recess. Each jaw is formed with two concave serrated recesses arranged to register as shown. In the extreme end of each jaw is a serrated recess, back of which is a semicircular flange, still back of which is a plain-faced recess. When the faces of the end recesses are brought into engagement with the tops of the burners, the lava tips will pass through the apertures of the flanges and enter the plain recesses. The lava tips may be brought into the bite of the flanges, and so forced within their sockets. In each section of the pliers, just back of the recesses, is formed a slot having a cutting edge. These constitute a wire-cutting attachment. The inner edges of those portions of the handles next the pivot are parallel when the jaws are brought together, thus providing for the reception of the thumb piece of a valve and enabling the operator to turn any valve or stopcock that may have become bound. The rear end of one handle is formed as a screw driver, while in a recess in the other handle is fitted to slide a spring strip, that may be used to clean out the slits of lava tips.

This invention has been patented by Mr. Will P. Dahl, of 919 25th Avenue South, Minneapolis, Minn.

IMPROVED LEAD PIPE REEL.

Lead pipe is usually put up on reels which do not have an inclosing case, the heads of the reels being con-



EITAPENC'S IMPROVED LEAD PIPE REEL.

nected by slats, which must be knocked off before the pipe can be unreel and disposed to customers; and before the reel can be turned, it is necessary to elevate it upon a bar passed through its hollow shaft or body. Like trouble also attends the putting up of the pipe on the reel. These difficulties are obviated in the invention here illustrated, which has been patented by Mr. Fred. Eitapenc, of Oneonta, N. Y. The outer reel case