ful polish. These wheels make 3,000 revolutions per minute.

## After polishing the buttons are placed on cards and ready for sale. Fifty hands can turn out about 150 gross per day of buttons. The shells cost from 40 to 50 cents per pound. The buttons when finished cost from 40 cents to \$25 per gross wholesale. The annual consumption of pearl buttons in the United States amounts to about \$3,500,000.

The sketches of this subject were taken from the plant of E. Huebner & Son, Newark, N. J.

### --AN IMPROVED SADDLE ATTACHMENT.

A combined loop and hook, for quickly and easily forming the connection between the saddle straps and



belly girths, and securely fastening them in position, is shown in the accompanying illustration, Fig. 1 showing the loop and hook in use on a saddle, Fig. 3 being a side view, and Fig. 2 showing the attachment to a girth ring. This improvement has been patented by Mr. John F. Kohler, No. 906 Columbus Avenue, New York City. The elongated metallic loop is slightly larger at its upper end, so that a strap may be passed through it several times if desired, and at the lower end it is doubled upon itself to form a

hook adapted to engage

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the girth ring, a portion of the hook surface being flattened and having an outwardly extending stud to engage perforations in the saddle strap. The tension of the girth and straps is designed to hold the saddle in place so that it cannot accidentally get loose, and the strap is easily and quickly fastened to the stud.

# ----A TOOL TO DRILL CONICAL RECESSES.

Fig. 1 shows a perspective and Fig. 2 a sectional view of an improved tool, patented by Mr. Charles A. Cutting, of Middletown, Va., and which may be used to conveniently drill conical recesses to receive posts, dowels, etc., as indicated in Fig. 3. At the lower end of the bit, between the twists, is held a removable cutter, an offset on its upper end fitting into a recess in the upper end of the bit and forming a pivot for the cutter to swing outward on, so that it will stand at angles to the axis of the bit. A shell or sleeve, slightly enlarged at its lower end, fits loosely over the cutter



#### The Wire Gun.

The first public test of the Brown segmental wirewound gun was made at Birdsboro, Pa., April 15, and in Fig. 3. It may have any number of spray perforawas attended with much success. Government exprts, representatives of foreign powers and a number of invited guests from New York, Philadelphia, and rapid rotary movement. Within two pendent links other cities were present. Three shots were fired, and the gun successfully withstood a pressure which the experts declared would blow any other gun in the world to atoms. The tests broke all records, and one of the enthusiasts declared they placed the United States in the van in gun making.

On the third and final test the charge was thirty pounds of powder, the projectile sixty pounds weight. The gun recoiled about 15 feet, and a section of the stone quarry rose in the air as the projectile struck.

The test gauges were set to show a pressure of between 40,000 and 60,000 pounds; it was found that the pressure had gone beyond the larger figure and exceeded the means at hand for measurement. The pressure was declared by experts to be something above 70,000 pounds. The standard army requirements are only 37,000 pounds.

The gun has just been finished as a sample for the United States government. It was built at the Diamond Drill Works at Birdsboro, under the personal supervision of John Hamilton Brown, the inventor. It is built on a new system, which is the winding of a steel wire around a segmental core of steel. The core is made of twelve pieces of steel 19 feet long, and with a cross section like the key of an arch. The core is 3 inches in thickness at the breech, and three-quarters of an inch at the muzzle.

This is wound with thirty-three layers of steel wire seven one-hundredths of an inch in thickness. The gun is about 15 inches in diameter at the breech and 10 inches at the muzzle. The gun is 19 feet in length and weighs three and one-third tons.

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# Venetian Mosaics for the Fair.

The British vice-consul at Venice says that the splendid mosaics now produced there continue to take the first place in the artistic markets of the world. Among the important works recently executed by the Venice and Murano Company, a well-known mosaic manufactory, is a large mosaic panel representing Columbus being received by Queen Isabella and King Ferdinand of Spain, after his return from America. This panel, measuring about 200 square feet, shows Columbus when kneeling before the sovereigns, presenting to them the natives of the newly discovered land and some products of the soil. The persons represented are about thirty-eight in number, many of them of the natural size, formed in three principal groups. In the most important is Columbus, having at his side the Crown Prince, and the sovereigns surrounded by the dignitaries of the court, ladies and nobles, and pages holding the standards. In the middle group, but more to the left, are the native Indians, and near the entrance of the hall other Spanish nobles, and the companions of Columbus. The gorgeous and various attires of all the figures, their warlike implements, the splendid stuffs of all sorts and tints, the rich decoration of the hall, the pageantry of the court, the strange costumes of the natives in full contrast with the others, and the various attitudes of all these perthe shank of the sonages, form a whole in perfect harmony with the detool regulates the tails of the scene, owing to the excellent distribution depth of the cut, of the figures and the perfect fusion of tints. The work is so delicately executed, says the vice-consul, that no one can believe that the panel is not painted ing in contact until on touching it he discovers that it is entirely composed of small enamel cubes, put together without end of the sleeve, any aid of color or cement, and worked according to The space formed the mode of the old Venetian mosaic school. This panel is to form the pendant of another, representing Columbus landing in America, and which will shortly be executed by the Venice and Murano Company. These mosaic works are executed for Mr. H. Furber, of Chicago, who is now building a palace near the Exhibivolving the tool tion, which is to be called Columbus Palace, and will, the shell revolves it is said, be the largest in America. The two panels with it, while the are to be placed in the entrance hall. The author of the

the valve extending below the body and having on its lower end a disk-like turbine water sprinkler, shown tions, and is adapted to rotate freely, the perforations being so inclined that the water pressure causes its supported from lugs on opposite sides of the body of the sprinkler is held a saddle bar, on which the head of the valve stem rests, and this bar rests upon a coupling bar, shown in Fig. 4, whose outer ends have lips which lock over the lower edges of the pendent links. This coupling bar may be made entirely of fusible metal, but preferably consists of two pieces of brass or other metal, lap-folded and united, as shown, by a solder which will fuse at a temperature below that of boiling water. The fusing of this solder, when a fire starts in the vicinity of the sprinkler, causes the two pieces of the coupling bar to be



HOLMES' AUTOMATIC SPRINKLER.

separated, lets down the saddle bar, pushing the pendent links outwardly, and allows the valve with its turbine disk to drop, the force of the escaping water then causing its widespread spraying distribution. Further information relative to this improvement may be obtained of Mr. C. H. Matthiessen, P. O. box 655, Chicago, Ill.

## AN IMPROVED FEED-WATER REGULATOR.

An automatically operating regulator of the feeding of water to a steam boiler, designed to hold the water in the boiler at all times at about its normal level, is shown in the picture, and forms the subject of a patent issued to Mr. Emory M. Carr, of New Castle, Ind. A slightly inclined pipe arranged alongside the boiler, with its upper end at about the normal water level, is connected by a pipe at its lower end with the water space of the boiler, and a pipe connects its other end with the steam space. Both ends of the longitudinal pipe are secured in heads, and on the head on its higher end is fulcrumed a lever, the lower end of which is connected by a longitudinal rod with the other head, while its upper end is connected by a rod with



CARR'S FEED-WATER REGULATOR.

the feed-water pump. On the latter rod also is a coiled

CUTTING'S RECESS BORING TOOL.

terial being bored. A lug in the upper end of the shell prevents the bit from being accidentally withdrawn therefrom. In operation, as the tool cuts into the material, and its lower end moves out of the shell, the point of the cutter is pushed outward to assume an conical recesses, as shown in Fig. 3. A wedge set in its sides in contact with the walls of the recess.

PITCH pine beams will shrink in thickness from 18%

tool is free to move | cartoons is Prof. Chev E. Paoletti, an artist well known downward in the in Venice, and affirmed to be one of the best painters shell as the latter who still maintain the traditions of the great Venetian school. As a work of art, the mosaic is said to be the rests on the mamost remarkable modern specimen ever exhibited. a valve in the steam pipe connecting the boiler with

## AN AUTOMATIC SPRINKLER TO PUT OUT FIRES.

spring, normally holding the valve to its seat. With Many of the insurance companies now stipulate for the water at its normal height, it fills the longitudinal the employment of automatic sprinklers in manupipe, and the feed pump is still, but as the water falls angular position relative to the bit, thus forming facturing establishments which they underwrite, or, the pipe becomes filled with steam, the heat of which in the absence of such sprinklers, charge a higher causes an expansion of the pipe and an outward movethe bottom of this recess is adapted to engage the rate for insurance. A sprinkler of this kind, which ment of the lever fulcrumed on its upper end, thus bottom of a post or dowel, splitting it and wedging has been patented by Mr. Thomas Holmes, of Chicago, pulling the rod connected with the valve in the steam Ill., is shown in the accompanying picture, Fig. 1 pipe leading to the feed pump, and setting the latter representing the operation of these sprinklers in a in motion. As the boiler is filled by the incoming waroom, and Fig. 2 being a larger perspective view of ter the longitudinal pipe is also filled, and by its coninches to 1814; spruce from 81/2 to 81/2; white pine, the device attached to a pipe by which water is sup-traction as it cools the lever fulcrumed at one end from 12 inches to 11%; yellow pine, a trifle less. Cedar plied under pressure. Within the body of the sprinkler is moved to close the valve in the steam pipe leading beams will shrink from a width of 14 inches to 13¼; a valve is held to close the water supply opening, and to the feed pump, the spring on the rod also assisting elm from 11¾ to 10¾; and oak from 12 to 11¾ inches. to have a limited fall as the valve opens, the stem of to close the valve.