

ship, about a dockyard, mine, waterworks, engineering construction—in short, wherever a perfect light for use under water or in a gaseous atmosphere is desired.

These lamps can be used, not only for the inspection of dock-gates and harbor work generally, but also for the ex-

amination of ship bottoms, and the carrying out of repairs while ships are afloat, which, although small, frequently necessitate the docking of the ship, in order that the work may be done satisfactorily, but which with illumination of the arc lamp just described, could no doubt be effected while the ship is unloading and loading her cargo.

## MACHINE SHOP NOTES FROM THE STATES

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XXX.

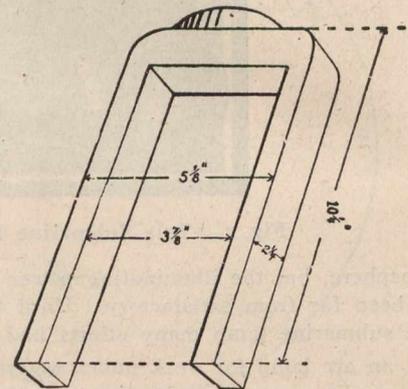
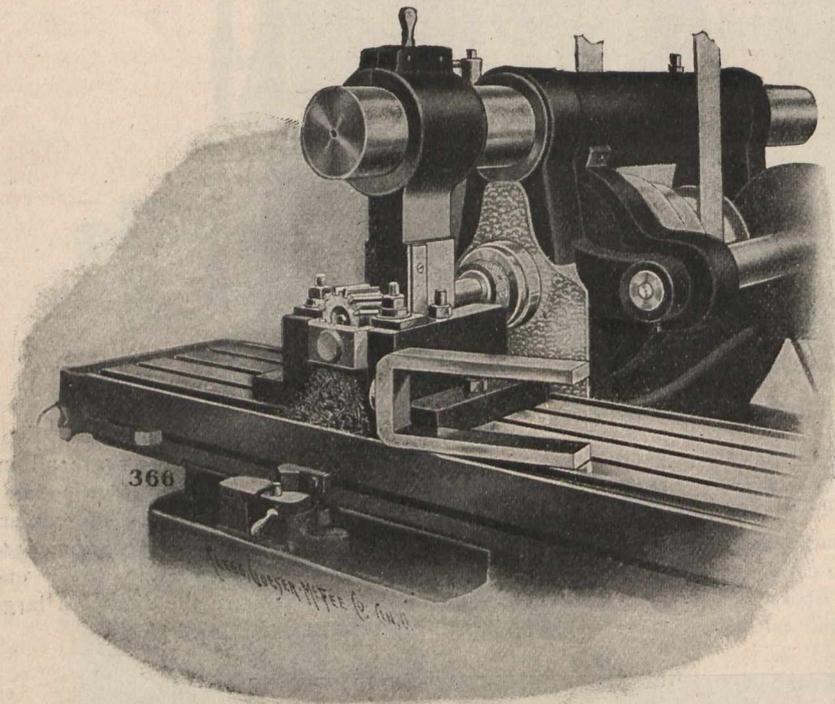
### STEAM ENGINE WORK.

Below is shown the last operation of finishing connecting rod straps, the three preceding operations having appeared in former issues. The one shown herewith consists of finishing the inside end of the strap. This is done

by a high speed steel cutter with adjustable inserted blades,  $3\frac{7}{8}$ " diameter. The power vertical feed of the machine (a No. 3 Plain "Cincinnati" Miller) is used, feeding .012" per turn of cutter.

This operation is completed on 12 straps per hour.

The total time required for the four successive operations, that is, milling the ends, milling the sides, milling the edges, and milling the inside, is  $43\frac{3}{4}$  minutes per strap.



by a high speed steel cutter with adjustable inserted blades, so that its size can be maintained after grinding. It is held on an extension arbor, and supported from the overhanging arm as shown. The surface finished is approximately 20 sq. in., and removes about  $\frac{1}{4}$ " of metal. The cutter is

Those who have this sort of work to do, will find the above compares more than favorably with what can be accomplished by the older methods of shaping or slotting, and is only another instance of the advantage of using a modern miller on a great variety of machine shop work.

### DETROIT RIVER TUNNEL.

Mr. Mountain, the chief engineer upon the plans of the Detroit River Tunnel Company, which have just been approved by the Canadian Railway Commission, states that it is the most complete tunnel scheme he has ever seen. The project, which is to cost between \$7,000,000 and \$10,000,000, provides for the construction of two parallel tubes of iron to rest 65 feet below the surface of the water on beds of concrete, and to be flanked by concrete walls. These will give double tracks to enable the Michigan Central and Canada Southern trains to cross beneath the Detroit River.

The tunnel proper is to be 20'-0" in diameter, and its roof will be 40'-0" below the water, and the tracks will be laid upon huge beds of cement. The approaches on either side will be 18'-0" high by 16'-6" wide, while the width of the portals will be about 60'-0". The length of the tunnel actually under the river will be 2,625'-0". On the east side there will be an approach of 3,200'-0" of tunneling and 3,300'-0" of half tunneling. The west approach will consist of 2,135'-0" of tunneling and 1,540'-0" feet of half tunneling. There will be a 2 per cent. grade on the west side and  $1\frac{1}{2}$  per cent. on the east. It is intended to sink the iron tubes in sections,

and then rivet them together and pump the water out. The trains running either way through the tunnel will be propelled by electric motors, which will prevent gases from generating and simplify the problem of ventilation. The tunnel will run from the Michigan Central Station at Detroit, cross the river at the old ferry slips, and connect at Windsor with the Canada Southern Railway.



### WHOLE TOWN TRAVELS FREE.

The town of Lauenburg, in Schleswig-Holstein, enjoys a privilege which is probably unique in the world—that of free transit by rail to and from the neighboring town of Buchen. As the inhabitants number about 5,500 and the distance is about nine miles, the costliness of the privilege to the railway companies is great.

The queer exemption, according to the London "Globe," dates from 1844, when the Berlin-Hamburg line was built. The Lauenburgers made great sacrifices to secure that the line should touch their town, but the physical difficulties were so great that the engineers abandoned the idea and took it through Buchen, to which town the Danish Government afterward constructed a branch from Lauenburg, giving to the Lauenburgers in perpetuity the right of free transit for themselves and their baggage.