

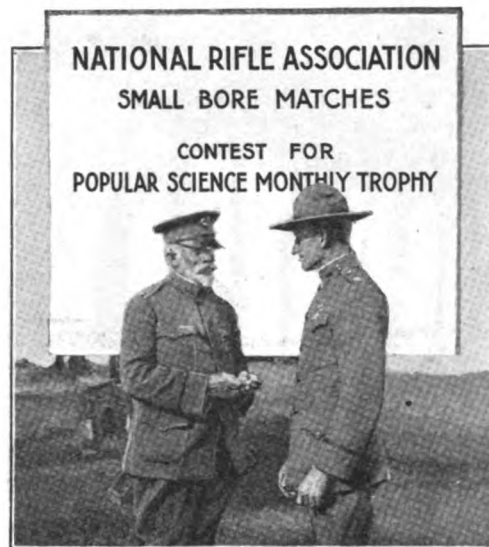
## Protecting the Fire-Fighters

A PROTECTIVE mask for the fireman, the miner, or the soldier in the trenches has recently been placed in the market. The mask, of rubber and rubber-coated fabric, consists of a hood covering the entire face, and a muzzle-shaped rubber cup that covers the mouth and nose of the wearer, fitting against the nose, cheek, and chin in such a manner as to be airtight. The double mask is securely fastened to the head by a harness of three straps. The mouth-piece of the mask is connected by a hose entering at its lower end with an air-pump, which may be at a considerable distance; or with a reservoir on the back of the wearer which contains air under pressure and a purifying apparatus removing the carbon dioxide from the exhaled air and making it fit to be breathed again.

An ingenious arrangement of flutter and check valves permits fresh air from the air-tube to enter the mouth and nose-piece, but prevents the unbreathable air surrounding the wearer from reaching the interior of the mask. Airtight contact with the skin of the wearer is safeguarded by the elastic rim of the mouth and nose-piece, which is curled inwardly, forming a pneumatic cushion between the skin and the mask.



A new protective mask for firemen and others; in the picture at the left the edge of the elastic rim of the mouth-piece is raised to show the curled edge, a new feature that insures airtight contact



Receiving the prize offered by the Popular Science Monthly to the winner in the Small-Bore Tournament

## He Won the Popular Science Monthly Trophy

THE pleased looking young man in the picture above is Captain Grosvenor L. Wotkyns, of the Ordnance Department of the Army, in civil life a Pasadena, Cal., rifleman. He is receiving the POPULAR SCIENCE MONTHLY Trophy, which he won in the National Rifle Association Small-Bore Tournament at Caldwell, N. J., last August. Colonel William Libbey, president of the Association, is presenting the trophy. Captain Wotkyns scored 392 out of a possible 400 points in the Small-Bore National Individual Match, in which the POPULAR SCIENCE MONTHLY Trophy was first prize.

His score means that at 50 and 100 yards, 20 shots per range, Captain Wotkyns averaged 98 out of the possible 100 points for each string of ten shots.

In the International Small-Bore Team Match, the United States against England, twenty men per team, with the course of fire the same as that in the Small-Bore National Individual Match, Captain Wotkyns was again high man, with the score of 391. Neither of his scores was equaled during the entire tournament, although the shooters comprised the oldest and most skilled riflemen of the country, including three picked United States Navy riflemen, several United States Marines, many Army sharks, and the best of the civilian military riflemen of the country. The American team, by the way, won from England by 94 points.

The POPULAR SCIENCE MONTHLY Trophy, a handsome watch costing \$150, was the most sought prize of the large prize list at the small-bore tournament. Captain Wotkyns' victory was a popular one, inasmuch as he was the builder of the small-bore range and assistant to the officer in charge.

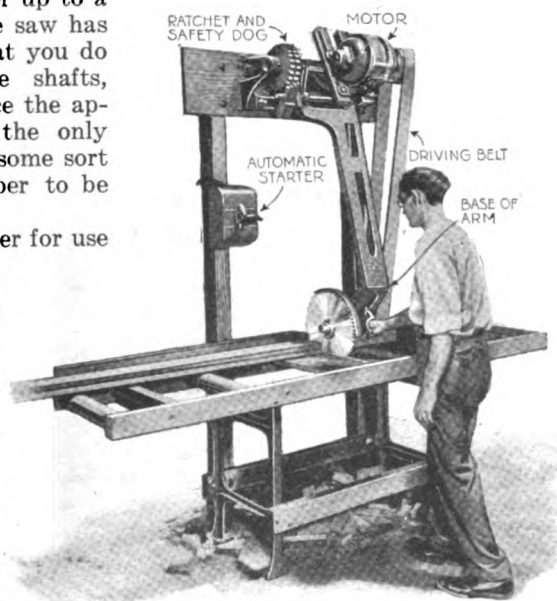
## The Circular Saw that Swings

HE presses a button, grasps a handle, pulls it back and forward—and the new, simple sawing-machine is in action, cutting off blocks of wood. It will swing from any overhead post or beam and thus takes up very little floor space.

It is designed particularly for firms with a large amount of crating or boxing to do, and will cut lumber up to a thickness of two inches. The saw has its own electric motor, so that you do not have to think of line shafts, counter-shafts, or belts. Since the apparatus is hung overhead, the only floor equipment necessary is some sort of bench on which the lumber to be cut may be laid.

There is an automatic starter for use when run on direct current. The electric motor may be adjusted on a sliding base attached to a horizontal shaft. The circular saw is carried at the lower end of a swinging arm, the upper end being pivoted to the same shaft on which the motor is mounted.

The saw is driven by a belt running from one end of the motor shaft to the saw shaft. The motor is so placed that its weight overbalances that of the saw, causing it to swing to the rear of the cutting-table when released.



A motor on the upper shaft, which is belted to the lower shaft, turns the circular saw as it swings easily through the wood