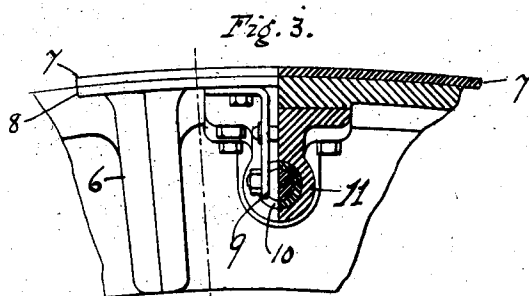
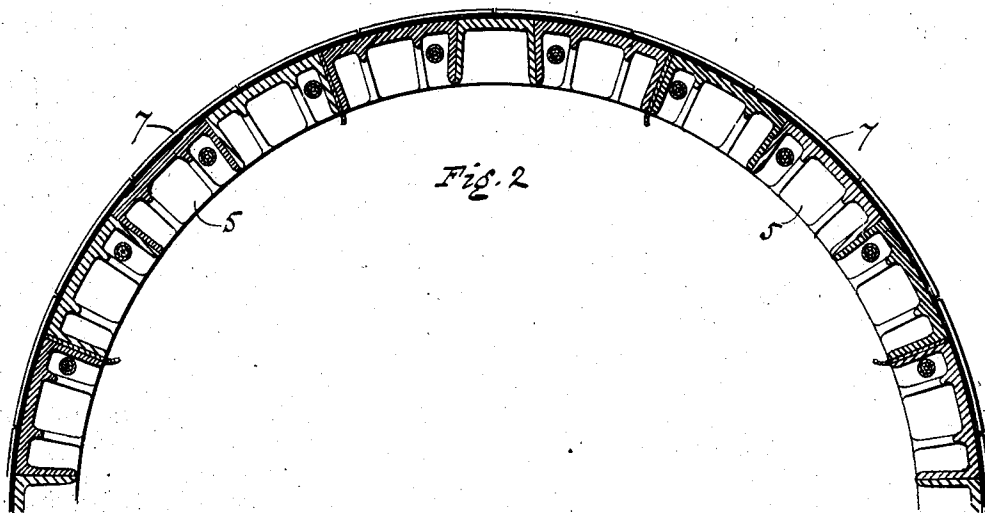
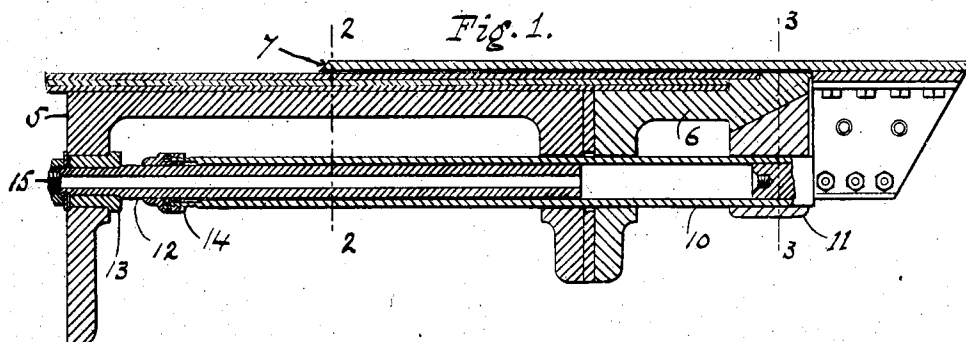


No. 834,732.

PATENTED OCT. 30, 1906.

H. JAPP.
SHIELD FOR TUNNELS.
APPLICATION FILED APR. 12, 1906.



WITNESSES

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HENRY JAPP, OF NEW YORK, N. Y., ASSIGNOR TO S. PEARSON & SON, INCORPORATED, OF LONG ISLAND CITY, NEW YORK, A CORPORATION OF NEW YORK.

SHIELD FOR TUNNELS.

No. 834,732.

Specification of Letters Patent.

Patented Oct. 30, 1906.

Application filed April 12, 1906. Serial No. 311,312.

To all whom it may concern:

Be it known that I, HENRY JAPP, a subject of the King of Great Britain and Ireland, residing in the borough of Manhattan, in the city, county, and State of New York, have invented certain new and useful Improvements in Shields for Tunnels, of which the following is a specification.

My invention relates to shields used in tunnel-driving, and particularly to an improved extension-hood around the shield and the means for advancing it.

The object of my invention is to produce a more simple and more efficient extension-hood than those now in use whereby the hood may be more easily and quickly advanced either as a whole or in parts.

In the accompanying drawings, Figure 1 shows a longitudinal section of the shield and one of the parts of the hood with its advancing means. Fig. 2 is a sectional view taken on the line 2 2, Fig. 1. Fig. 3 is a view, partly in end elevation and partly in section, on the line 3 3, Fig. 1.

In the drawings, 5 represents one of the segments of any suitable style for lining the interior of the shield, only one-half of which is shown in Fig. 2. This shield, as is well known in the art, is placed in advance and pushed forward as a whole in the usual manner. These segments 5 form a part of the shield, and in front of them is another ring of segments 6, of slightly-different form. These segmental rings are secured to each other and to the shell of the shield in any suitable manner.

Around the outside of the upper half of the shield are longitudinally-adjustable plates 7, which constitute the extension-hood. These plates project slightly beyond the front of the shield and may have one or more reinforcing cutting-edge plates 8 secured thereto. Bolted or otherwise attached to these plates 7 8 is a T-piece 9, which may be conveniently made of angle-irons, Fig. 3. To each T-piece I bolt or otherwise secure the outer end of a tubular rod 10, which projects backward within the forward end of the shield and is supported and can slide in the guide 11, bolted to the segment 6. This tubular rod 10, acting as a cylinder, works in con-

junction with the hollow rod 12, which is secured to the rear flange of the segment 5 and acts as a stationary piston. The sliding tubular rod or cylinder 10 is guided in the flange of the segment 6 and in the forward flange of segment 5, as well as in the guide 11, close to the front of the shield. This guide 11 is primarily relied on to support the plates 7 8.

The hollow piston 12 may be secured to the segment 5 by a bushing 13 in the inner wall of the segment 5. A stuffing-box 14 is provided at the end of the cylinder 10 around the piston 12.

Hydraulic or other fluid pressure is admitted through the hollow piston at the rear end 15 from any convenient source of supply. Suitable valves or cocks are provided to provide for the advance of either an individual plate or any number desired simultaneously or successively.

It is now clearly seen that on admitting fluid-pressure to any cylinder 10 at 15 the cylinder will be forced out to advance the plates 7 8 any desired distance within the limits of movement of the cylinder.

I claim as my invention—

1. In combination with a tunnel-shield, an extensible hood comprising a plurality of sliding plates around the periphery of the shield, and fluid-pressure means for operating each plate independently.

2. In combination with a tunnel-shield, an extensible hood comprising a plurality of sliding plates around the periphery of the shield, and a hydraulic piston for operating each plate independently.

3. In combination with a tunnel-shield, an extensible hood comprising a plurality of sliding plates, a reinforced cutting edge for each of said plates, a hydraulic piston for operating each plate, and means connected with the shield for supporting and guiding the piston.

4. In combination with a tunnel-shield, an extensible hood, comprising a plurality of sliding plates, a cylinder and piston for each plate, one of these parts being secured to the plate and the other to the shield, and guiding means for the moving part.

5. In combination with a tunnel-shield, an

extensible hood comprising a plurality of sliding plates around the periphery of the shield, with a cylinder secured to each plate, and a hollow piston therefor secured to the
5 shield.

6. In combination with a tunnel-shield, an extensible hood, comprising a plurality of sliding plates, with a cylinder and piston, one secured to each plate and the other to

the shield and a guide for the moving part so bolted to the shield.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY JAPP.

Witnesses:

EVELYN F. HOUGHTON,
L. I. LEVI.