O. B. DOWD.

Tunnel.

No. 168,146. Patented Sept. 28, 1875.

Fig. 1

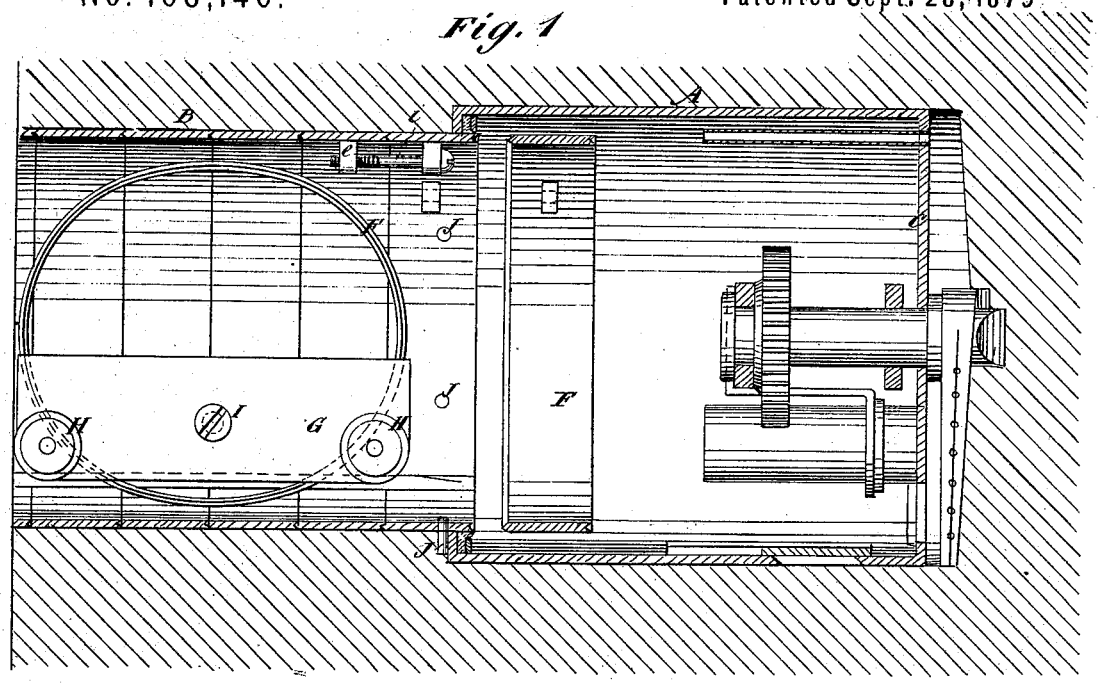


Fig. 2

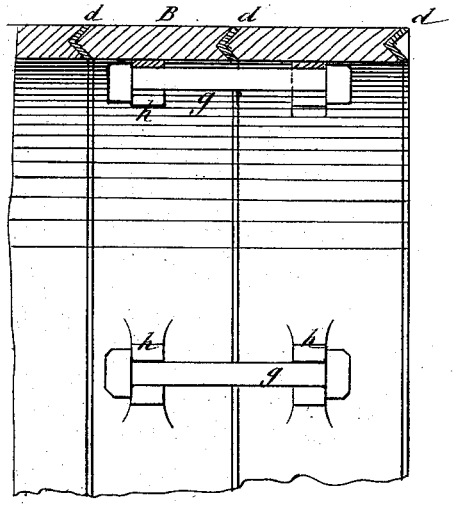


Fig. 3

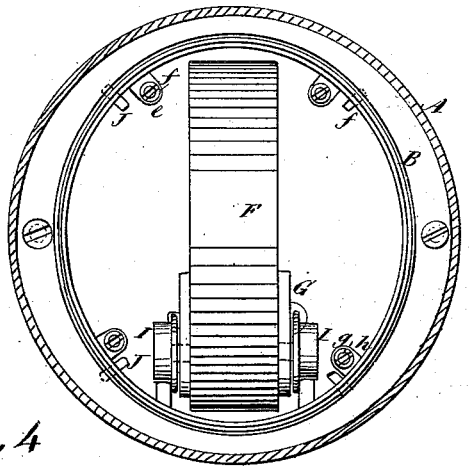
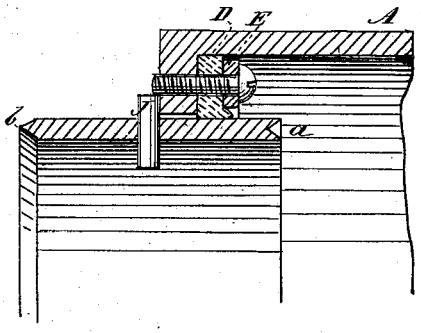


Fig. 4



WITNESSES:

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UNITED STATES PATENT OFFICE.

OLNEY B. DOWD, OF NEW YORK, N. Y.

IMPROVEMENT IN TUNNELS.

Specification forming part of Letters Patent No. **168,146**, dated September 28, 1875; application filed August 6, 1875.

CASE B.

To all whom it may concern:

Be it known that I, OLNEY B. DOWD, of the city, county, and State of New York, have invented new and useful Improvements in Tunnels, Sewers, &c, of which the following is a specification:

My invention consists, essentially, of the construction of the walls of tunnels and sewers of sections of elliptical tube, this form being employed to allow of carrying the sections through the previously-constructed part to the place where they are to be added in the construction of tunnels under river-beds, and in other places where the only access to the work is through the completed portion of the tunnel. The invention also comprises certain means of conveying the sections along the tunnel; also, means of fastening the sections and packing them, and also a contrivance for holding the cage or case employed in advance of the wall for digging out the bore from being pressed back by the pressure on the head of the case.

Figure 1 is a longitudinal section of a portion of a tunnel, and the tunneling-case employed in advance of it. Fig. 2 is a detail section of the tube forming the tunnel-walls. Fig. 3 is a transverse section through the tunneling-case. Fig. 4 is a detail, in section, of the joint between the tunnel and the tunneling-case.

Similar letters of reference indicate corresponding parts.

A is the case or shield employed for boring the tunnel, and containing the apparatus for that purpose, and also being the place in which the tube B, with which the tunnel is lined, is set up. It is a round or elliptical shell of metal, having a head, C, at the front end, when working in places much exposed to water, but may be open for dry tunneling, and at the rear end has an opening of the size and shape of the tube B, and a packing, D, and follower or packing-ring surrounding it, to pack around the tube water-tight. F represents the sections of the tube, one of which is seen in position to be connected with the previously-formed tube, and another is represented in the position in which the sections are carried into the case on a truck, consisting of two independent plates, G, each having two wheels, H, and being detachably clamped to the ends of the sections F by a bolt, I, so that a section of the tube forms a portion of the truck itself when in working condition, and being taken out of the truck when it has arrived in the place for being set up, the other portions of the truck are less cumbersome to return past other incoming tube-sections to the mouth of the tunnel than they would be, together with other devices necessary to make a complete truck independently of the tube-sections. These tube-sections are grooved on one end, as at *a*, and tapered at the other end, *b*, to match tightly one with another, and pack with lead *d*, and they are screwed up tight by lugs *e* and bolts *f*, or other fastening—for instance, a two-headed link, *g*, and notched lugs *h*, the link being elongated by heat, to be applied to the lugs, and drawing them up tight by its contractions in cooling; but in many the sections will be so pressed together by their weight and the earth as not to need any fastenings. J represents stop-pins, to be used for preventing the case from being pressed back on the tunnel by pressure against its head, the pins being screwed or otherwise projected out from the inside, as shown, through holes, to be afterward stopped in any approved way.

The apparatus attached to the head of the case represents some of the means employed for boring out the tunnel, and is described in another application for a patent filed by me simultaneously with this.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The tunnel-tube consisting of sections B, having an elliptical form and smooth exterior surface, and lugs and fastenings or connecting devices on the inner surface, as shown and described, whereby a section may be conveyed through a completed portion of the tube without impediment, as set forth.

2. The combination of the tunnel-sections B, of elliptical form, and the enlarged case A, as shown and described, whereby the sec-

tions may be introduced through the portion of tunnel previously made, and fitted together in the case.

3. The combination of the stop-pins J with tunnel B and tunneling-case A, substantially as specified.

4. The trucks G H and clamping-bolt I, combined and arranged for coupling with a tube-section, substantially as specified.

5. The combination of packing D and follower E with the tunnel B and the case A, substantially as specified.

OLNEY B. DOWD.

Witnesses:
T. B. MOSHER,
ALEX. F. ROBERTS.