

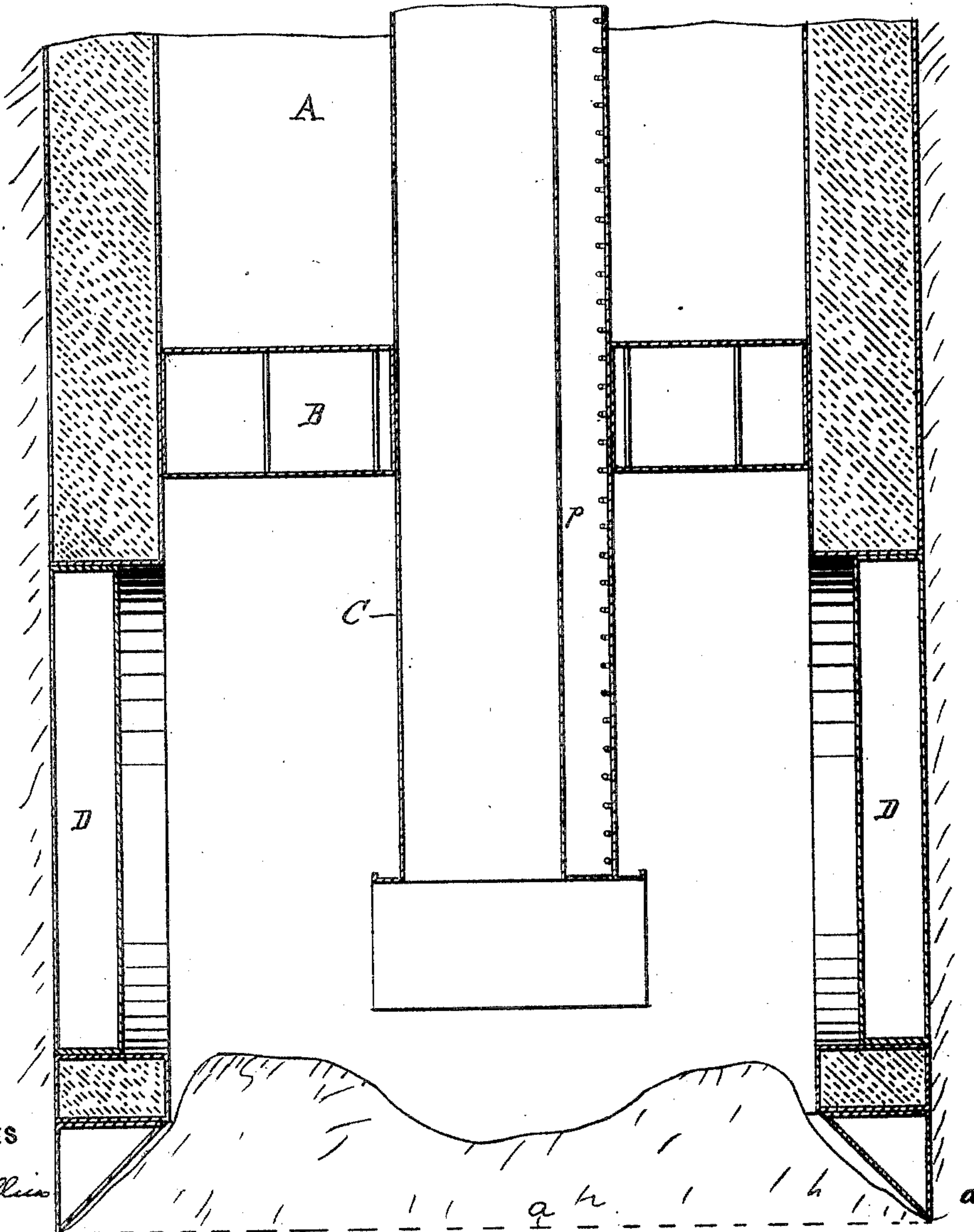
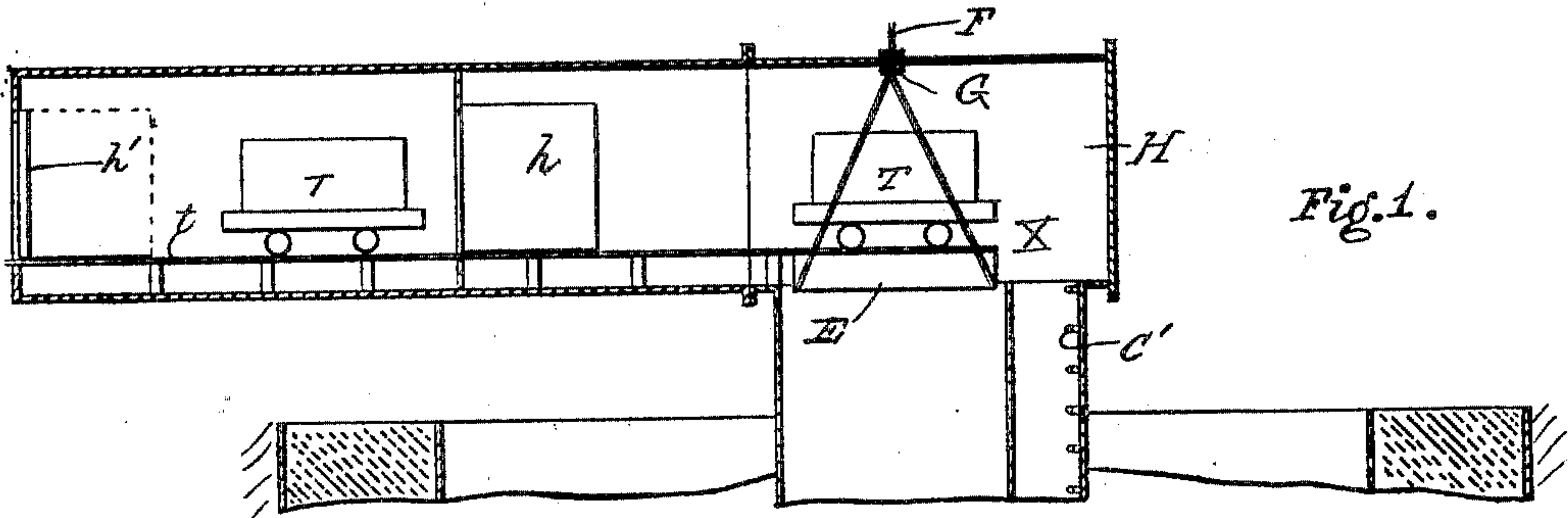
No. 797,815.

PATENTED AUG. 22, 1905.

E. W. MOIR.
AIR LOCK APPARATUS FOR CAISSONS AND TUNNELS.

APPLICATION FILED MAR. 18, 1905.

3 SHEETS—SHEET 1.



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Fig. 2.

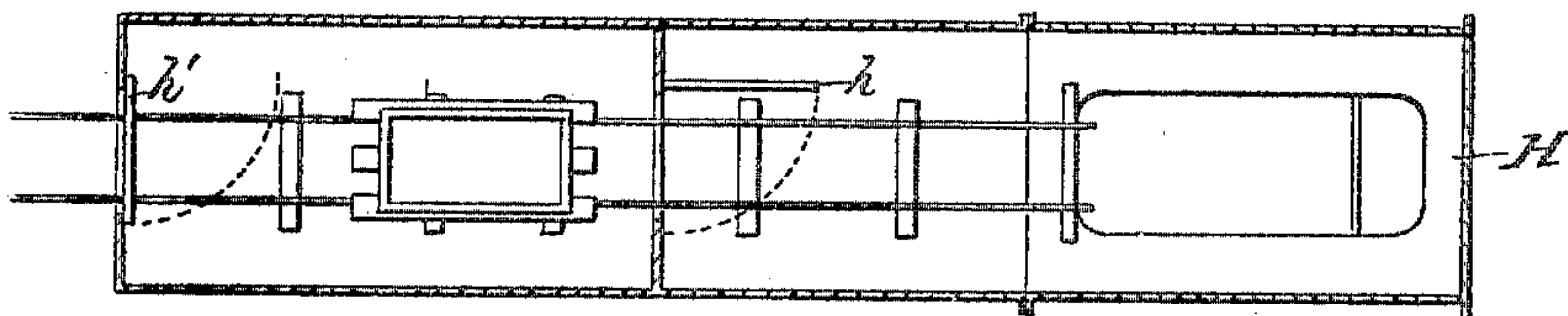
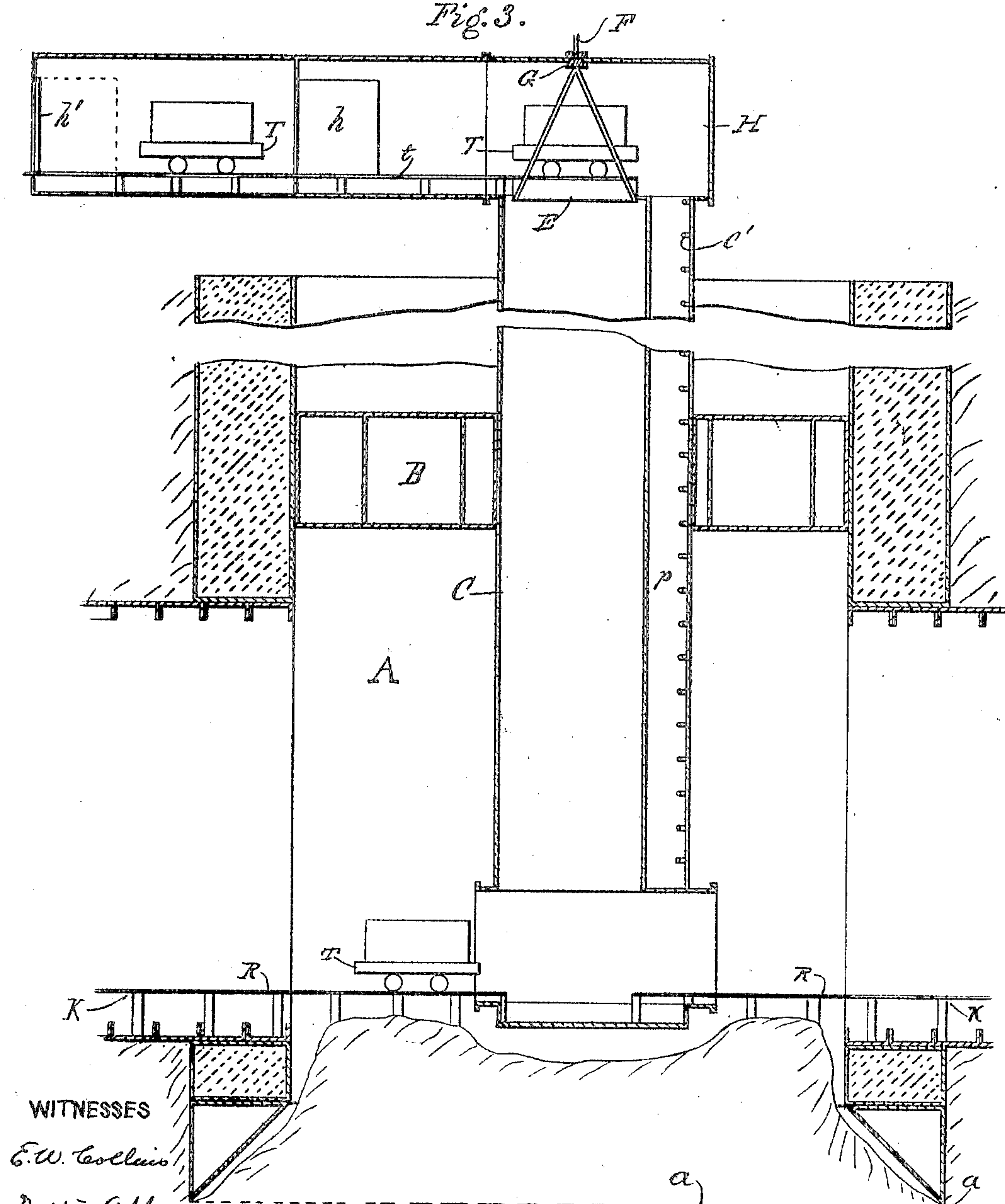


Fig. 3.



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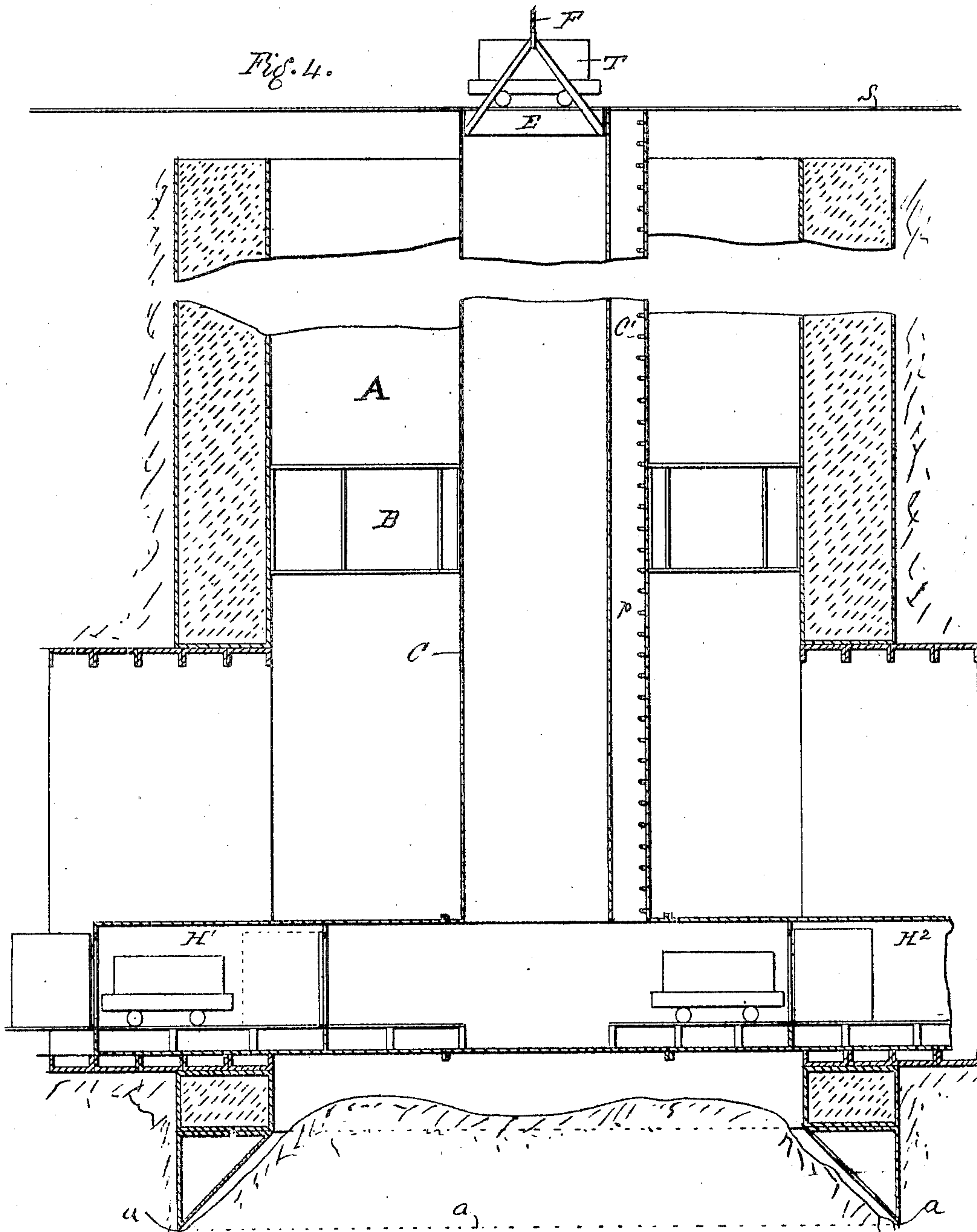
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UNITED STATES PATENT OFFICE.

ERNEST W. MOIR, OF LONDON, ENGLAND, ASSIGNOR TO S. PEARSON AND SON, INCORPORATED, OF LONG ISLAND CITY, NEW YORK, A CORPORATION OF NEW YORK.

AIR-LOCK APPARATUS FOR CAISSONS AND TUNNELS.

No. 797,815.

Specification of Letters Patent.

Patented Aug. 22, 1905.

Application filed March 18, 1905. Serial No. 250,780.

To all whom it may concern:

Be it known that I, ERNEST W. MOIR, a subject of the King of Great Britain and Ireland, and a resident of London, England, have invented certain new and useful Improvements in Air-Lock Apparatus for Caissons and Tunnels, of which the following is a specification.

My invention relates to that class of engineering in which excavating-work has to be carried on under a pressure greater than atmospheric pressure and the material excavated has to be taken out through air-locks. This is particularly required in caisson and tunnel work.

The object of my invention is to provide a simple and easily-manipulated air-lock apparatus for the convenient and quick handling of the material excavated.

In the accompanying drawings, Figure 1 is a vertical section illustrating the application of my invention to the sinking of caissons. Fig. 2 is a sectional plan view through the air-lock. Fig. 3 is a vertical sectional view illustrating the application of my invention to tunnel-work, and Fig. 4 is a diagrammatic view of a modification.

Referring to Figs. 1 and 2, A is the caisson, which may be of any suitable construction, provided with the usual cutting edge *a* and the transverse air-tight floor B. In Fig. 1 I have indicated in the side walls of the caisson plugs D D, which can be removed when the caisson has been sunk to the proper depth in order to start from those points the horizontal excavating-work for tunnels to be constructed from the caisson, as indicated in Fig. 3. Passing through the air-tight floor B is a vertical shaft C, which may be of any suitable cross-section and which is preferably formed by a metal tube. This tube has a vertical partition *p*, on the other side of which from the shaft C is a ladder-way C' for the workmen and space for pipes. Through the shaft C passes a hoisting-cage E, suspended from a wire or other rope F, which preferably passes through a packing-gland G in the closed top of the hoisting-shaft to a suitable winding-drum. Extending in a substantially horizontal direction from the top of the hoisting-shaft I provide an air-lock H with inwardly-opening doors *h h'*, the chamber between the two doors being of sufficient size to receive a wheeled truck or wagon T and a

man when the outer door *h'* is open. The floor of the horizontal air-lock is preferably provided with a runway *t*, (rails, for example,) on which the wheels of the wagon or truck can be guided, and the floor of the hoisting-cage is also preferably provided with a corresponding runway.

In operation the empty trucks are lowered on the cage through the hoisting-shaft and may be run off to be filled with the material excavated by the workmen. A filled truck is then run onto the floor of the hoisting-cage, which can then be lifted to the top, as indicated at X in the drawings. Thereupon the filled truck or wagon is run off the cage onto the runway *t* and into and through the air-lock, the doors *h h'* being opened and closed one at a time, as will be readily understood. When the caisson has been sunk to the desired level, as indicated in Fig. 3, the described air-lock and hoist can be used for conveying excavated material from the tunnels by removing the plugs D D and putting in a floor or platform at K, Fig. 3, with rails or runways R leading into the tunnels.

Instead of having the horizontal air-lock at the top of the elevating-shaft it may be arranged at the bottom, as illustrated in the modification Fig. 4, the air-locks in this case being indicated at H' H" leading into the tunnels at the right and left. In this modified construction, of course, the hoisting will take place under atmospheric pressure, and the trucks will be discharged from the cage onto runways S at the top. The specific construction of this modification, Fig. 4, forms the subject of a separate application for patent filed by me March 18, 1905, Serial No. 250,781.

I claim as my invention—

1. Air-lock apparatus for excavating-work, comprising a vertical shaft and a hoisting-cage therein on which a wheeled truck may be run with a substantially horizontal air-lock, into and from which said truck may be run from and onto the cage.

2. Air-lock apparatus, comprising a vertical shaft and hoisting-cage therein adapted to receive a wheeled truck, with a substantially horizontal air-lock open to the shaft and having a runway to receive the truck.

3. Air-lock apparatus, comprising a hoisting-shaft and a hoisting-cage therein adapted to receive a wheeled truck with a substan-

tially horizontal air-lock at the top of the shaft and having a runway to receive the wheeled truck.

4. Air-lock apparatus, comprising a vertical hoisting-shaft and a hoisting-cage therein adapted to receive a wheeled truck with substantially horizontal runways for the truck at the top and bottom of the shaft and an air-lock at one of said horizontal runways.

5. Air-lock apparatus, comprising a vertical hoisting-shaft and hoisting-cage therein, adapted to receive a wheeled truck with horizontal runways at the bottom leading to tunnels and a substantially horizontal air-lock at the top of the shaft with a runway to receive the truck.

6. Air-lock apparatus, comprising a caisson having an air-tight floor, a vertical shaft passing therethrough and a hoisting-cage in the shaft adapted to receive a wheeled truck with a substantially horizontal air-lock opening to the shaft and having a runway to receive the truck.

7. Air-lock apparatus, comprising a caisson having an air-tight floor and a shaft passing therethrough, and a hoisting-cage in the shaft adapted to receive a wheeled truck with a sub-

stantially horizontal air-lock opening to the top of the shaft and having a runway to receive a truck.

8. Air-lock apparatus, comprising a caisson with an air-tight floor and a tunnel-opening leading from the lower part of the caisson with a vertical shaft passing through the air-tight floor, a hoisting-cage in the shaft, substantially horizontal runways at the top and bottom of the shaft, and an air-lock at one of said runways.

9. Air-lock apparatus, comprising a caisson having an air-tight floor, a tunnel-opening from the side of the caisson below said floor with a vertical shaft passing through the floor, a hoisting-cage in the shaft adapted to receive a wheeled truck and a substantially horizontal air-lock at the top of the shaft with a runway to receive the truck.

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

ERNEST W. MOIR.

Witnesses:

C. SEDGWICK,
HUBERT HOWSON.