

(No Model.)

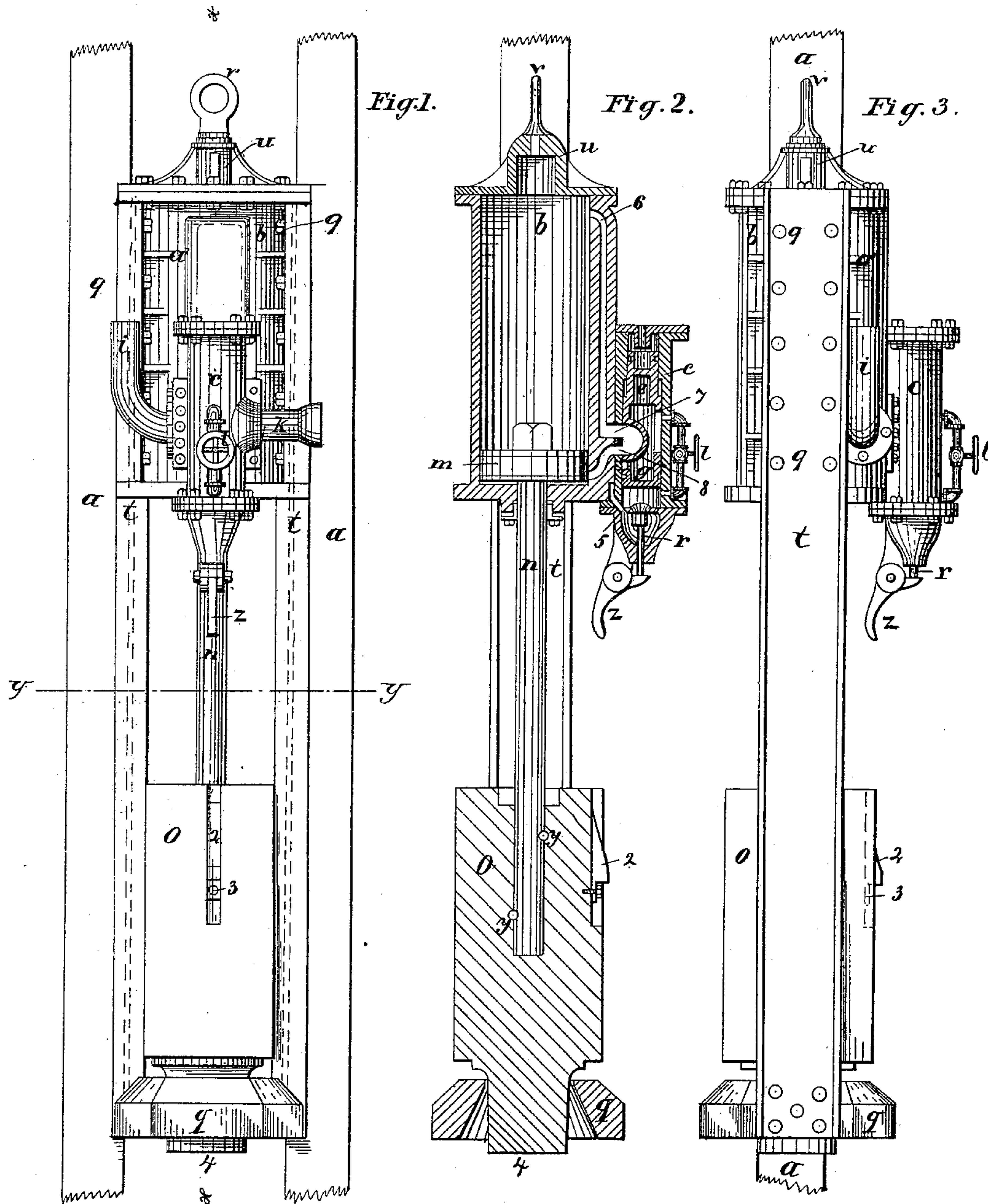
2 Sheets—Sheet 1.

T. M. SKINNER.

STEAM PILE DRIVER.

No. 273,904.

Patented Mar. 13, 1883.



Witnesses

W. C. Corlies  
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Inventor

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By Coburn & Shacher  
Attorneys

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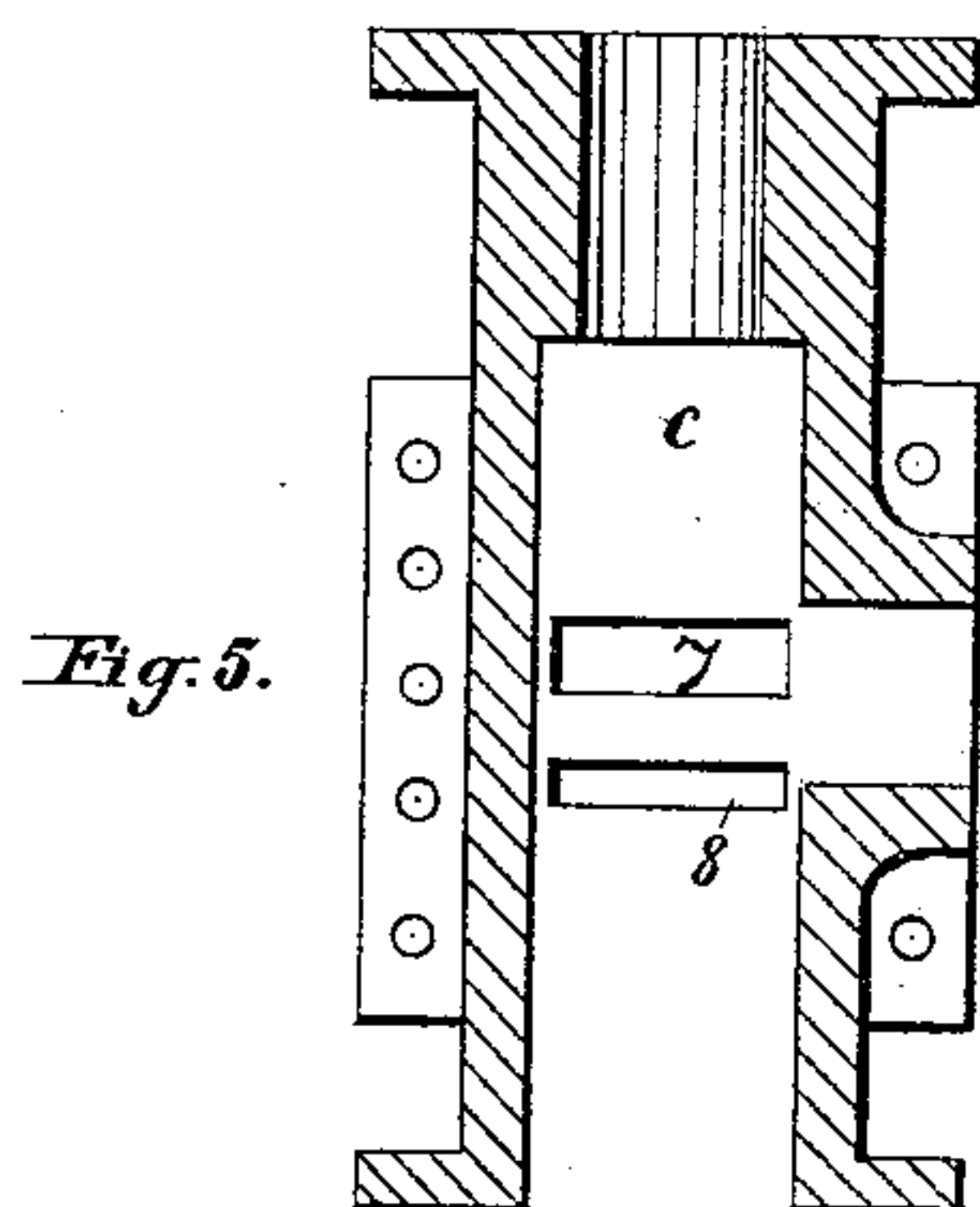
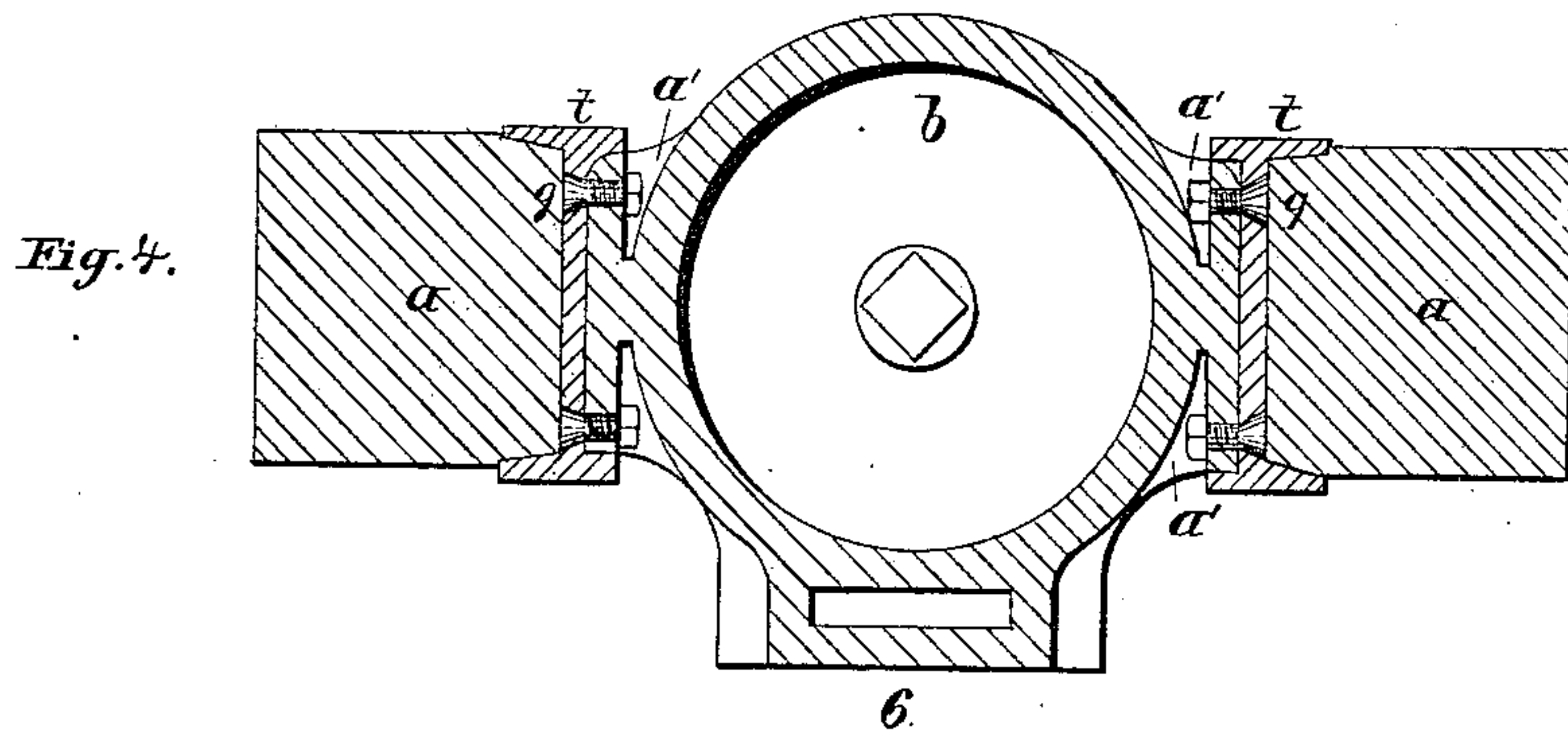


Fig. 6.



Fig. 7.

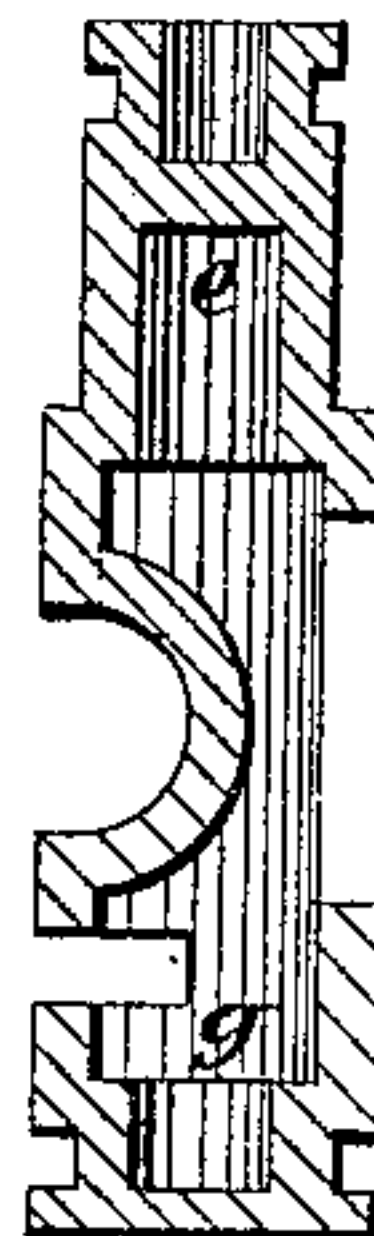
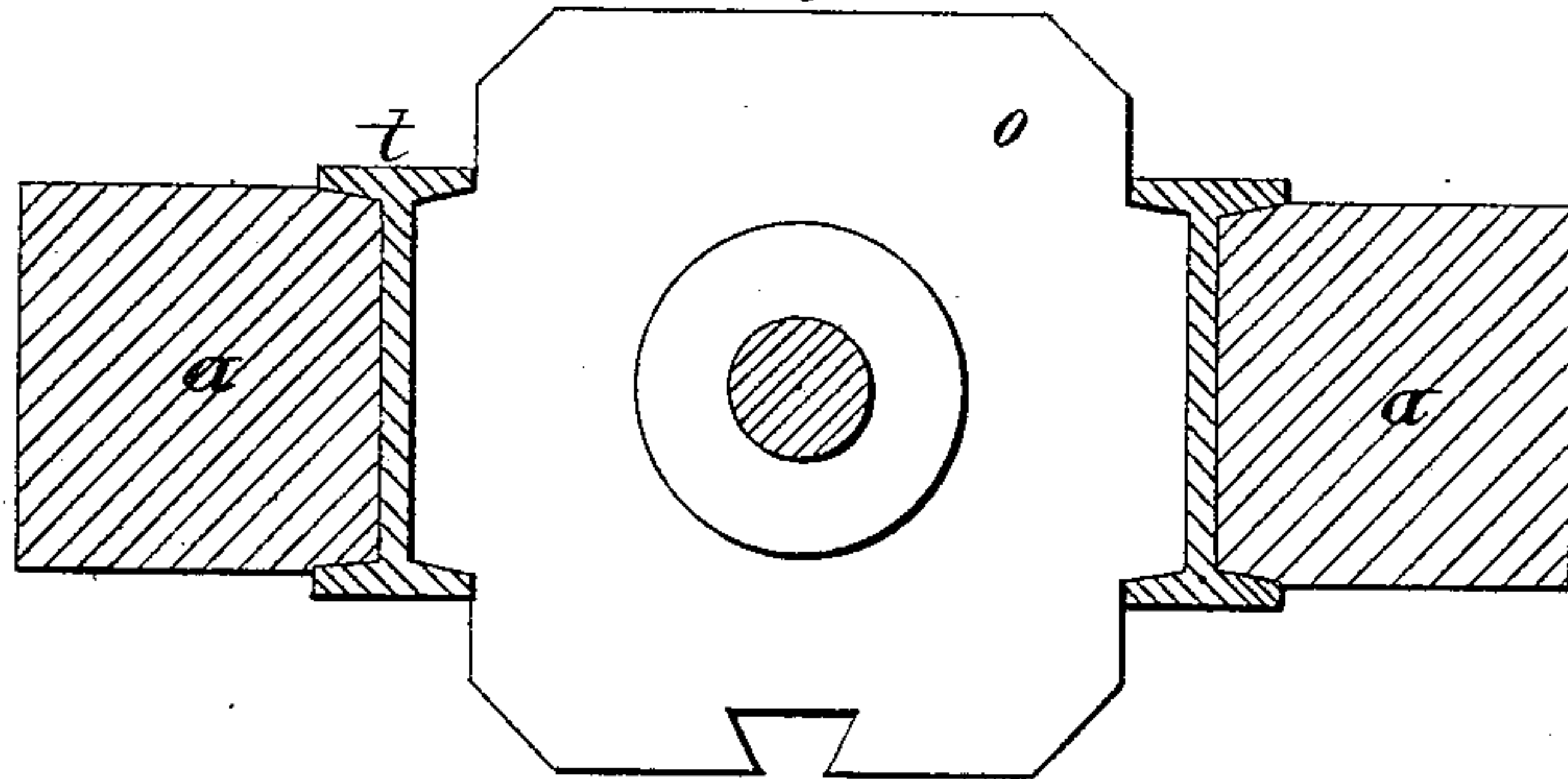


Fig. 8.



Witnesses

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# UNITED STATES PATENT OFFICE.

THOMAS M. SKINNER, OF COLORADO SPRINGS, COLORADO.

## STEAM PILE-DRIVER.

SPECIFICATION forming part of Letters Patent No. 273,904, dated March 13, 1883.

Application filed January 7, 1881. (No model.)

To all whom it may concern:

Be it known that I, THOMAS M. SKINNER, of Colorado Springs, in the county of El Paso and State of Colorado, have invented a certain new and useful Improvement in Steam Pile-Drivers, of which the following is a full and clear description, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to that class of steam pile-drivers in which the hammer is lifted by the direct action of the steam; and the object of my invention is to make a compact, durable, and effective steam pile-driver with a strong frame, and with a steam-chest so constructed as to receive and transmit to the cylinder the steam with little friction or wear, and in which the length of stroke can be regulated so as to overcome the difficulties that have been heretofore experienced in the use of steam pile-drivers, special reference being had to Letters Patent No. 185,458, granted to me December 19, 1876.

My invention consists in the special construction and combination of the valve with ports and pipes, as hereinafter specified, and also in the special construction of the movable trip with which the valve is opened and closed to regulate the length of fall of the hammer, and also in the special construction of the frame, all as hereinafter fully specified.

In the accompanying drawings, Figure 1 is a front elevation of my improved pile-driver; Fig. 2, a vertical central section taken transversely through the same on the line *x x*, Fig. 1. Fig. 3 is a side view of the same with one of the leaders *a* removed. Fig. 4 is a cross-section through the cylinder *b*; Fig. 5, a vertical section through the steam-chest *c*; Fig. 6, an edge view of the valve removed from the steam-chest; Fig. 7, a vertical sectional view of the same. Fig. 8 is a horizontal sectional view through the hammer-frame, taken at the line *y y*, Fig. 1, looking down.

*a a* are the leaders, which I preferably make of wood, and *t t* are beams of I or channel beam iron, secured firmly to the cylinder by means of the bolts *9 9*, the bolts passing through flanges cast on said cylinder and secured on the inside of the cylinder by nuts *a*, as clearly shown in Fig. 4. These I-beams *t t*

are also bolted to the cone *q*, as shown in Fig. 3.

*o* is the hammer, and is made of such shape as to fit between the I-beams *t t*, as shown in Fig. 8, the I-beams acting as a guide to the hammer, and preventing injury to the leaders and other parts of the machine when in operation. The form of the I-beam-frame pieces *t t* gives the frame great strength laterally, and at the same time forms a guide to the hammers *o*.

*m* is a piston, and *n* the piston-rod, to which the hammer *o* is attached by means of the pins *y y*.

6 is a port connecting the upper part of the cylinder *b* with the exhaust-port 7 and pipe *i*. *e g* is a steam-valve located in the steam-chest *c*.

*k* is a steam-pipe, through which the steam passes into the interior of the valve *e g*, by which means the pressure is relieved in the operation of the valve, and the valve is balanced by having openings on opposite sides relieving the pressure on its face.

7 8 are the exhaust and steam ports.

2 is a wedge-shaped trip-block attached to the hammer *o*. This trip-block is so secured to the hammer as to be adjustable vertically, and it is so arranged on the hammer that in the upward movement of the hammer it will strike the pivoted lever *z* and lift the valve *r*, and thus allow the steam to escape from below the valve *e g* through the exhaust-port 5, so that the valve *e g* may fall, thereby cutting off the supply of steam, while allowing an escape from below the piston *m* through the port 8 and the exhaust-port 5, thus allowing the hammer to fall by its own weight.

By the adjustment of the trip-block 2 of the hammer its upward stroke is regulated.

*l* is a pipe and cock on the steam-chest *c* for admitting steam below the valve *e g*.

The operation of my pile-driver is as follows: It is raised to the top of the leaders *a a* by means of a chain or rope attached to the ring *v*, and there supported till the pile is put in place. It is then arranged so that the cone *q* rests on the upper end of the pile, the whole weight of the machine being allowed to rest on the top of the pile. The pipe *k* being connected to a steam-boiler, the steam enters the interior of the valve *e g*, and then passes to the lower side of the valve through pipe and cock



1, which raises the valve and admits steam to  
 the lower side of the piston *m* through port 8,  
 which raises the hammer *o* until the trip-block  
 2 comes in contact with the pivoted lever *z*,  
 5 thus raising the valve *r*, exhausting steam from  
 below the valve *e g* through the exhaust-port  
 5 into pipe *i*. As the lower end of the valve  
*e g* is larger than its upper end, as clearly  
 shown in Fig. 7, the valve *e g* drops as soon as  
 10 the steam from below it exhausts, thereby ex-  
 hausting the steam from below the piston *m*  
 through the ports 8 into the pipe *i*, causing the  
 hammer *o* to drop upon the pile by its own  
 gravity. The drop of the hammer *o* releases  
 15 the pivoted lever *z*, allowing the valve *r* to close,  
 when the steam raises the valve *e g*, as before,  
 and repeats the operation above described.  
 The port 6 allows the escape of air and steam  
 from the cylinder above the piston *m* through  
 20 the exhaust-port 7 and pipe *i*, thus obviating  
 the necessity of any opening immediately into  
 the outer air, and providing for the warming  
 of all air admitted to the cylinder by means of  
 its transit through the exhaust-steam pipe.  
 25 This passage from the upper part of the cylin-  
 der through the ports 6 and 7 and pipe *i* is al-  
 ways open, being unaffected by the position of  
 the valve *e g*. The steam by which the piston  
*m* is operated is admitted below that piston  
 30 only, the only steam which gets into the cylin-  
 der above it being such as leaks through the  
 packing or is carried in with the current of air  
 from the exhaust-pipe.

Having thus fully described the construction  
 and operation of my invention, what I claim as 35  
 new, and desire to secure by Letters Patent,  
 is—

1. In combination with the leaders *a a* and  
 hammer *o*, the I-shaped irons *tt*, forming a part 40  
 of the frame of the pile-driver, and serving as  
 a guide to the pile-driver in the leaders, and  
 also as a guide to the hammer, substantially  
 as described.

2. The combination of the movable trip-  
 block 2, the hammer *o*, pivoted lever *z*, and 45  
 valve *r*, as shown and specified.

3. The hollow balanced valve *e g*, made larger  
 at one end than at the other, in combination  
 with the pipe and cock *l*, opening below the  
 valve, and exhaust-valve *r*, constructed and 50  
 arranged substantially as specified.

4. The combination of the exhaust-pipe *i*,  
 exhaust-ports 6 and 7, and the valve *e g*, as  
 and for the purpose specified.

5. The exhaust-pipe *i*, in combination with 55  
 the exhaust-port 5, valve *r*, exhaust-port 7,  
 and hollow valve *e g*, as described.

6. The combination of the I-beam irons *tt*  
 and flanges attached to the cylinder *b*, secured  
 together substantially as described.

THOS. M. SKINNER.

Witnesses:

JNO. C. MACGREGOR,  
 THOMAS H. PEASE.