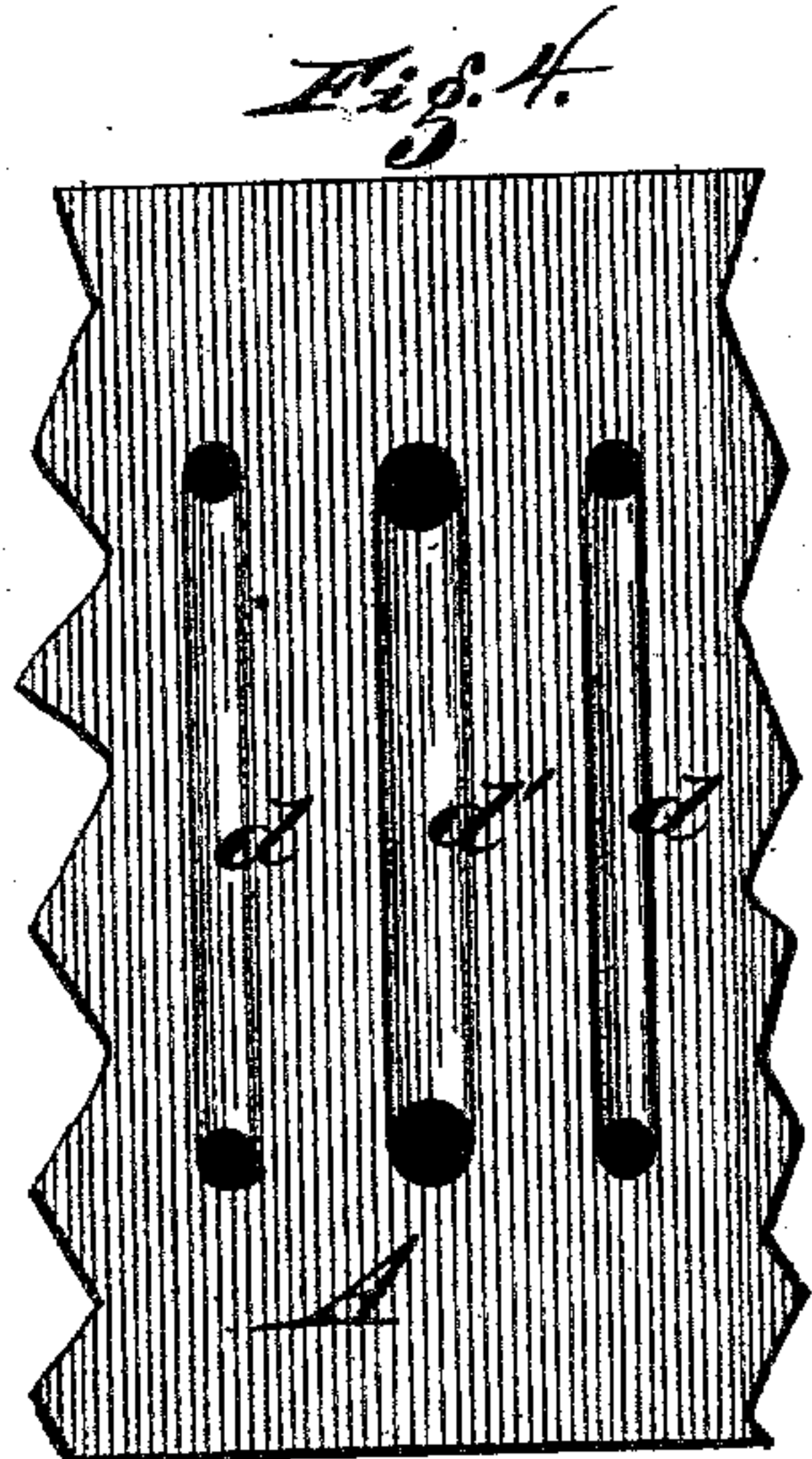
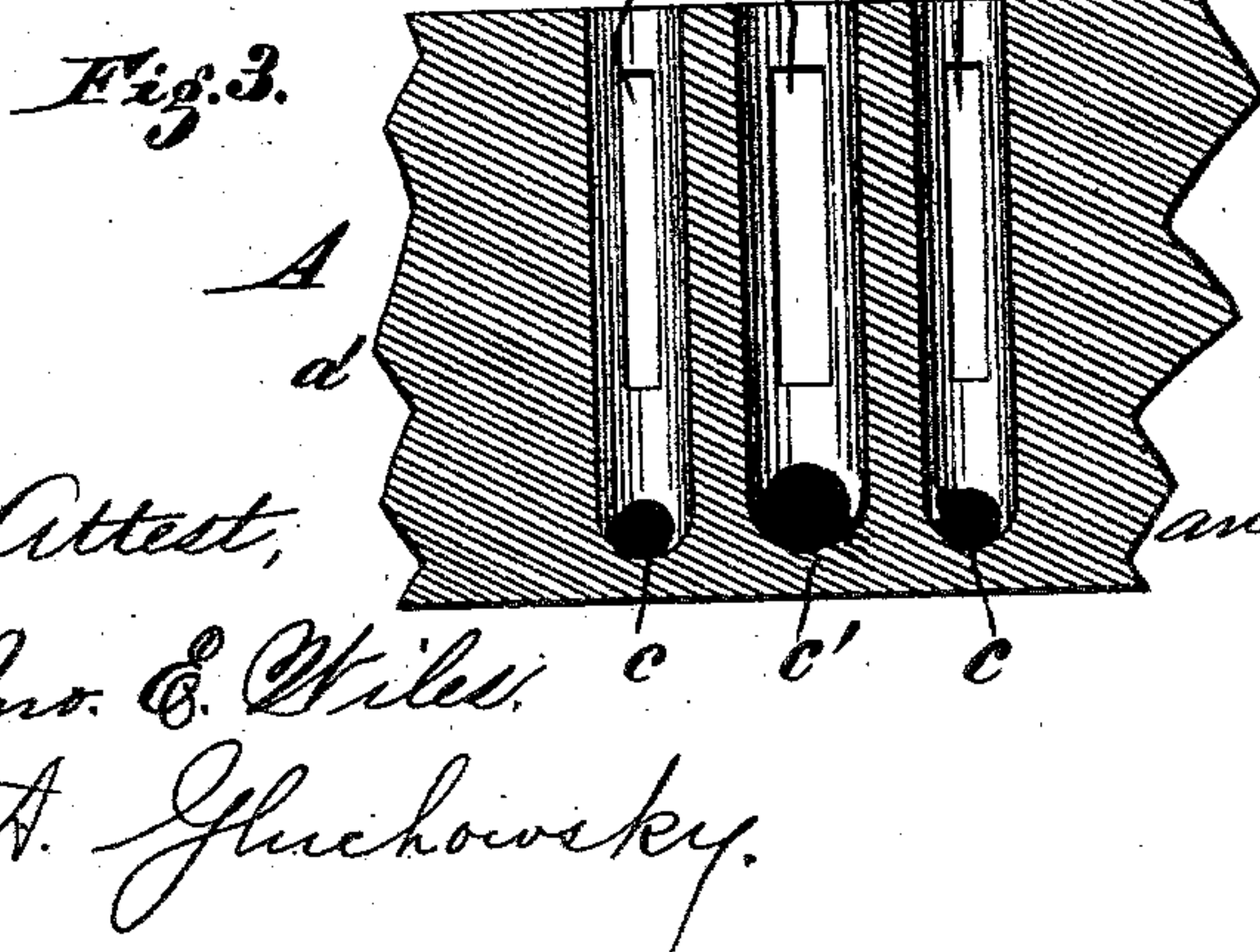
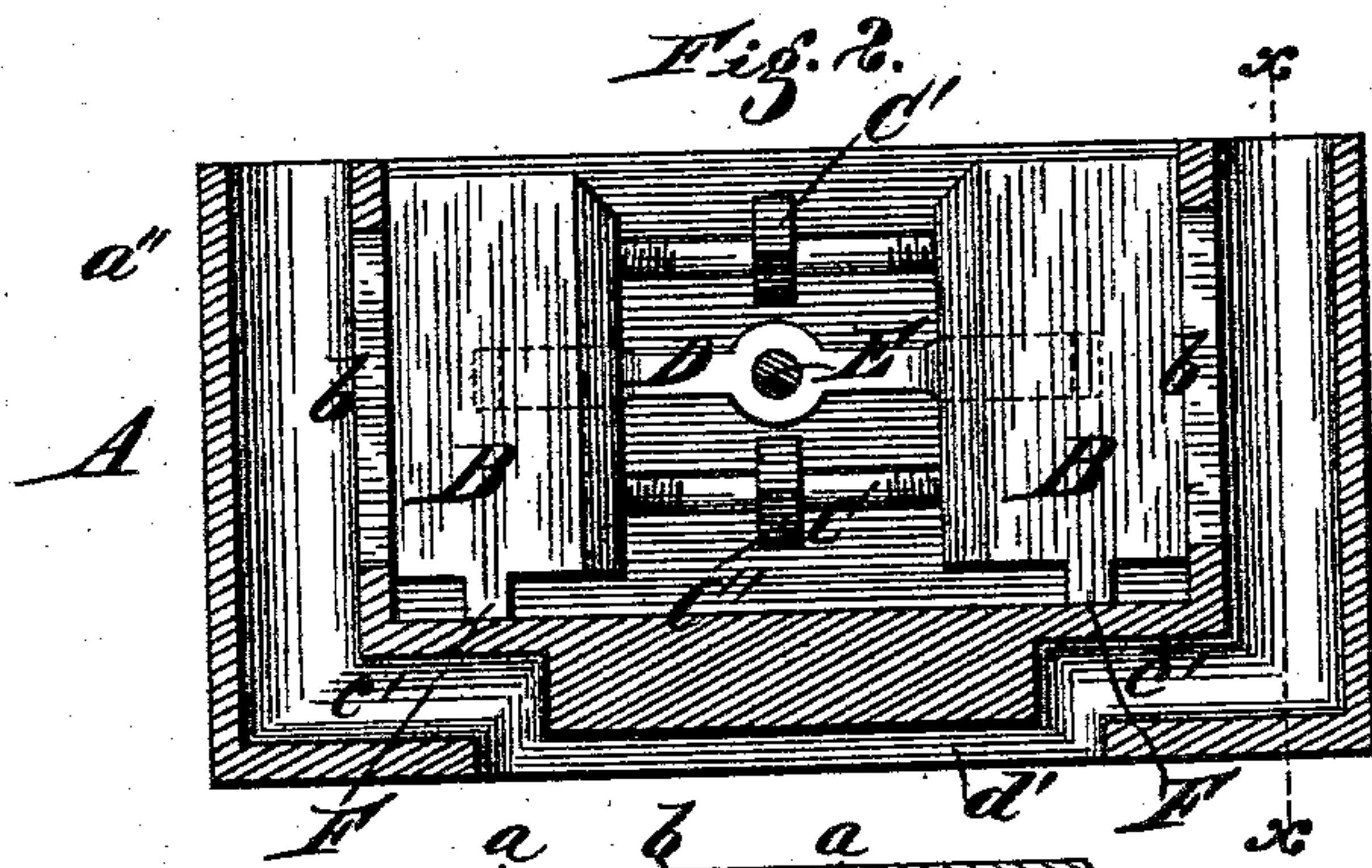
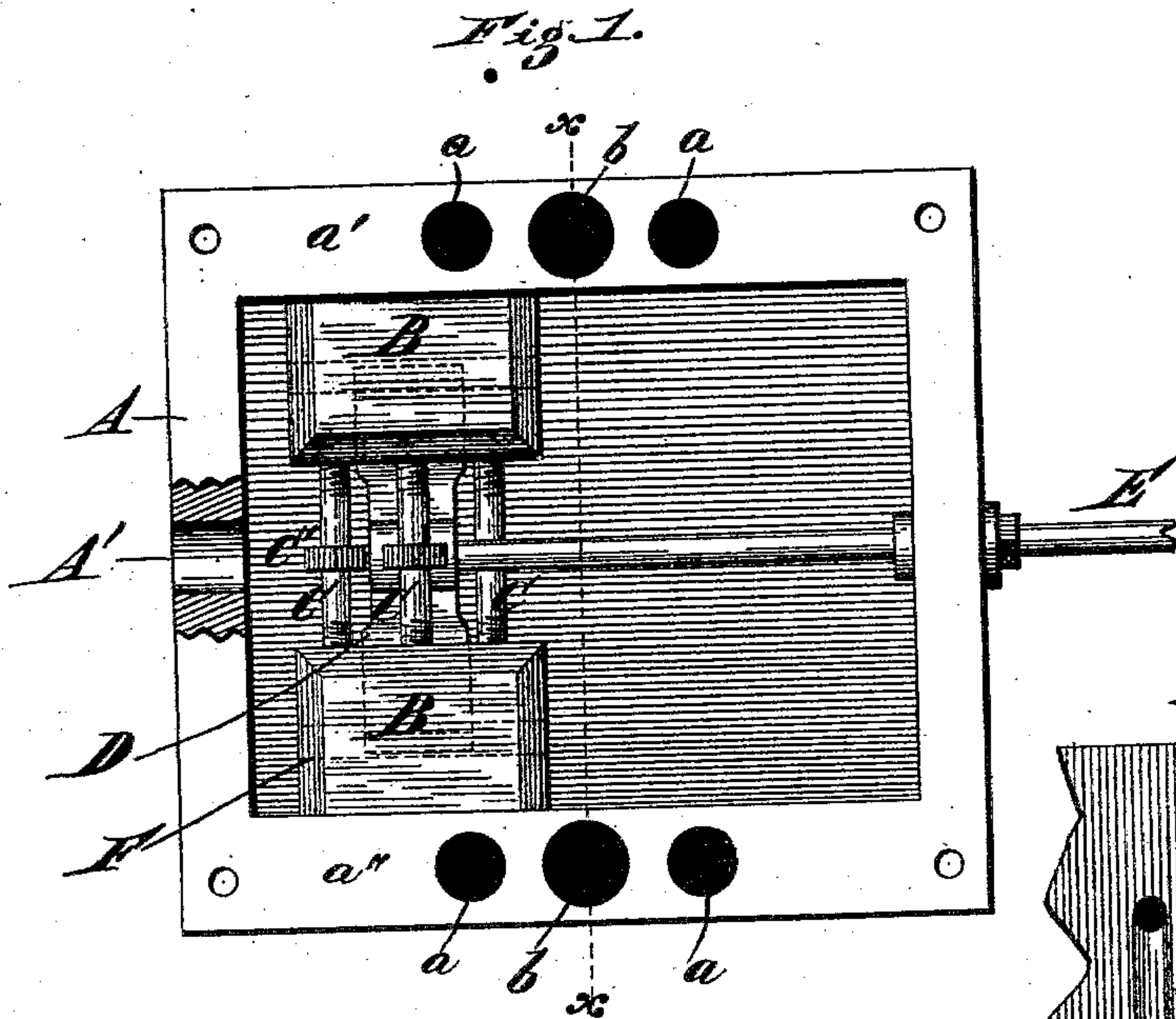


(No Model.)

T. CALVER & S. H. STOUT.  
BALANCED SLIDE VALVE.

No. 281,015.

Patented July 10, 1883.



Inventors,  
Samuel H. Stout  
and Timothy Calver,  
by Wood & Bond,  
Attorneys &c.

Attest,  
Jno. E. Wiles,  
A. Gluchowsky.



# UNITED STATES PATENT OFFICE.

TIMOTHY CALVER, OF PORTSMOUTH, OHIO, AND SAMUEL H. STOUT, OF COVINGTON, KENTUCKY.

## BALANCED SLIDE-VALVE.

SPECIFICATION forming part of Letters Patent No. 281,015, dated July 10, 1883.

Application filed April 14, 1883. (No model.)

*To all whom it may concern:*

Be it known that we, TIMOTHY CALVER and SAMUEL H. STOUT, both citizens of the United States, and residents, respectively, of Portsmouth, Scioto county, State of Ohio, and of Covington, in the county of Kenton and State of Kentucky, have invented certain new and useful Improvements in Balanced Slide-Valves, of which the following is a specification.

Our invention relates to improvements in slide-valves.

The objects of our invention are, first, to provide duplicate valves within a steam-chest having a steam-supply opening from the boiler and double sets of supply and exhaust ports leading by a single set of supply and exhaust ports to and from the cylinder, said valves being connected by adjusting-screws for lateral wear adjustment, and a yoke for receiving the end of the valve-stem to reciprocate them.

Another object of our invention is to provide tongues or ribs on the under side of the valves, upon which tongues the valves slide to diminish, as much as possible, the friction of the valves on their seats, and provide space for steam-pressure on said under side of the valves to balance the pressure on their upper sides, and thereby constitute a balanced slide-valve.

Other features of our invention will be fully set forth in the following description of the accompanying drawings, in which—

Figure 1 is an elevation of the steam-chest with the cap or lid removed to show our improved valve mechanism. Fig. 2 is a transverse sectional elevation on line *x x*, Fig. 1. Fig. 3 is a broken longitudinal section on line *x x*, Fig. 2. Fig. 4 is a broken under side view of the steam-chest, showing the steam supply and exhaust ports to and from the cylinder of the engine to which the steam-chest and its slide-valve are fitted.

A represents the steam-chest, having a live-steam-supply opening, A', leading from the boiler into the steam or valve chamber.

*a a* are live-steam ports constructed in duplicate in the opposite sides *a' a''* of the chest A.

*b* are exhaust-ports constructed intermediate the ports *a a*.

*d d d'* are ports respectively connecting, by passages *c c c'*, the several steam-ports *a a b* with the cylinder.

B B represent the valves, which are arranged in duplicate within the steam-chamber, and are connected together by right and left threaded adjusting screws or rods C, so as to be laterally adjustable and to provide for the wear of the working parts.

C' are nuts on screws C for turning them.

D is a yoke whose ends rest loosely in slots or openings made in the inner faces of the valves, so that they may slide for lateral adjustment. Yoke D connects the two valves, so that they will reciprocate in unison by means of the valve-rod E, whose inner end is attached to said yoke in any suitable manner.

F represents tongues or ribs constructed on the under side of both valves B. In thus narrowing the sliding surface of the valves on the floor of the steam-chamber, the friction is materially diminished by reason of the diminution of weight, and the presence of steam on the under side of the valves approximately balances the pressure on their upper sides, which closely approach the inner face of the cover or lid, as shown in Fig. 2.

In employing two valves and two sets of steam induction and eduction ports in the steam-chamber, the effect of the steam upon the valves is uniform, and it can be admitted to the cylinder and exhausted therefrom in greater volume.

It will be observed that as the bearing-surfaces of the valves B are cut away, as shown, the amount of wear will be greater; hence the importance of the adjusting-screws in such construction.

We are aware that it is not new to spread the balanced valves by means of adjusting-screws for the purpose of keeping them on their seats and compensating for wear; but such is not our invention. We are also aware that valves operating on opposite sides of a vertical seat have been secured to two frames adj-justably connected by screw-bolts for adjusting the valves to the valve-seat, and such is therefore not claimed by us.

We claim—

1. In combination with duplex slide-valves

cut away to give a minimum bearing upon the seat, right and left threaded bars or screws connecting said valves, and means for adjusting said screws to take up loss by wear, substantially as described.

5 2. The combination, in a slide-valve, of the steam-chest A, having double sets of supply and exhaust ports *a a b* and connecting-passage ports *c c c'* and *d d d'*, the duplex valves  
10 B, having tongue F, and means, CC', for adjust-

ing said valves in relation to each other, substantially as described.

In testimony whereof we have hereunto set our hands.

TIMOTHY CALVER.  
SAMUEL H. STOUT.

Witnesses:

ALOIS WINTERBERGER,  
J. W. BANNON.