No. 675,652. Patented June 4, 1901.

C. H. DOEBLER & W. S. COOPER.

PNEUMATIC LIFT FOR WORK BENCHES.

(Application filed Sept. 4, 1900.)

(No Model.) 2 Sheets—Sheet 1.

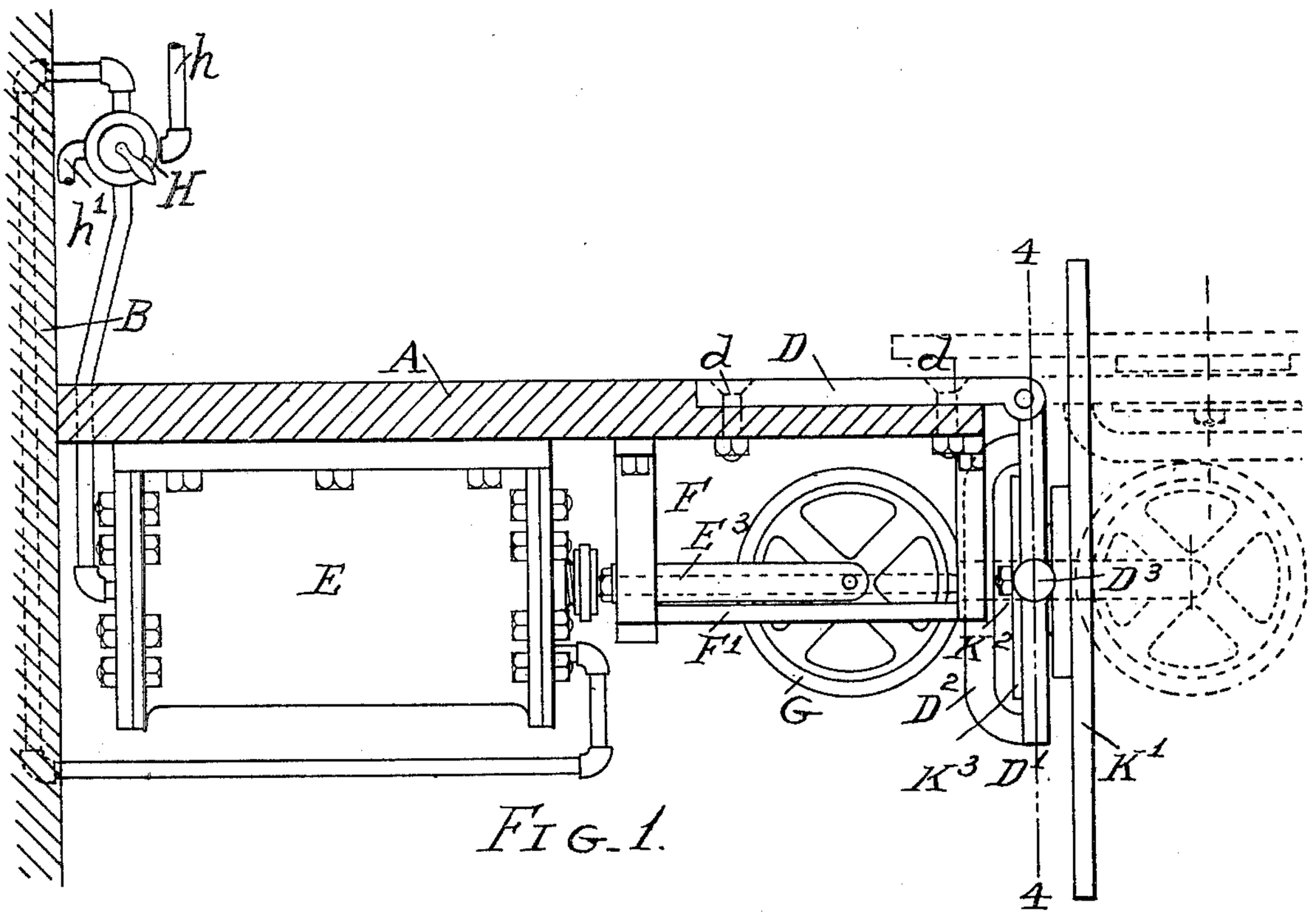

FIG. 1.

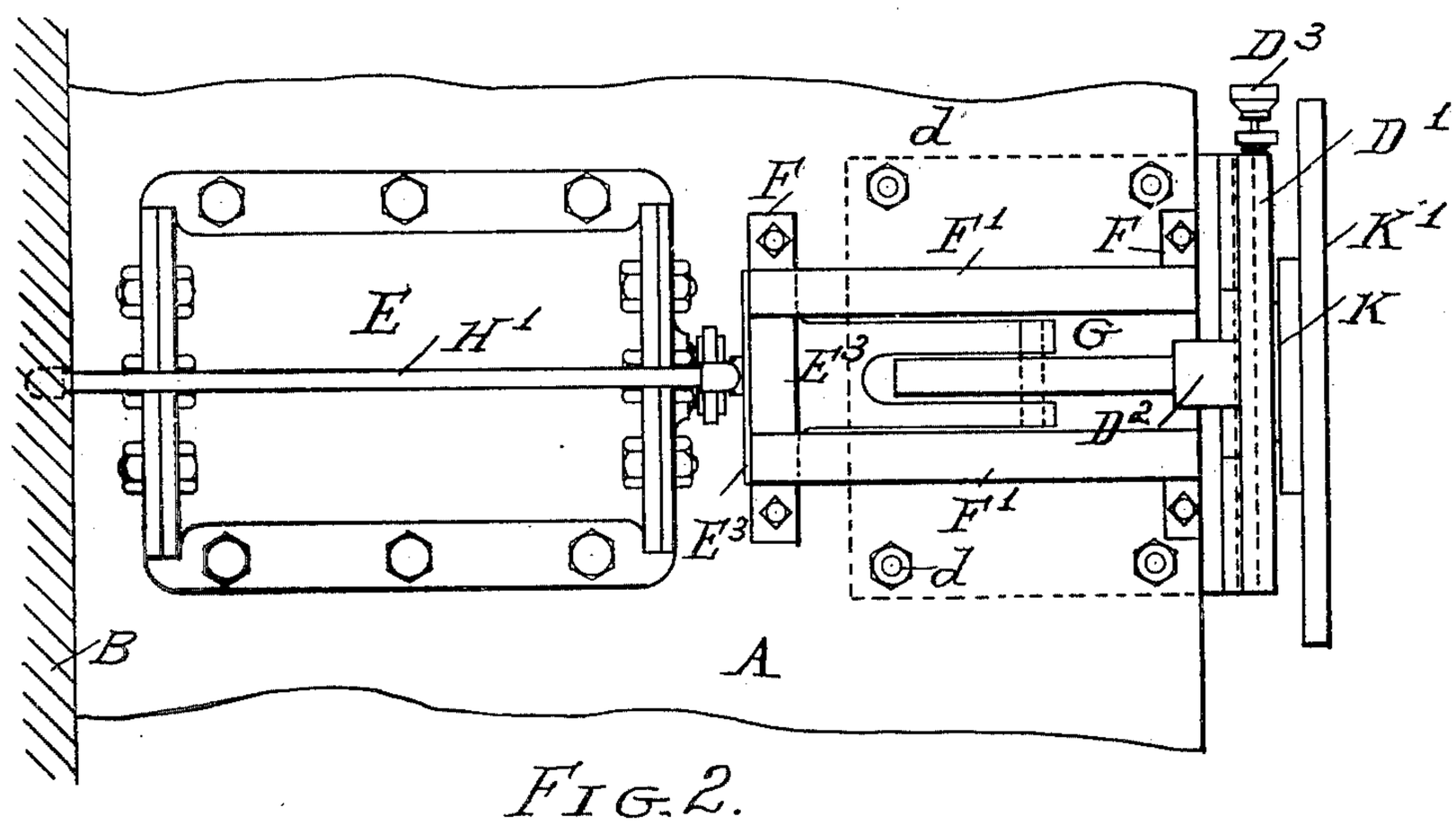

FIG. 2.

Witnesses.
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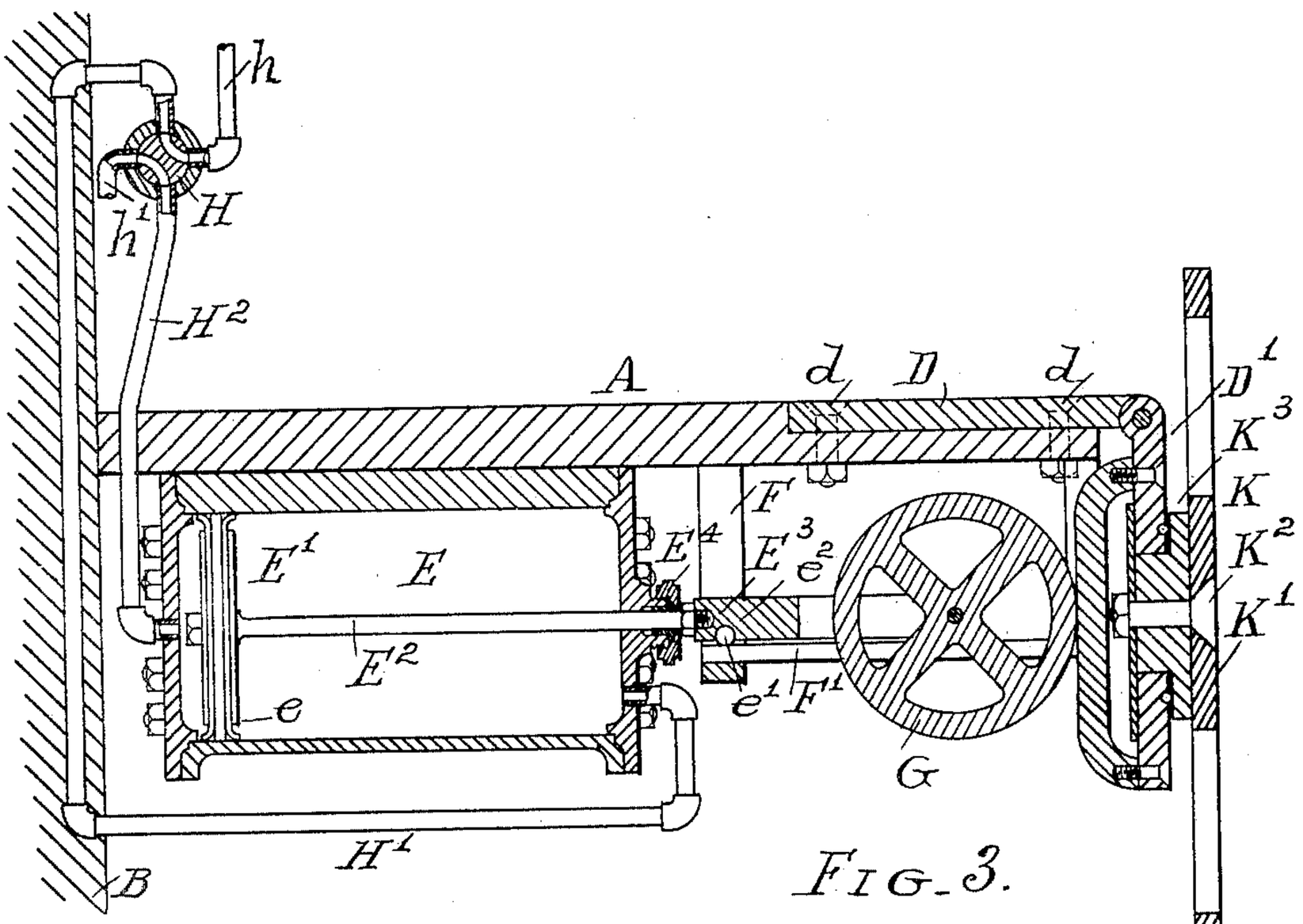

FIG. 3.

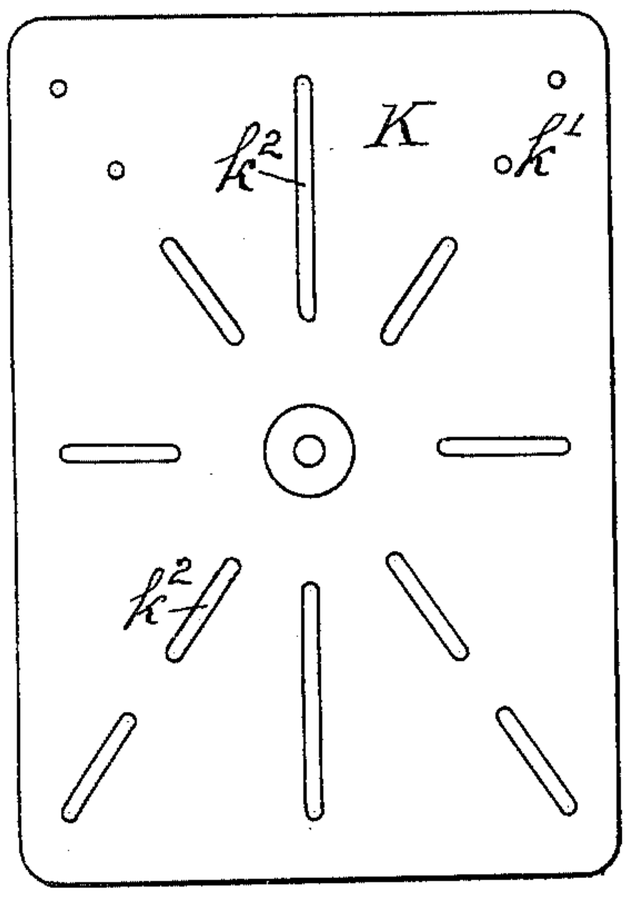

FIG. 5.

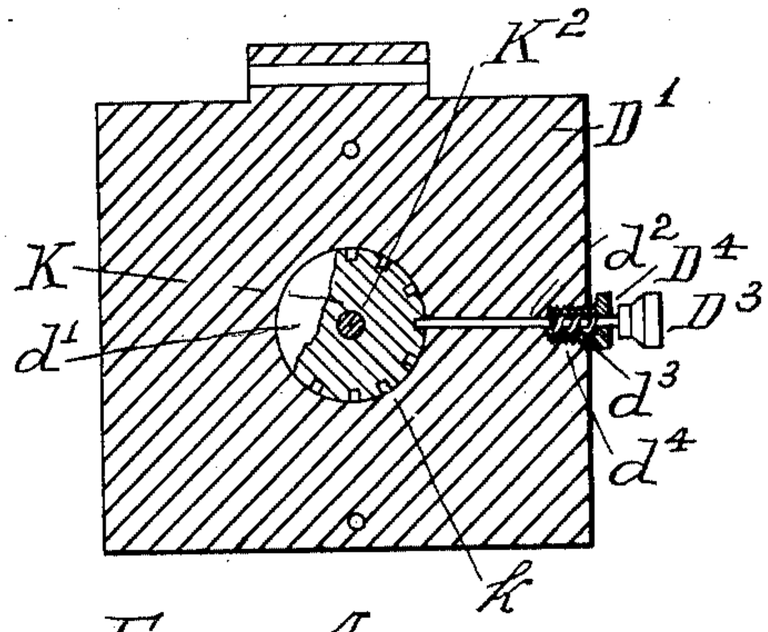

FIG. 4.

Witnesses.
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UNITED STATES PATENT OFFICE.

CHARLES H. DOEBLER AND WINFIELD S. COOPER, OF SPRINGFIELD, ILLINOIS.

PNEUMATIC LIFT FOR WORK-BENCHES.

SPECIFICATION forming part of Letters Patent No. 675,652, dated June 4, 1901.

Application filed September 4, 1900. Serial No. 28,893. (No model.)

To all whom it may concern:

Be it known that we, CHARLES H. DOEBLER and WINFIELD S. COOPER, citizens of the United States, residing at Springfield, in the county of Sangamon and State of Illinois, have invented certain new and useful Improvements in Pneumatic Lifts for Work-Benches, of which the following is such a full, clear, and exact description as will enable others skilled in the art to which it appertains to make and use our said invention.

Our invention relates to work-benches such as are used in machine-shops; and the general purpose of our invention is to provide a work-bench so constructed and arranged that bulky and heavy articles, such as pump-cylinder castings or the like, may be conveniently placed on the bench or changed in position thereon or removed therefrom by mechanical means and without the severe manual labor heretofore required in conducting such operations.

The more specific purposes of our invention are to provide a table of improved construction attachable to a work-bench and adjustable to lie in a position parallel to the top of the bench or in a position vertical thereto or in any intermediate position between the horizontal and the vertical, to provide means for adjusting said table in different positions on its support, to provide means for raising or depressing said table by air-pressure, to provide simple and effective means for controlling the air-pressure, and to provide means for reducing to the minimum the friction between the parts.

With these ends in view our invention consists of the novel features of construction and combinations of parts shown in the annexed drawings, to which reference is hereby made, and hereinafter particularly described, and finally recited in the claims.

Referring to the drawings, Figure 1 is a side elevation of the apparatus in position on a work-bench. The work-bench is shown in section, and the raised position of the table is shown in dotted lines. Fig. 2 is a plan of the apparatus in position on a work-bench as viewed from the under side. Fig. 3 is a vertical longitudinal section through the apparatus on the axis of the air-cylinder. Fig. 4 is a vertical transverse section on the line 4 4 of Fig. 1. Fig. 5 is a top plan of the table detached.

Similar letters of reference designate like parts in all of the views.

The bench A may be of any suitable and convenient form. For convenience in illustration I have shown the bench in connection with a wall B. A hinge member D is secured to the bench A by bolts *d*, and a complemental hinge member D′ is pivotally connected with the member D. On the member D′ is an approximately arch-shaped plate D^2. The plate D^2 may be integral with the member D′ or may be made separately and secured thereto. An air-cylinder E is secured in any suitable manner on the under side of the bench A. Hangers F are secured on the under side of the bench A and in line with the cylinder E and are connected by rails F′. A piston E′ slides in the cylinder E and has suitable packing-rings *e*, of leather or other flexible material. A forked cross-head E^3 is secured to the piston-rod E^2. A wheel G is mounted to turn in the fork of the cross-head, with the periphery of the wheel in rolling contact with the outer face of the plate D^2. A roller *e′* is housed and turns in a recess e^2 in the cross-head E^3 and rolls on the upper surface of the rails F and serves to prevent the cross-head from rubbing on the rails. The piston-rod E^2 slides in a gland E^4 of any suitable construction, and the gland prevents the escape of air around the rod. A three-way valve H is connected by a pipe *h* with any suitable source of air-supply. Pipes H′ and H^2 respectively connect the valve with the left-hand end and the right-hand end of the cylinder. The construction and arrangement of the valve and its connections are such that when compressed air is admitted on one side of the piston the air on the other side of the piston may escape to the atmosphere. It will be seen, then, that reciprocating movement of the piston may be produced by alternately admitting and exhausting air on opposite sides of the piston. The exhaust-air passes through the valve H and thence through the outlet-pipe *h′* to the atmosphere. A hub K, having in its periphery notches *k*, fits in a central hole *d′* in the

member D′. A bolt D^3 is slidable in a hole d^2, radial to the hub K, and the inner end of the bolt engages in the notches *k*. A spring d^3, housed in a recess d^4 in the member D′, acts to normally retain the end of the bolt D^3 in the notches *k*. A plug D^4, through which the bolt D^3 passes, screws into and closes the recess d^4. By retracting the bolt D^3 the hub may be turned in the hole *d′* to occupy any desired position and when in position may be secured by the end of the bolt entering a notch *k* in the periphery of the hub. The table K′ is secured to the hub K by a bolt K^2, passing through the table, through the hub, and through a washer K^3, abutting against the end of the hub, the arrangement and connection of the parts being such that the table may turn with the hub. The table K is pierced by a series of holes *k′* and a series of slots k^2, adapted to receive bolts or other connecting devices, by means of which the casting or other work to be operated upon may be secured to the table.

The parts being assembled, as shown in Figs. 1 and 3, the apparatus is ready for use.

The operation of the apparatus is as follows: The article to be operated upon is secured to the table K. The handle of the valve H is then turned so as to admit compressed air on the left-hand side of the piston, causing the piston E′, the piston-rod E^2, the cross-head E^3, and the wheel G, supported on the cross-head, to move to the right. As the wheel G moves to the right the perimeter of the wheel engages with the contiguous face of the plate D^2, and continued outward (right-hand) movement of the piston causes the wheel to raise the table K′ to the horizontal position shown in dotted lines, Fig. 1.

It is obvious that by proper manipulation of the valve-handle the table may be set and retained at any inclination between the vertical position (shown in Fig. 3) and the horizontal position. (Indicated by dotted lines in Fig. 1.) The table having been adjusted as above described may, by releasing the bolt D^3, be turned and set in such position as may be most convenient for the work in hand.

Having fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In an apparatus of the class described the combination of a bench, a hinge member secured thereto, a complemental hinge member pivotally connected with said first-named hinge member and a table turnable on said complemental hinge member, as set forth.

2. In an apparatus of the class described, the combination of a bench, a table having a hinge connection with said bench, and a pneumatic lifting device adapted to raise said table, substantially as set forth.

3. In an apparatus of the class described, the combination of a bench, a table having a hinge connection with said bench, a stationary air-cylinder, a piston slidable in said cylinder, means for supplying compressed air alternately on opposite sides of said piston, and a piston-rod connected with said piston and in operative relation to said table, as set forth.

4. In an apparatus of the class described, a bench, a table having a hinge connection with said bench, stationary hangers, rails connecting said hangers, a cross-head reciprocable on said rails and a wheel mounted on said cross-head and adapted to raise said table, as set forth.

5. In an apparatus of the class described, the combination of a bench, a table having a hinge connection with said bench, a stationary air-cylinder, stationary hangers and rails connecting same, a cross-head reciprocable on said rails, a wheel mounted on said cross-head in operative relation to said table, a piston slidable in said cylinder, a piston-rod connecting said cross-head with said piston, and a three-way valve connected with a source of air-supply and also intercommunicating with the interior of said cylinder at both ends thereof, as set forth.

6. In an apparatus of the class described, the combination of a bench, hangers secured thereto, rails connecting said hangers, a cross-head reciprocable on said rails and having a transverse recess, and a roller housed in the recess in said cross-head and adapted to roll on said rails, as set forth.

In witness whereof we have hereunto subscribed our names, at Springfield, Illinois, this 23d day of June, 1900.

CHARLES H. DOEBLER.
WINFIELD S. COOPER.

Witnesses:
TURNEY ENGLISH,
FRANK G. LISTER.