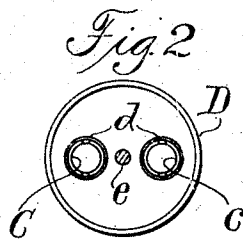


1,045,710.



Witnesses
G. Terry
M. E. Myers.

Inventor
Walter A. Kruck.
By Edwin Guthrie,
Attorney

UNITED STATES PATENT OFFICE.

WALTER A. KRUCK, OF CAMDEN, NEW JERSEY.

PNEUMATIC PIANO-ACTION.

1,045,710.

Specification of Letters Patent.

Patented Nov. 26, 1912.

Application filed March 1, 1912. Serial No. 680,900.

To all whom it may concern:

Be it known that I, WALTER A. KRUCK, a citizen of the United States, residing at Camden, in the county of Camden and State of New Jersey, have invented certain new and useful Improvements in Pneumatic Piano-Actions, of which the following is a specification.

This invention relates to pneumatic piano actions, and has for its object the improvement of the invention set forth in application for Letters Patent in the United States filed April 27, 1911, Serial No. 623,614, for pneumatic action for self-playing pianos, by combining in one structure and position the valve-operating and action-operating devices, and giving to the various parts thereof special construction and arrangement as hereinafter shown and described.

Figure 1 of the drawings herewith represents a vertical section of all parts, and Fig. 2 is a top plan of the valve-lifting piston.

The same letter refers to the same part.

Considering the drawings, the support A, which may be of wood, is provided with the suction cavity *a*. Upon the base is set the cylindrical cup B, having the hole *b* through the bottom, and secured to the base by the hollow screws C and *c*, passed through the bottom of cup B into the base A. A piston D is constructed with, usually, a pair of orifices *d* that movably fit the hollow screws externally, and the rise and fall of the piston is guided by the screws. The piston D is slightly raised on the under side, and openings, *d*, are large enough to permit the quick escape of air from beneath the piston. The piston rod *e* is also a valve rod, having at its upper end the valve F. The top of the cylinder B, in which piston D operates, is closed by the cap *f*, and the cap *f* has a central orifice with upset edge to afford a valve seat, designated by numeral 1, for the valve F. It will now be noted that cylinder B may be termed the valve-operating cylinder, and the relatively larger cylinder G, extending above it, may be called the action-operating cylinder. Within cylinder G is a piston *g*. The cylinder G is closed at the top by a cap H, which is pierced by the air-holes *h*. Centrally through cap H is passed the air tube J, and it will be observed that the central portion of piston *g* has an opening made to movably fit the tube J. The opening of the piston thus arranged about the tube is designated by the numeral 2, and, in practice

a small ring of felt 3 may be attached at the said opening 2, encircling tube J to prevent excessive entrance of air. A yoke K of any chosen form pivotally connects the piston *g* and the action-operating lever *k*. Piston *g* drops upon the cushion *j*. The note sheet L passes over the tracker M, and the tracker is connected by tube *m* with the channel N in the base A, leading to the hole *b* in the bottom of valve-operating cylinder B already mentioned.

All the cylinders, cups, caps, and pistons are in practice usually of stamped metal.

The operation of this invention may be brought on when an opening of the note sheet registers with a duct in the tracker. Air enters immediately beneath the piston D through the hole *b*, by reason of the fact that the cylinder B is maintained in a state of partial vacuum through the communication established by the hollow screws C and *c* with the suction cavity *a*. The valve F is raised into contact with the lower end of tube J, thus closing cylinder G below piston *g* to the atmosphere. The air being exhausted beneath piston *g* it descends and actuates lever *k*. When the note sheet again covers the duct in the tracker, air is taken from beneath piston D, which can no longer sustain the valve F in its uppermost position closing tube J, and the valve F is re-seated in the position shown in the drawing, and the partial vacuum in cylinder B and below piston D is reestablished. At the same time air enters tube G below piston *g*, which is lifted again into the attitude illustrated. The parts are now ready for a repetition of the operation.

It will be observed that the pistons are without packing. In practice they are made to fit the cylinders movably, but not closely enough to bind, and piston D is so formed as to permit the air to escape from below it through the openings *d*, as freely as may be desired to permit perfect action.

Having now described this invention and explained the manner of its operation, what I claim is:—

1. In a pneumatic piano action, the combination with a support having a suction cavity, of a valve-operating cylinder arranged on said support, a piston arranged in said cylinder, a tracker, means constructed to connect the tracker and said cylinder below the piston, means constructed to connect said suction cavity and cylinder

above said piston, means constructed to close the top of said cylinder and provided with a valve seat, a valve arranged to occupy said valve seat, said valve being connected with and operated by said piston, an action-operating cylinder arranged in axial alinement with said valve-operating cylinder and provided with a piston, an air tube passing through the piston in said action-operating cylinder, the lower end of said tube being constructed and arranged as an upper seat for said valve, a lever, and pivotal connections between the lever and the piston in said action-operating cylinder.

2. In a pneumatic action, the combination with a support having a suction cavity, of a valve-operating cylinder arranged upon said support, a piston arranged in said cylinder, a tracker, means constructed to connect the tracker and said cylinder below the piston, means comprising hollow screws passing through said piston and the bottom of said cylinder whereby said suction cavity is connected with the cylinder above said piston, means constructed to close the top of said cylinder and provided with a valve seat, a valve arranged to occupy said valve seat, said valve being connected with and operated by said piston, an action-operating cylinder arranged in axial alinement with said valve-operating cylinder and provided with a piston, an air tube passing

through the piston in said action-operating cylinder, the lower end of said tube being constructed and arranged as an upper seat for said valve, a lever, and pivotal connections between the lever and the piston in said action-operating cylinder.

3. In a pneumatic piano action, the combination with a valve-operating cylinder and an action-operating cylinder arranged in axial alinement and each having a piston, of a tracker, means constructed to connect the tracker and the valve-operating cylinder below its piston, a suction chamber, means constructed to connect the suction chamber and valve-operating cylinder above its piston, means provided with a valve seat and constructed to partition one cylinder from the other, a valve constructed to occupy said seat and connected with the piston in said valve-operating cylinder, an air tube having one end located in said action-operating cylinder below its piston and arranged as a second seat for said valve, and a lever pivotally connected with the piston in said action-operating cylinder.

In testimony whereof I affix my signature in presence of two witnesses.

WALTER A. KRUCK.

Witnesses:

H. R. GEORGE,
BEN S. BROWN.