

No. 742,170.

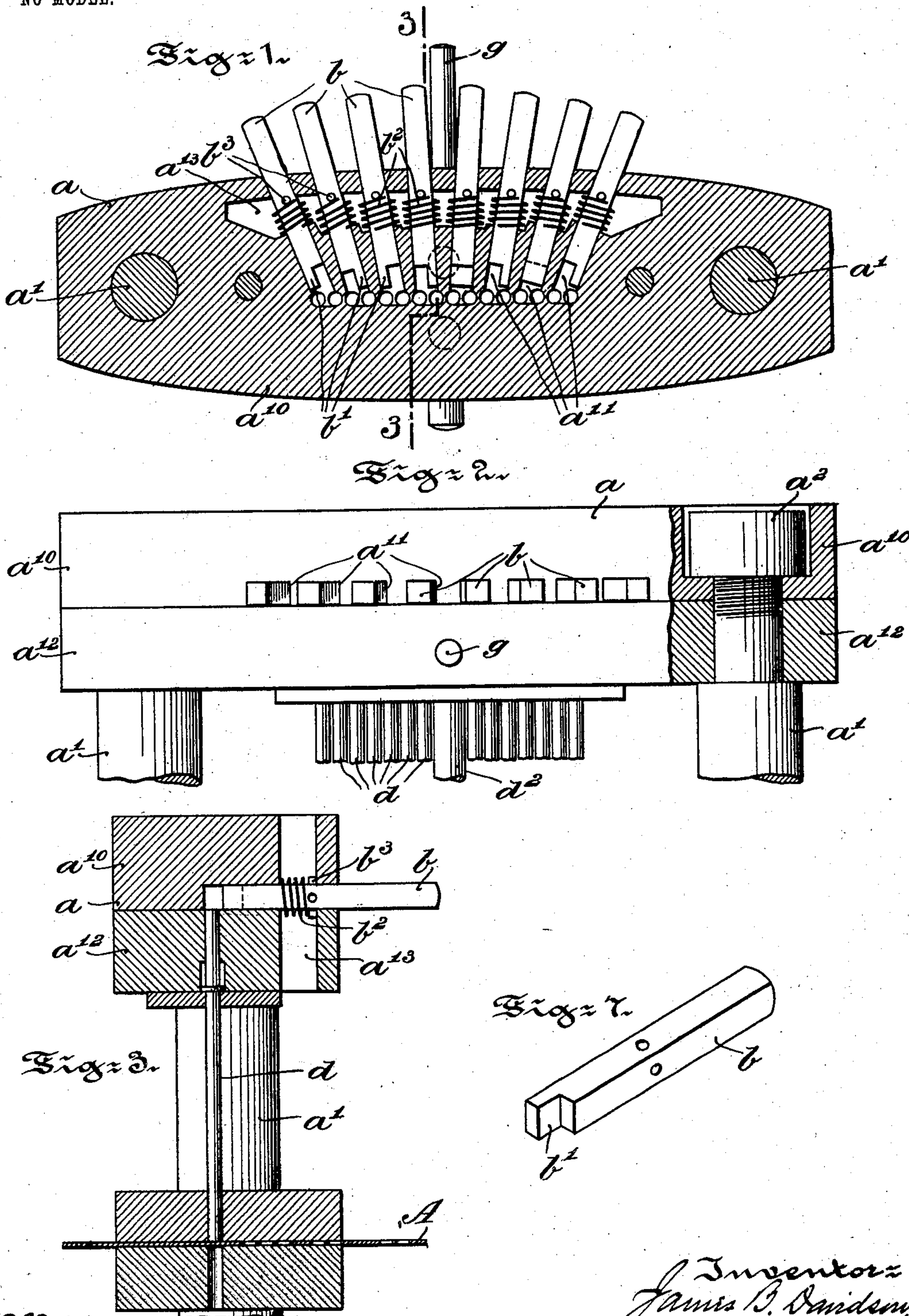
PATENTED OCT. 27, 1903.

J. B. DAVIDSON.
PIANO CARD PUNCHING MACHINE.

APPLICATION FILED APR. 23, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses
Jos. C. Wolmenith.
Wilhelm Vogt

Inventor:
James B. Davidson,
By J. Walter Douglas
Attorney.

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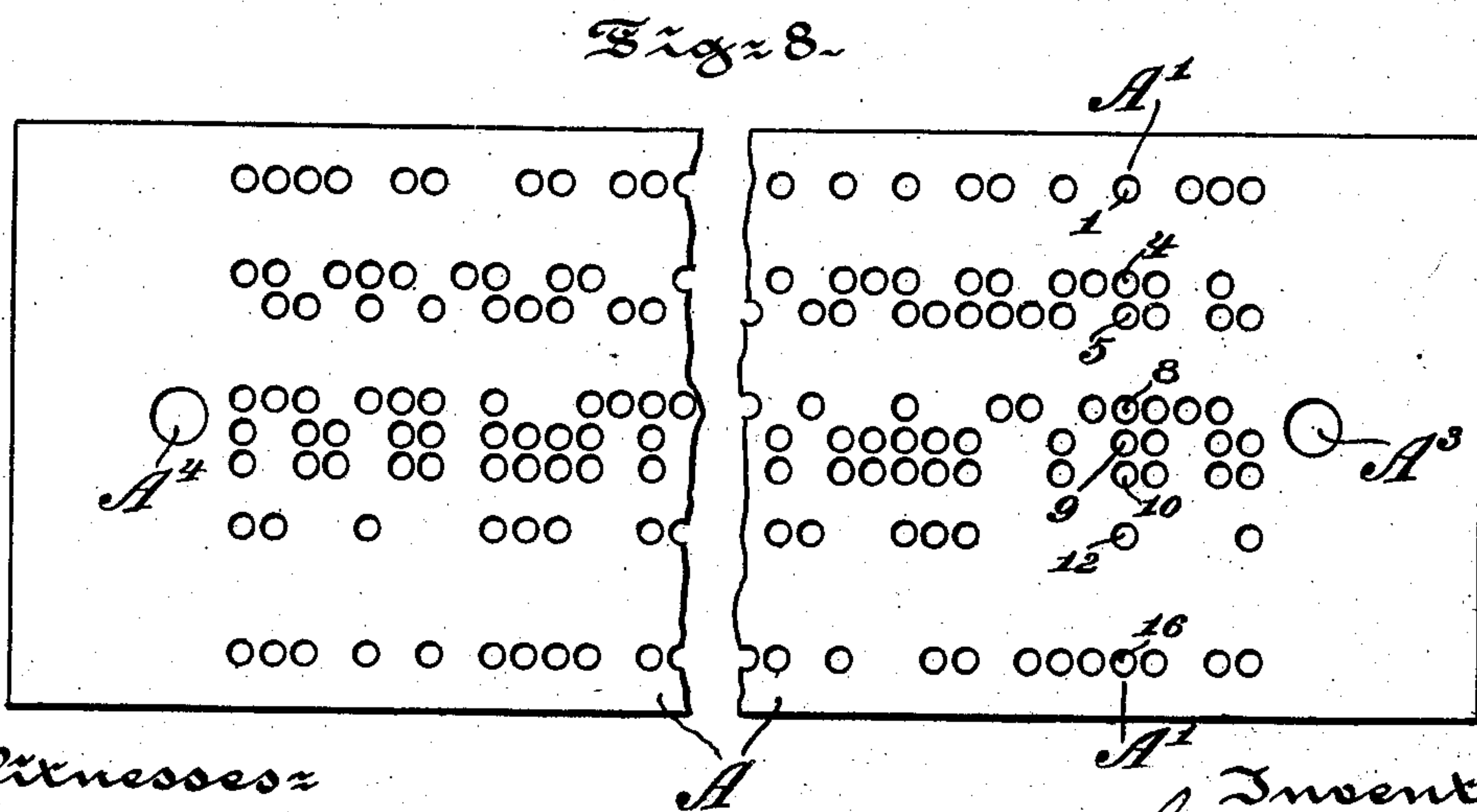
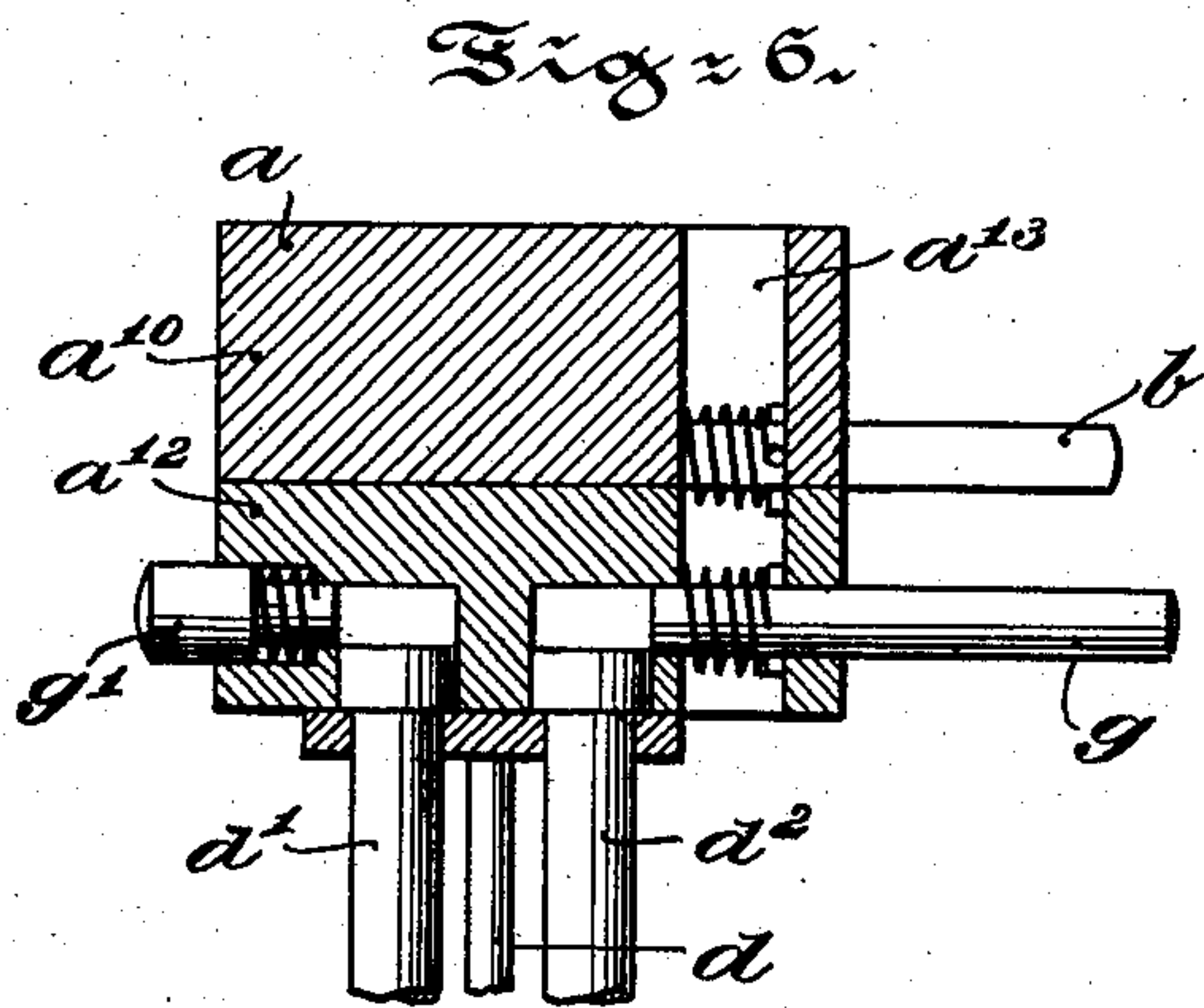
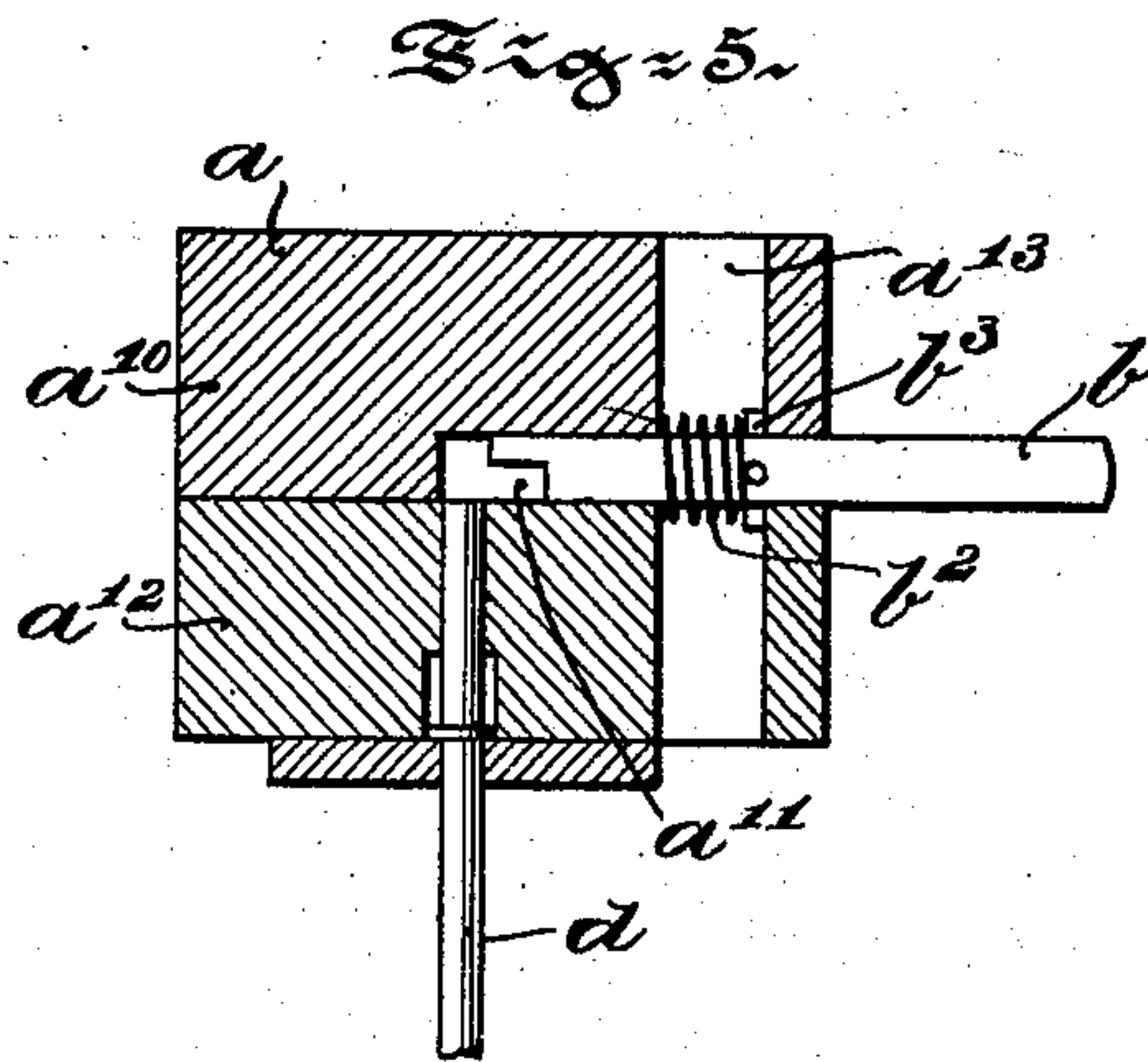
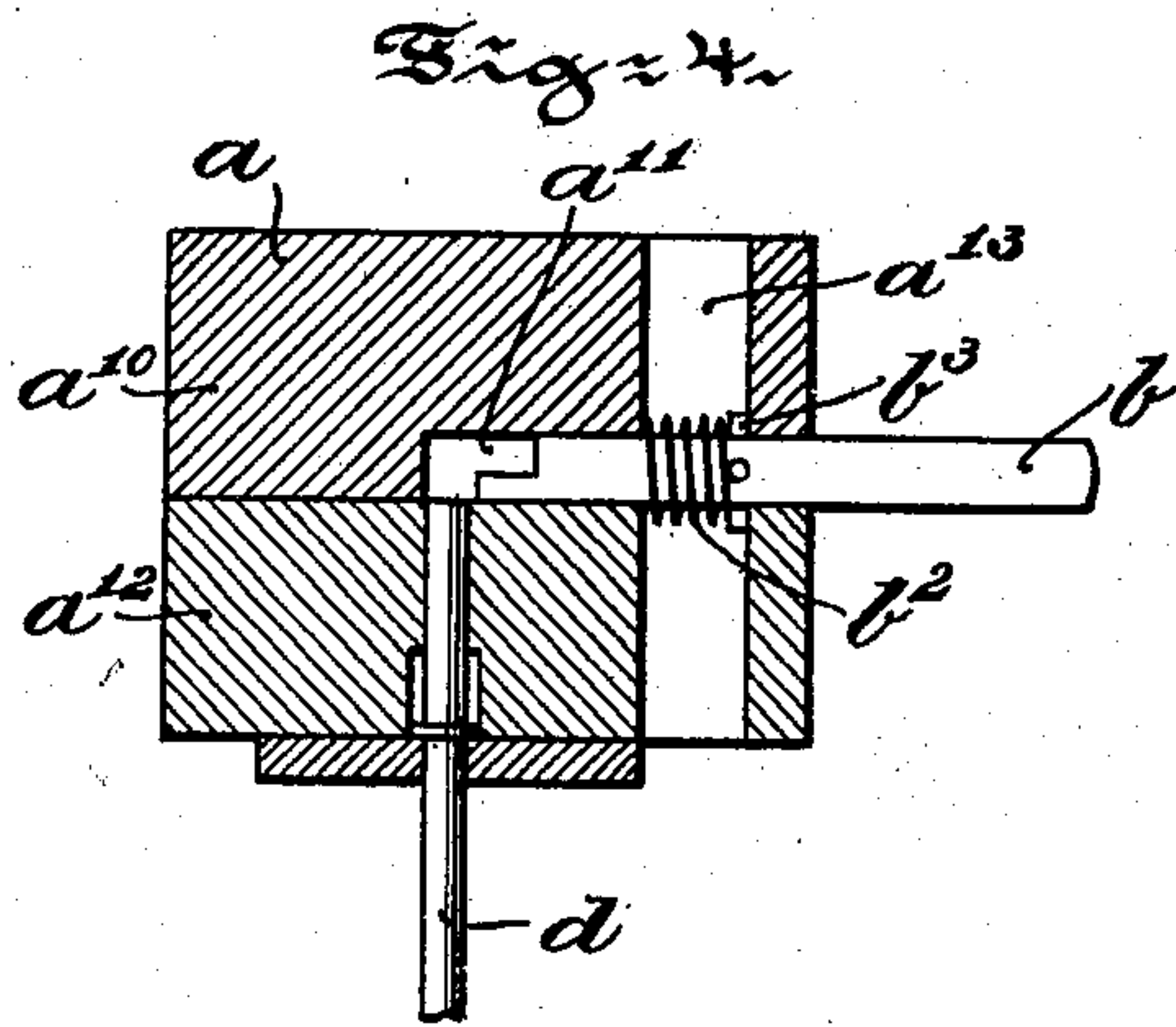
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2 SHEETS—SHEET 2.



Witnesses:
Jas C. Woburnith
Wilhelm Vogt

Inventor:
James B. Davidson,
By J. Walter Dugan
Attorneys

UNITED STATES PATENT OFFICE.

JAMES B. DAVIDSON, OF PHILADELPHIA, PENNSYLVANIA.

PIANO CARD-PUNCHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 742,170, dated October 27, 1903.

Application filed April 23, 1903. Serial No. 153,882. (No model.)

To all whom it may concern:

Be it known that I, JAMES B. DAVIDSON, a citizen of the United States, residing at the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Piano Card-Punching Machines, of which the following is a specification.

My invention has relation to that class of card-punching machines known as "piano-machines," in which rows or banks of punches are arranged under control of levers or push-keys; and in such connection it relates to the construction and arrangement of the mechanism controlling the punches of such a machine.

In machines having more than eight punches for use in punching cards with regular and irregular holes it was customary to provide each punch in series with a separate key or lever controlling the locking of the punch to the head carrying all the punches. In such a construction the manipulation of the keys was an intricate and a difficult operation, requiring skilled operators and keen oversight to prevent mistakes. Again, it was customary to have in the head a single punch for punching the peg-holes of the card, and where the holes were to be punched at the beginning and ending of the card with this single peg-hole punch it was necessary to shift or manipulate the card so that the punch usually punching a back peg-hole could punch the front peg-hole. This shifting or manipulation of the card was a delicate operation, requiring also skilled operators and a keen oversight of the work.

The principal objects of my present invention are twofold. First, there is provided a single lever or push-key, which by a simple adjustment may control either one of two adjacent punches or may control both of said punches to make the same operate or to make both inoperative. With such an arrangement a simplification of the control of the punches is secured by lessening the number of levers or push-keys and a wider variation in the combinations of punches to be operated is secured. Second, there is provided an additional peg-hole punch and push-key or lever, the punch being arranged back of the regular punches and manipulated or con-

trolled by a special key back of the regular punch keys or levers. With this additional key the accurate cutting of the back peg-hole may be obtained by a comparatively unskilled operator without a shifting of the card in the machine.

The nature and scope of my invention will be more fully understood from the following description, taken in connection with the accompanying drawings, forming part hereof, in which—

Figure 1 is a horizontal sectional view of the head or block of a piano card-punching machine, illustrating the regular punches and the levers or push-keys controlling the same, the mechanism shown embodying main features of my invention. Fig. 2 is a rear elevational view, partly sectioned, of the head or block and auxiliary parts. Fig. 3 is a vertical sectional view on the line 3-3 of Fig. 1. Figs. 4 and 5 are views corresponding to Fig. 3, but illustrating certain adjustments of the regular punch-key. Fig. 6 is a central vertical sectional view illustrating the front peg-hole punch and key and the additional back peg-hole punch and key. Fig. 7 is a perspective view of one of the keys or levers, and Fig. 8 is a plan view of a card punched by the machine.

In the drawings only the head or punch-carrying portion of the machine, together with such auxiliary parts as are necessary to understand the present invention, have been illustrated.

The head a is attached to the machine by the rods a' and operated in the usual manner. For the sake of convenience of construction it is formed of two blocks clamped together by the rods a' and nuts a^2 on said rods. On the under surface of the top block a^{10} is cut grooves or channels a^{11} , which are square in cross-section, and in these grooves are located the levers or push-keys b . In the lower block a^{12} are supported in any well-known manner the series of punches d and the front peg-hole punch d' and rear peg-hole punch d^2 , which extend from the block at right angles to the levers or keys b . In the drawings the punches d are illustrated as sixteen in number, the keys or levers b being one-half that number, or eight in all. The head a is vertically slotted, as at a^{13} , for a

purpose hereinafter described. Each key b is substantially square-shaped in cross-section and has at its inner end a rectangular projection b' , as clearly illustrated in Fig. 7.

5 By turning the key or lever b and inserting it into a channel a^{11} , so that its inner rectangular end projects into the path of two adjacent punches d , the key or lever b may be used to lock both of said punches to the head a , as illustrated in Fig. 4, or when turned one hundred and eighty degrees and then inserted into the channel a^{11} the rectangular end b' may clear both adjacent punches d , and thus release the same from the head a , as clearly illustrated in Fig. 5. Again, by turning the key

15 b ninety degrees from the position shown in either Figs. 4 or 5 the end of the key b when said key is inserted into a channel a^{11} may be projected into the path of either of said punches d , as illustrated, for instance, in Fig. 3. In Fig. 1 of the drawings the varying positions of the keys b are illustrated. Thus numbering the punches d from 1 to 16 from the left to the right in said figure the

25 first key b is designed when pressed inward to lock punch number 1 to the head a and to leave punch 2 free. The second key b is designed to lock punch 4 to the head and to leave punch 3 free. The third key b locks punch 5 to the head and leaves punch 6 free. The

30 fourth key locks punch 8 and leaves punch 7 free. The fifth key b locks both punch 9 and punch 10 to the head. The sixth key b locks punch 12 to the head and leaves punch 11 free. The seventh key b leaves both punch 13 and punch 14 free in the head, and the eighth key b leaves punch 15 free in the head and locks punch 16. In the arrangement shown in Fig. 1 when all the keys are pressed inward

40 into the head the punches numbered 1, 4, 5, 8, 9, 10, 12, and 16 will perforate the card A , as indicated on the row A' of perforations on said card A in Fig. 8. The keys b should be so arranged in the head a that they may be readily

45 removable from the channels a^{11} and yet may when in position in said channels a^{11} be normally retracted from the path of the punches d . To secure this arrangement, upon the body or shank of each key b is coiled a spring

50 b^2 , all the springs lodging in the vertical recess or slot a^{13} of the head and bearing at one end against the block a^{12} and at the other end against one or more pins b^3 , inserted in the body or shank of the key b and readily removable therefrom. To change the adjustment of a key b , all that is necessary is to first withdraw the pin or pins b^3 and then draw out the key b from its channel a^{11} . In inserting the key b in its new position the shank is

60 passed through the spring b^2 and the pins b^3 inserted to confine the spring between the pins b^3 and block a^{12} . A second feature of my invention resides in the provision of a back peg-hole punch d^2 , controlled by a lever

65 or push-key g , projecting from the back of the head. This punch d^2 and its key g is in addition to the front peg-hole punch d' and

its key g' , and the preferred arrangement is illustrated in Fig. 6. The key g traverses the lower block a^{12} to a point immediately in the rear of the line in which the regular punches d are arranged, and the punch d^2 , controlled by said key g , is arranged in a plane parallel to the plane of the regular punches d , but back of the same. With this additional back

75 peg-hole punch d^2 and its controlling key or lever g the back peg-hole A^3 may be punched in the card A when the first row of regular holes is punched in said card and without shifting the card in the head. The front peg-hole A^4 is punched, as heretofore, by the front

80 peg-hole key d' at the time the last row of regular holes is punched in the card.

Having thus described the nature and objects of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a card-punching machine, a series of regular punches arranged in pairs, and a single key for each pair of punches, said key adapted to engage either one or both of said punches in the pair, substantially as and for the purposes described.

2. In a card-punching machine, a head, a series of regular punches depending from said head, and a series of keys arranged in said head, each key arranged to control a pair of adjacent punches so as to lock either one or both of said punches to said head.

3. In a card-punching machine, a head, a series of regular punches arranged in pairs in said head, a key arranged to control a pair of punches, said key having a shank and a rectangular end projecting from said shank and adapted when turned in said head to lock either or both of the punches in said pair to the head.

4. In a card-punching machine, a head, a series of regular punches depending from said head, a series of keys controlling said regular punches, a front peg-hole punch projecting from the head in front of the regular punches, a key controlling said front peg-hole punch, a rear peg-hole punch projecting from the head in back of the regular punches, and a key controlling said rear peg-hole punch.

5. In a card-punching machine, a head, punches depending from said head, keys arranged in said head so as to normally leave all the punches free to move in said head and adapted when operated to lock either one or the other of a pair of punches or both or neither of the same to said head.

6. In a card-punching machine, a head, punches depending from said head, keys arranged in said head so as to normally leave all the punches free to move in said head and having an end so formed that the same when operated is adapted to lock either one or the other of a pair of punches or both or neither of the same to said head.

7. In a card-punching machine, a head, a series of punches depending from said head, and a series of keys arranged in said head, each key adapted to control the operation of

a pair of punches or one of a pair of punches, at one time.

5 8. In a card-punching machine, a head, a series of punches depending from said head, and a series of keys arranged in said head, each key adapted according to the position given said key to control either one of a pair of punches or both of the pair or to render
10 action on one of the pair of punches inoperative, or both of said punches inoperative.

9. In a card-punching machine, a head having punches suitably connected with said head, and keys in said head so arranged as that in operation the same are adapted to be
15 brought into engagement with either or both of a pair of punches according to the position of each key, and said key adapted to be shifted into a position, whereby action on one of a pair or a pair of punches is prevented.

20 10. In a card-punching machine, a head having punches suitably connected therewith, and keys, each of which is square in cross-section, and that portion adapted to engage a punch or pair of punches undercut whereby
25 either one or both of a pair of punches is or are adapted to be actuated by each key or

both of the pair of punches are adapted to be rendered inoperative by such key, depending upon the particular position of the key in the head.

30 11. In a card-punching machine, a head, a series of punches suitably connected with said head, and a series of keys arranged in said head, each key being square in cross-section and provided with an uncut end, means
35 for normally holding each key in an inoperative position and out of action with respect to the punches, the construction and arrangement being such that each key is adapted to engage either one or both of a pair of punches
40 at a time, according to the shifted position of the key, and also of being shifted into a position whereby engagement of one or both of a pair of punches is prevented.

45 In testimony whereof I have hereunto set my signature in the presence of two subscribing witnesses.

JAMES B. DAVIDSON.

Witnesses:

J. WALTER DOUGLASS,
THOMAS M. SMITH.