

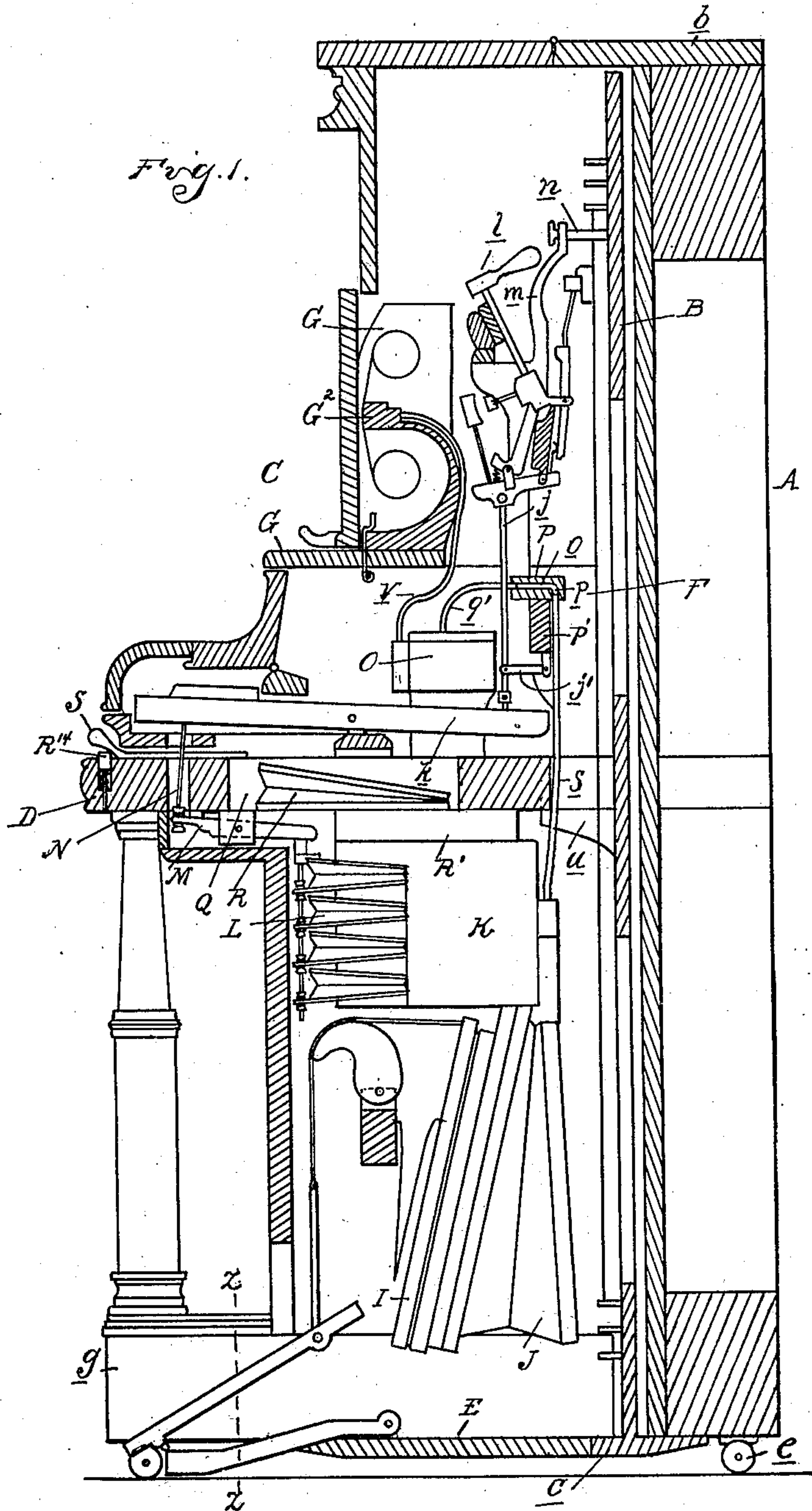
No. 897,331.

PATENTED SEPT. 1, 1908.

A. E. WHITEHEAD.
MECHANICAL MUSICAL INSTRUMENT.

APPLICATION FILED OCT. 17, 1904.

5 SHEETS—SHEET 1.



Witnesses
A. L. Hobby
Jas. P. Barry

Inventor
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By James Whittemore
att'y.

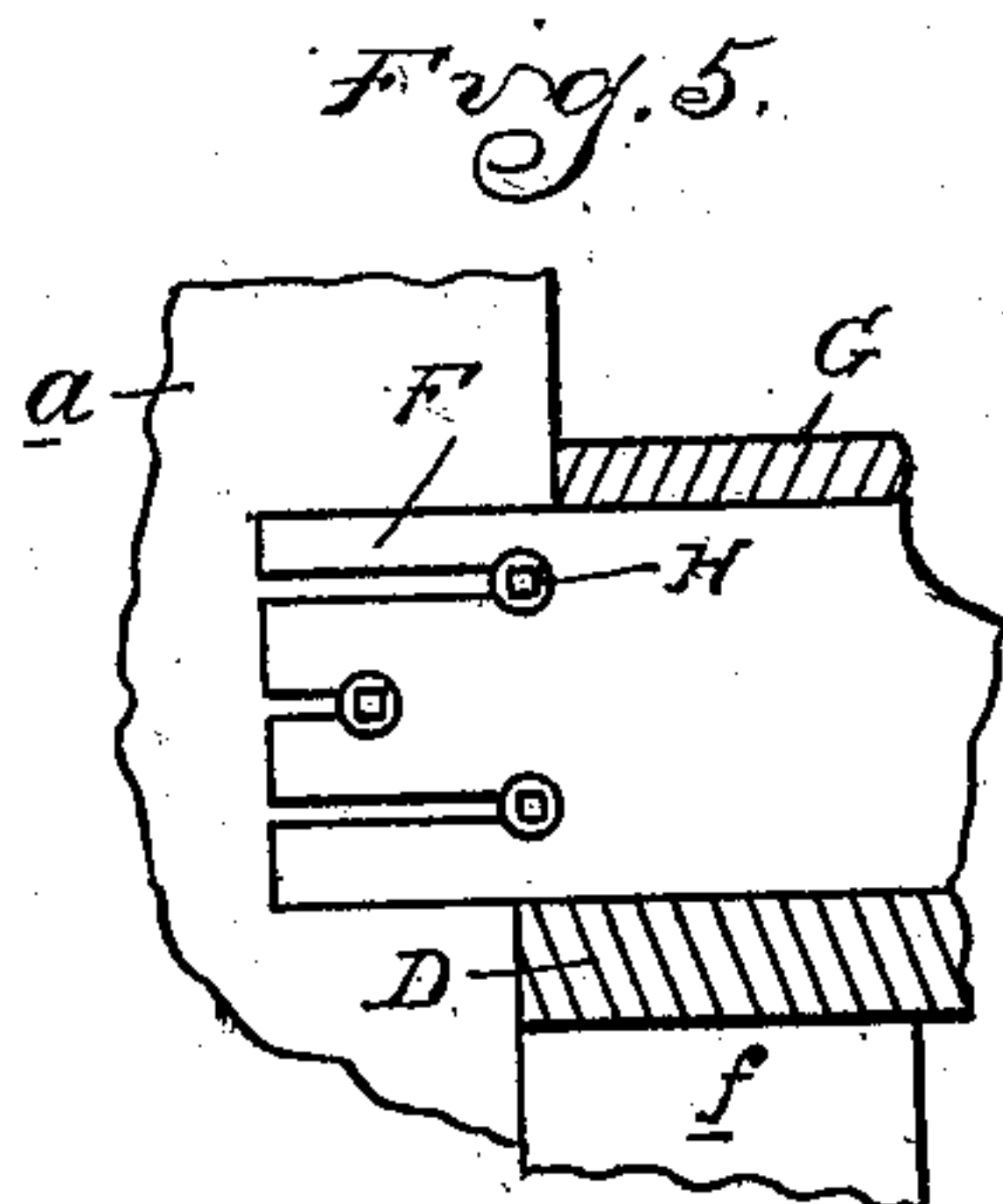
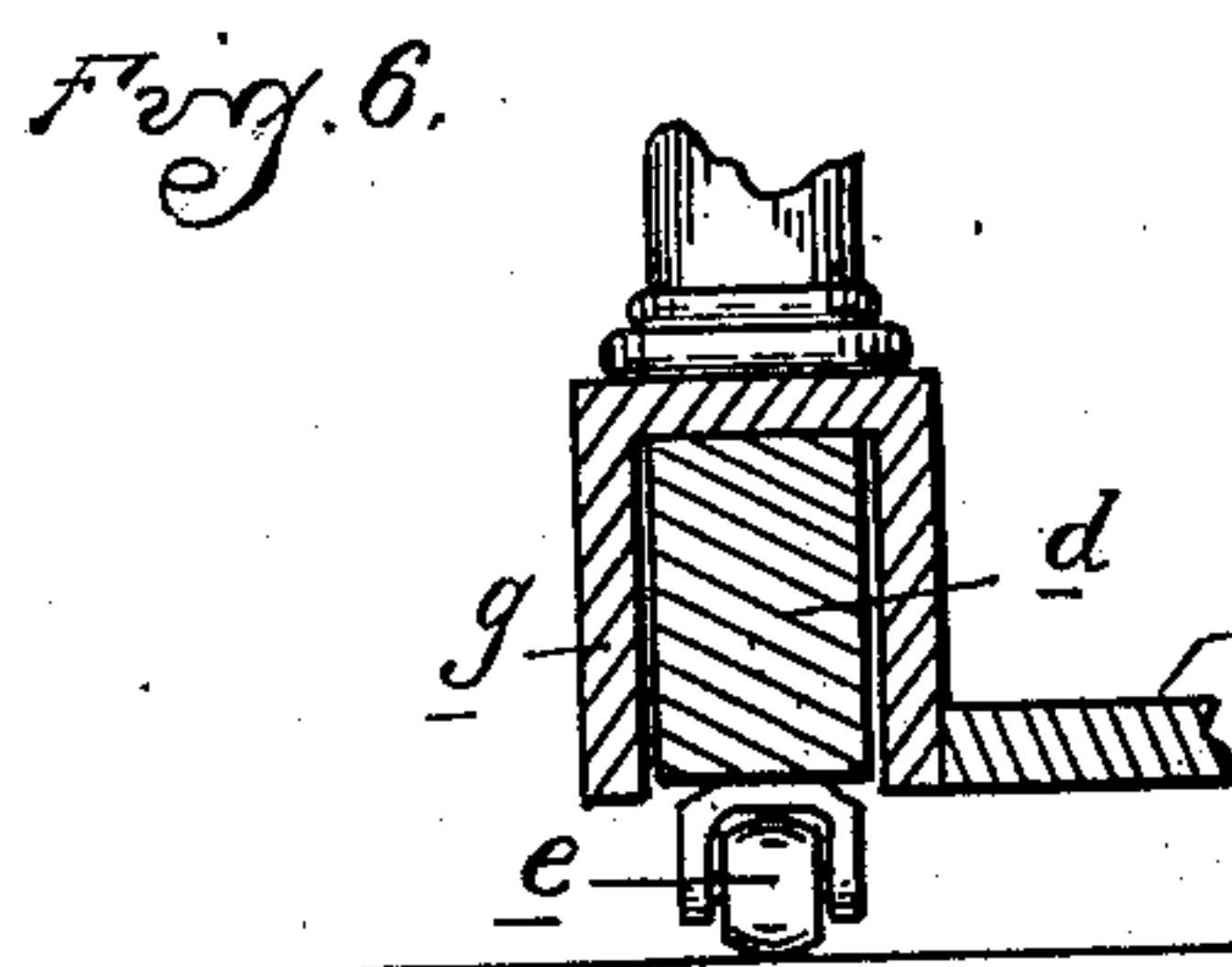
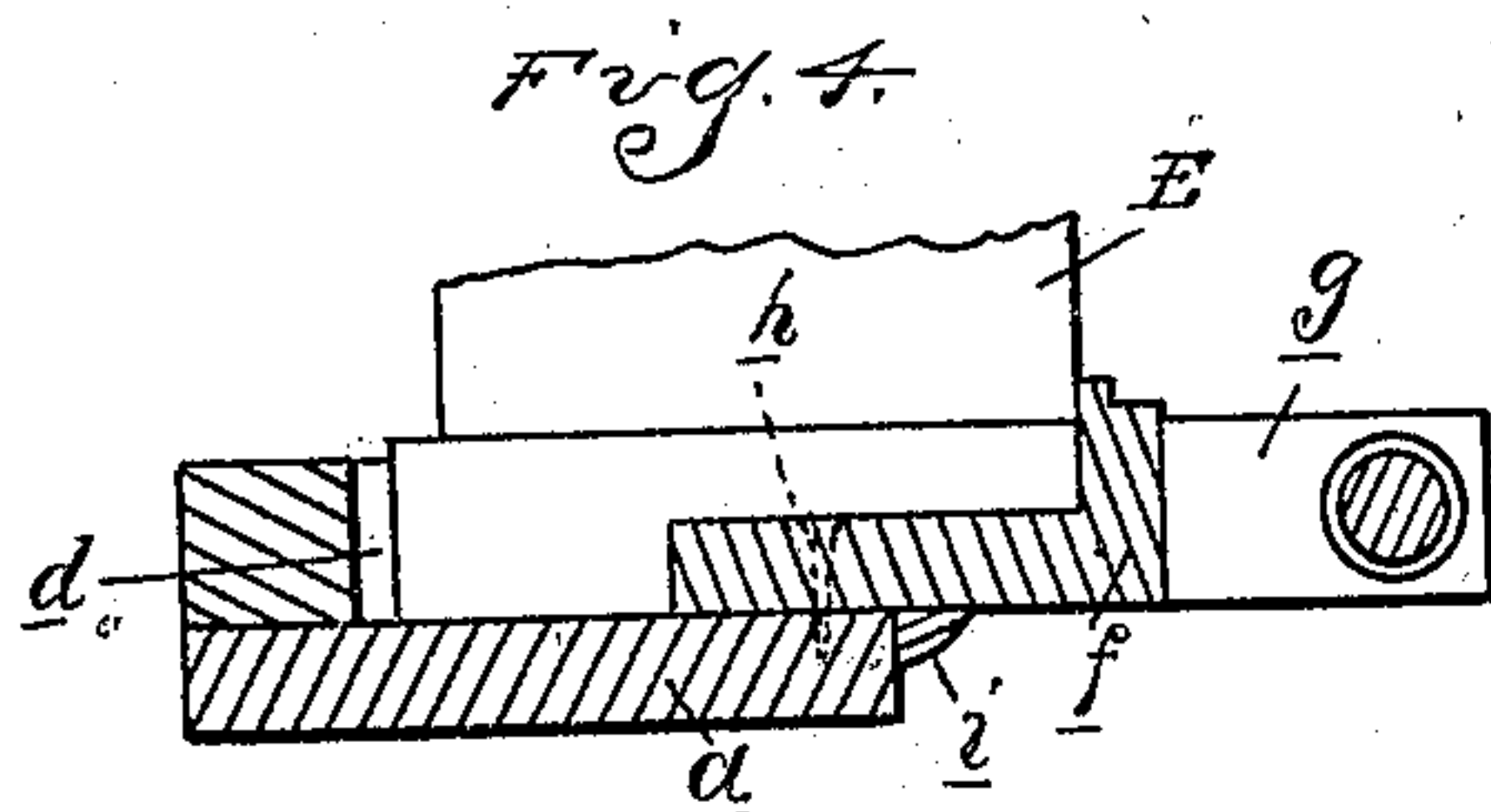
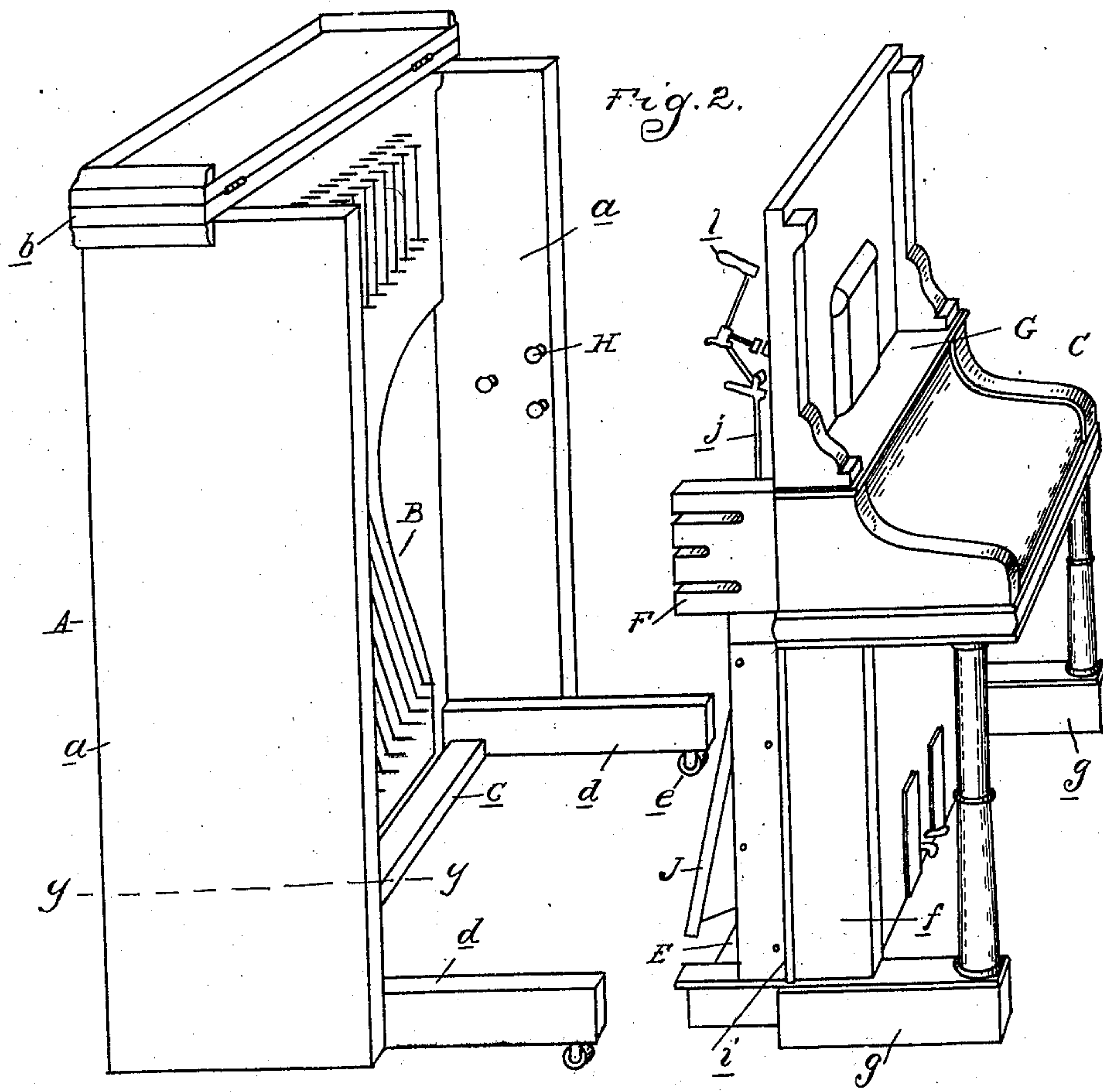
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5 SHEETS—SHEET 2.



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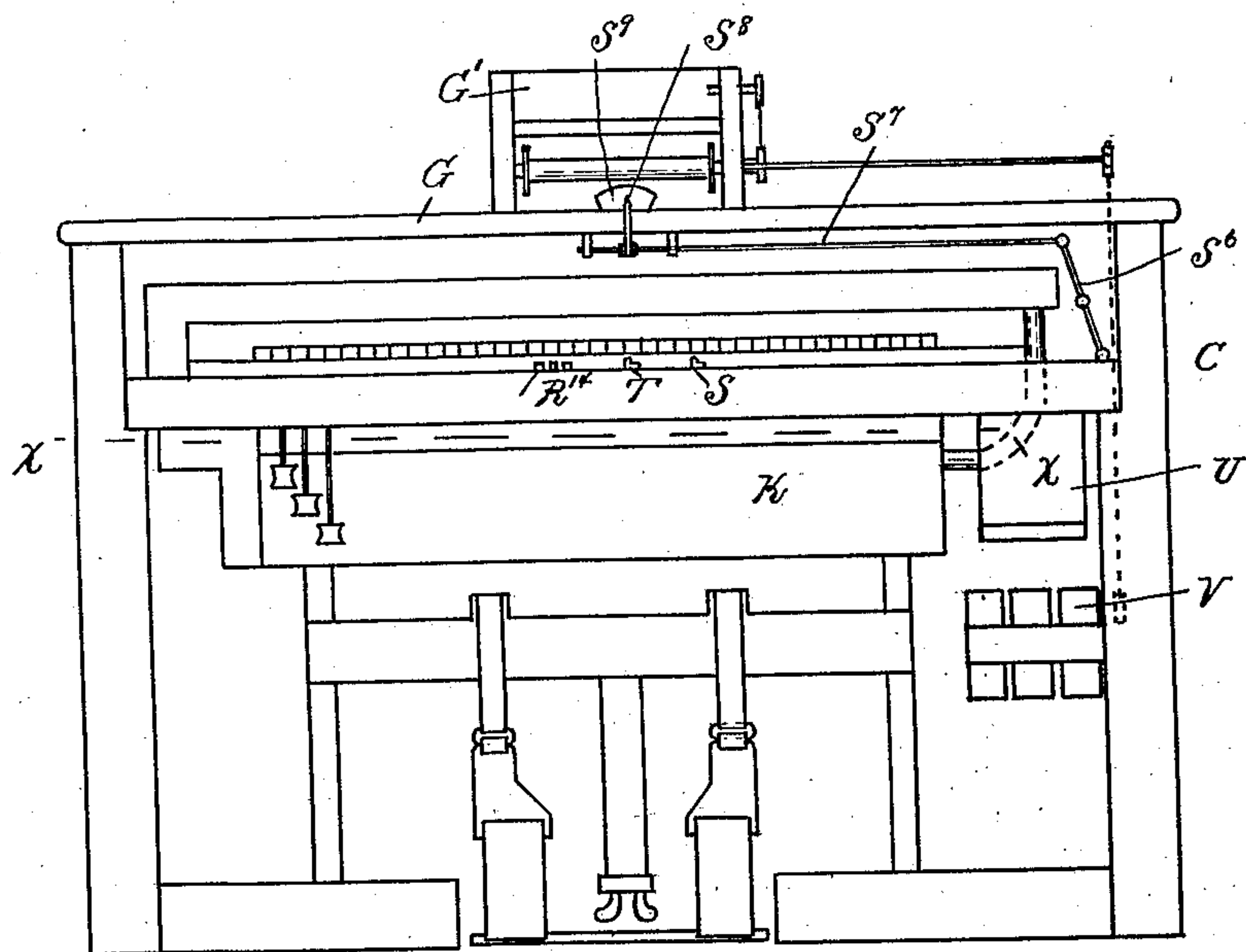
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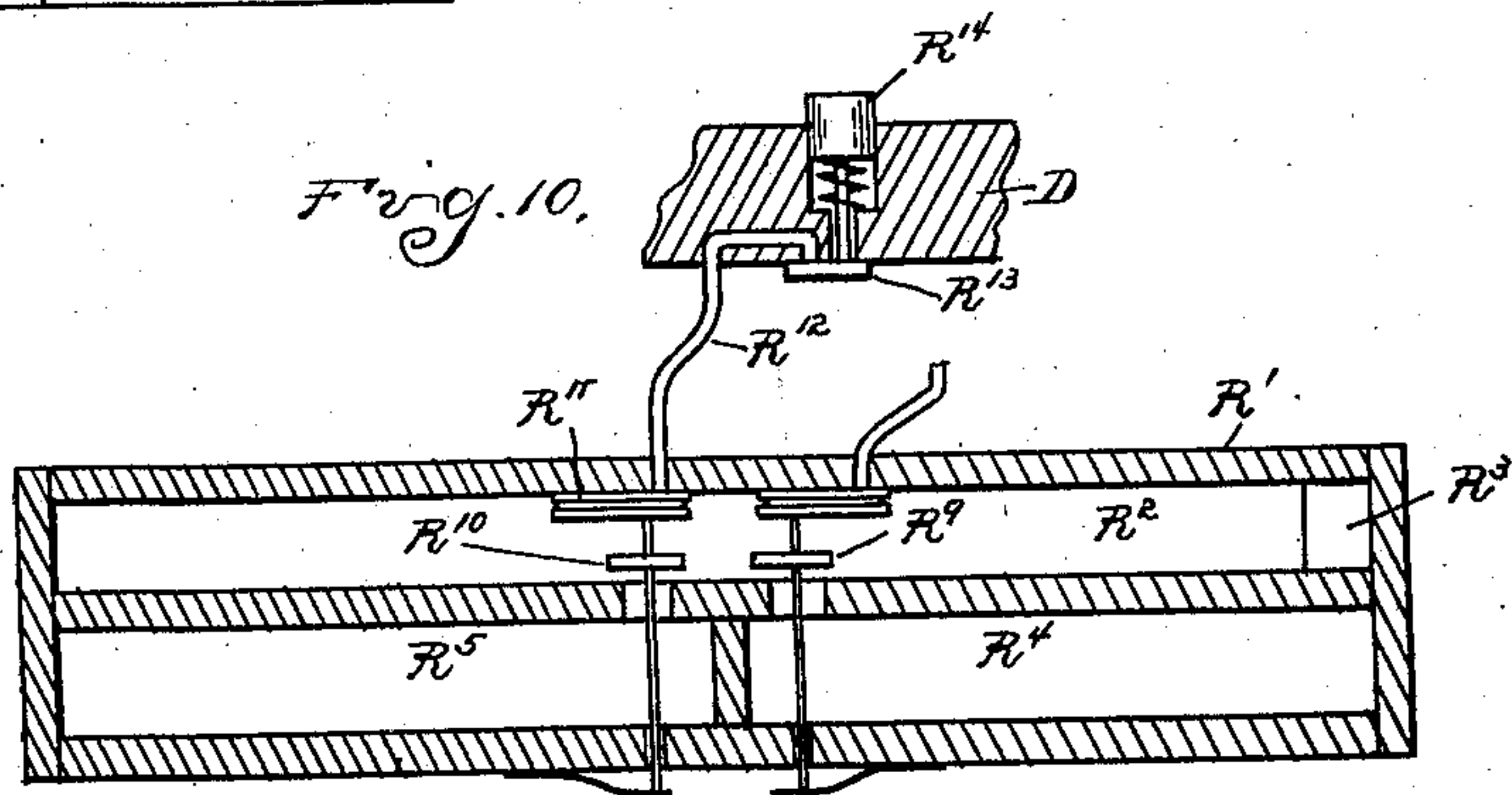
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5 SHEETS—SHEET 3.

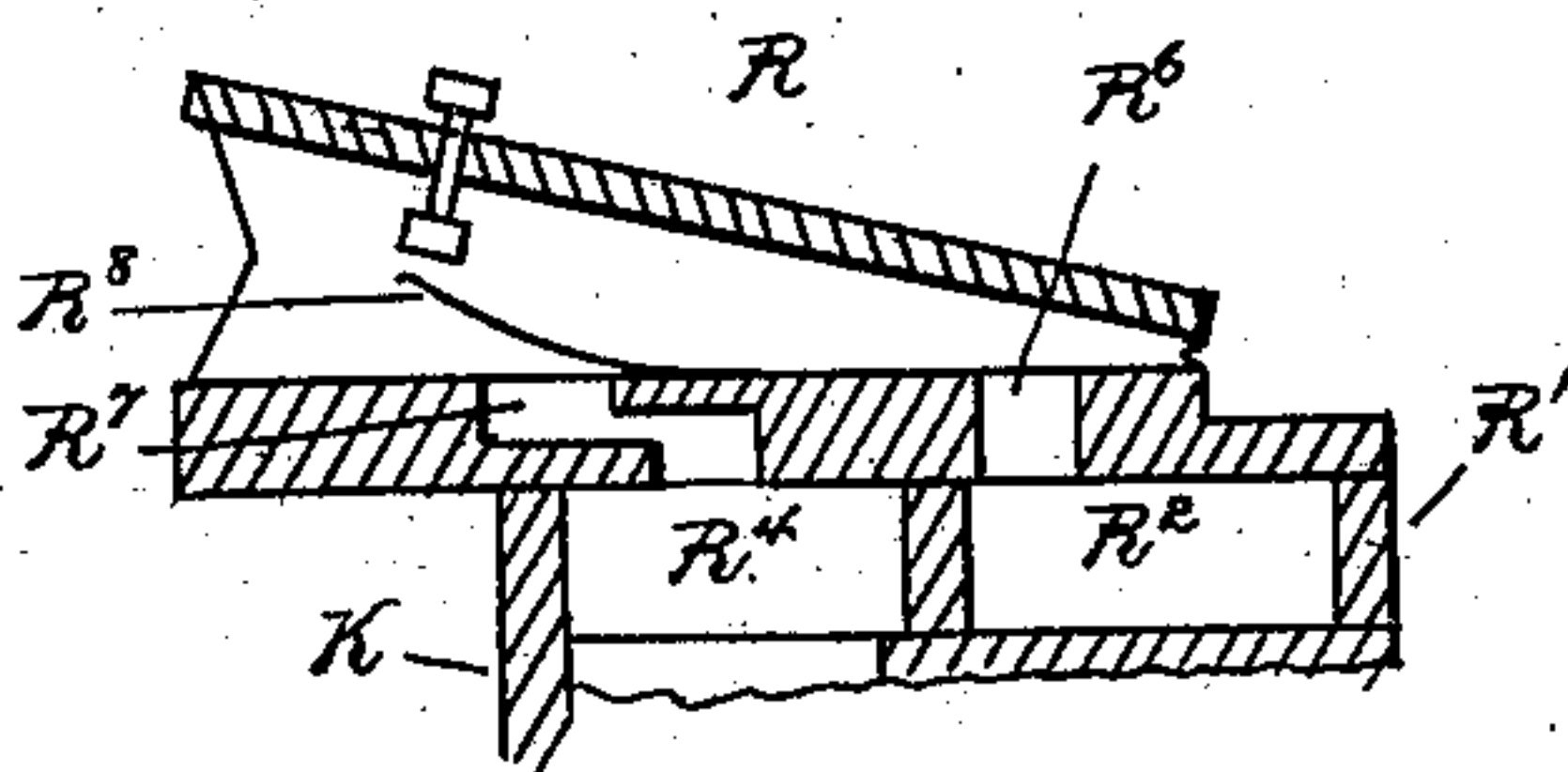
Frīg. 3.



Fr. 10.



Fv g. 11.



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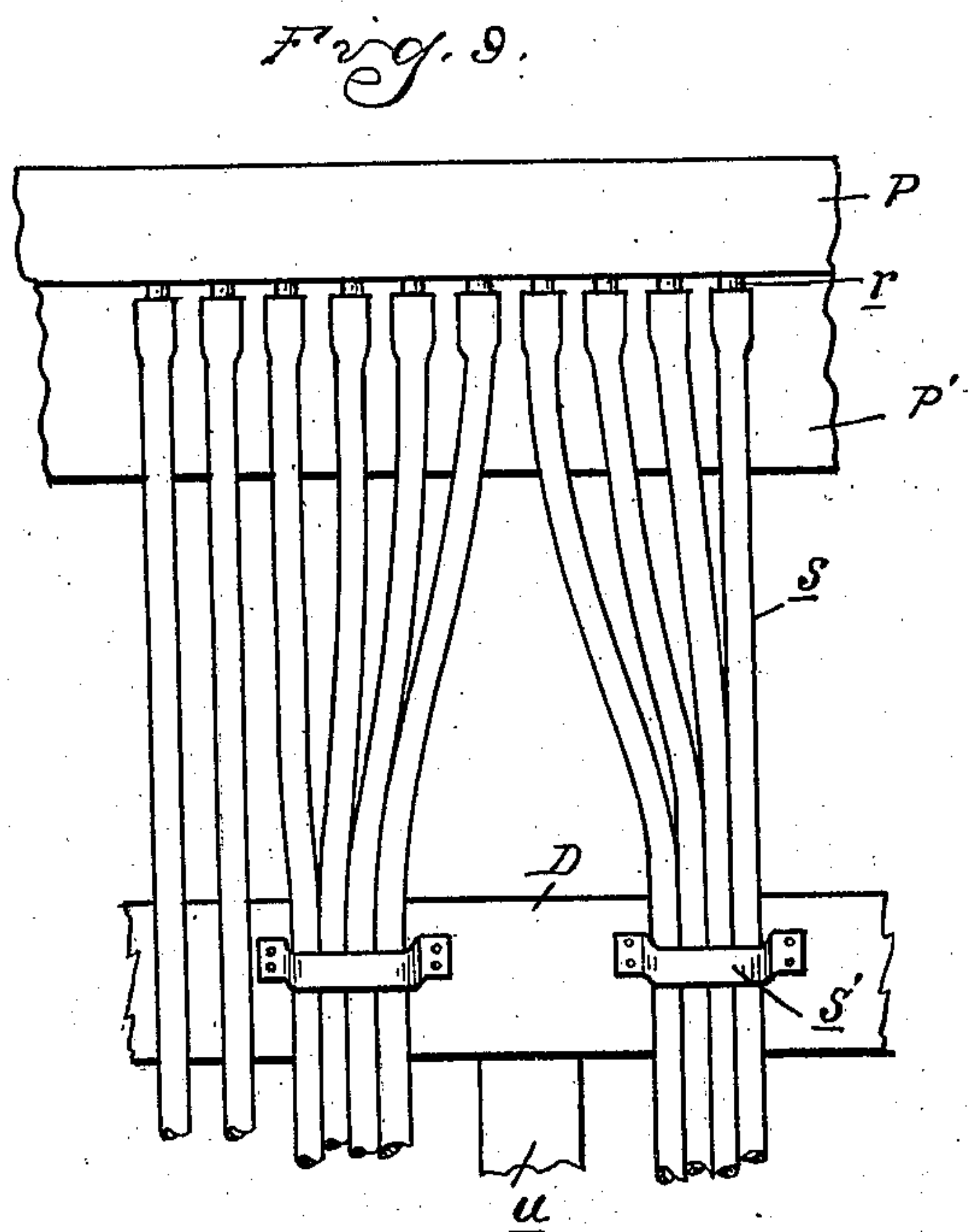
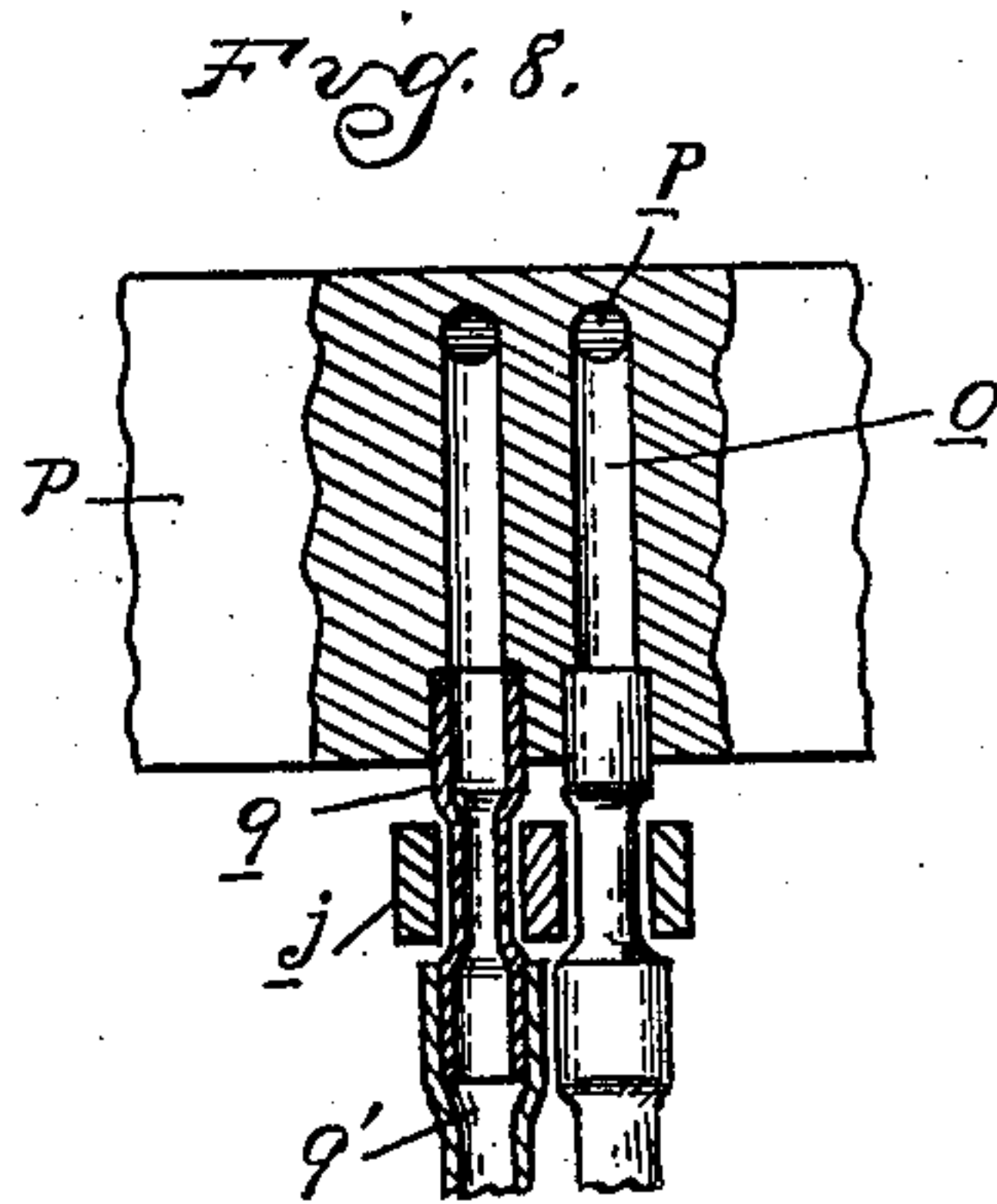
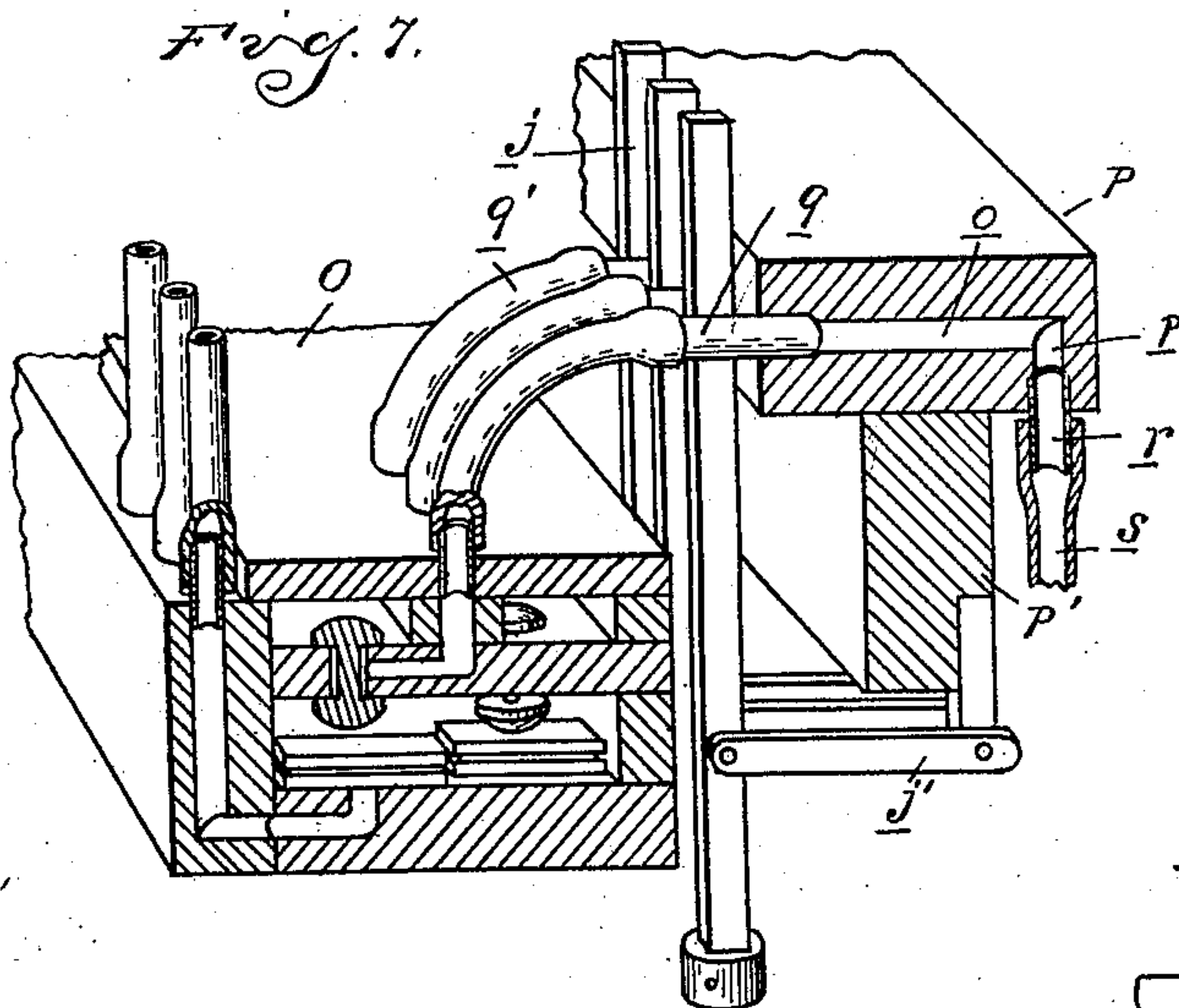
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5 SHEETS—SHEET 4.



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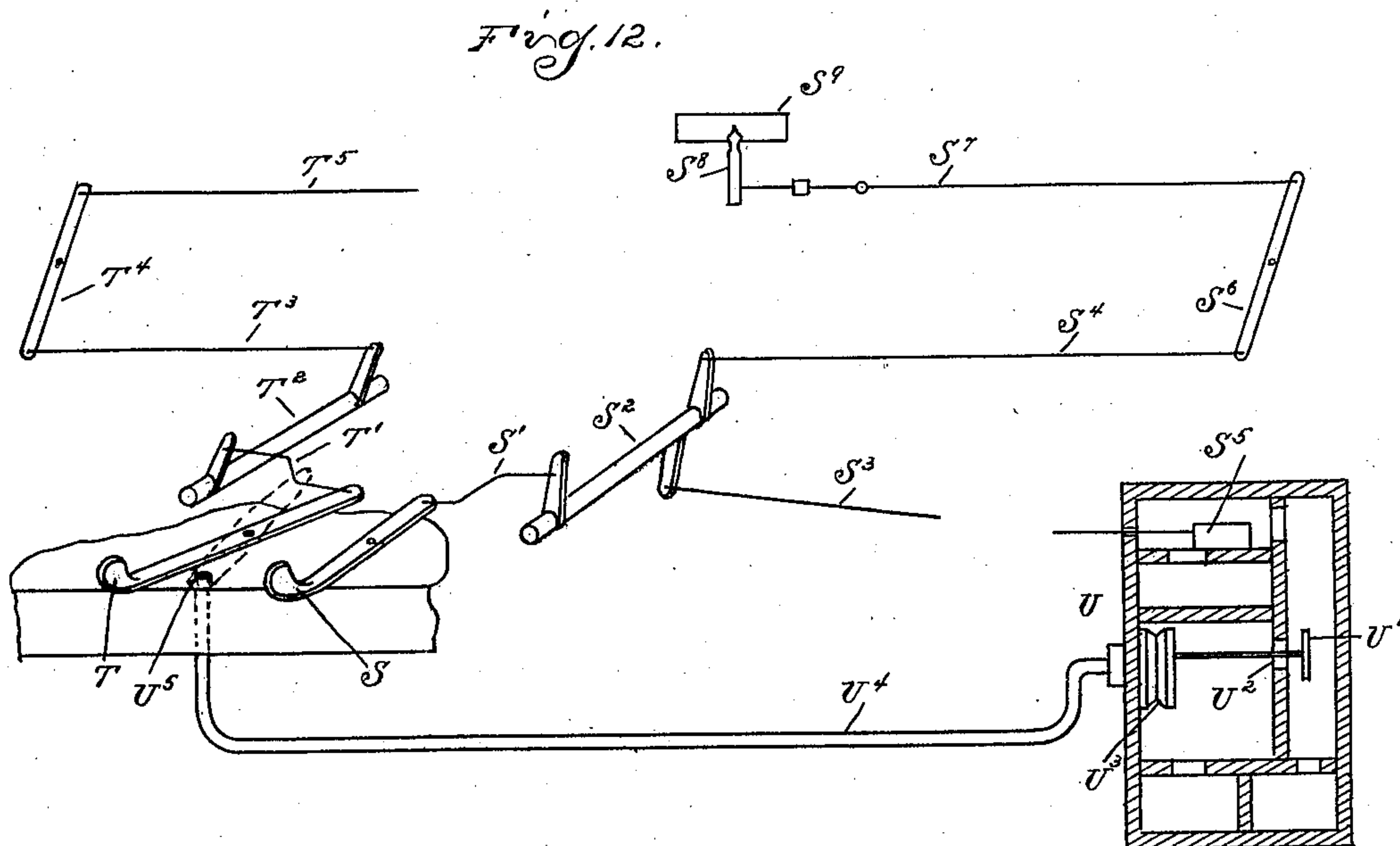
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PATENTED SEPT. 1, 1908.

A. E. WHITEHEAD.
MECHANICAL MUSICAL INSTRUMENT.

APPLICATION FILED OCT. 17, 1904.

6 SHEETS—SHEET 5.



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Inventor
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Att'y.

UNITED STATES PATENT OFFICE.

AURA E. WHITEHEAD, OF DETROIT, MICHIGAN, ASSIGNOR TO FARRAND ORGAN COMPANY,
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MECHANICAL MUSICAL INSTRUMENT.

No. 897,331.

Specification of Letters Patent.

Patented Sept. 1, 1908.

Application filed October 17, 1904. Serial No. 228,791.

To all whom it may concern:

Be it known that I, AURA E. WHITEHEAD, residing at Detroit, in the county of Wayne and State of Michigan, a citizen of the United States, have invented certain new and useful Improvements in Mechanical Musical Instruments, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to mechanical musical instruments, with more particular reference to self-playing pianos.

The invention consists in the peculiar construction of a separable sectional case, in which the parts of the instrument are mounted; further, in the peculiar construction of the automatic playing mechanism and in the arrangement thereof in relation to the manually operated action and, further, in the peculiar construction, arrangement and combination of parts, as hereinafter set forth.

In the drawings, Figure 1 is a vertical cross section through the instrument. Fig. 2 is a perspective view of the two separate sections of the case, together with the parts respectively mounted thereon. Fig. 3 is a front elevation of the instrument with the front members of the case removed. Fig. 4 is a horizontal section, substantially on line $y-y$ of Fig. 2, through one of the side walls of the case, showing the manner of securing the separable sections thereof. Fig. 5 is an elevation of the inner face of said side wall, illustrating the securing devices. Fig. 6 is a cross section on line $z-z$ of Fig. 1. Fig. 7 is a sectional perspective view of the primary valve chest and pneumatic connections therefor. Fig. 8 is a sectional view of a portion of Fig. 7. Fig. 9 is a rear elevation thereof. Fig. 10 is a horizontal section on line $x-x$ of Fig. 3, illustrating the valves and the operating connections for the regulators. Fig. 11 is a cross section through one of the regulators. Fig. 12 is a diagrammatic view, illustrating the tempo regulating mechanism and the controlling devices for the winding mechanism.

One of the primary objects of the invention is to obtain a construction of piano which may be either manually or automatically operated and which is contained within a case which is but slightly larger than that of the ordinary piano. To attain this end,

it is necessary to arrange the various parts of the automatic and manually operated action very compactly, utilizing all available space within the case.

It is another object of the invention to obtain a construction, the parts of which are so arranged within the case as to be easy of access for adjustment or repairs.

With these objects in view, I have provided a case for my improved instrument which is separable in the longitudinal plane into two sections. One of these sections contains the harp or frame, sounding board and strings of the piano, while the other section has mounted therein all of the parts of the action, both manual and automatic.

As shown, A is the rear section of the case which comprises the sides a , the top b and bottom c , within which is mounted a harp B. This section also contains the supporting base for the entire instrument, which latter consists of base cross bars d , projecting forward from the sides a and provided at their forward ends with the supporting casters e . These bars extend substantially the full width of both sections of the case and form the support upon which the forward section of the case rests.

C is a front section of the case. This is formed of the sides f , which at their lower ends rest upon a box rail g adapted to telescopically engage with the cross bars d .

D is the key bed which extends between the sides f and is rigidly attached thereto at its opposite ends.

E is a bottom board which extends between the box rails g .

F are cheek plates arranged above the key bed D and projecting adjacent to the inner faces of the sides a of the case section A.

G is a horizontal board or shelf connecting the cheek plates F, forming the usual support for the music rack.

The sections A and C of the case are united to each other by clamping screws H, which engage with slots in the inwardly projecting portions of the cheek plates F and secure the latter to the sides a of the case section A. The sections are preferably further secured by screws h which attach an inwardly projecting portion of the sides f , under-lapping the sides a . The joint between the sections is concealed by a molding i , secured to the sides f which abuts against the forward edge

of the sides *a*. Thus, the section C will be separated by sliding on the rails *g* and has its side portions normally securely fastened to the sides of the section A, so as to form a single case.

The manual action for the piano is all supported on the key bed and is removable with the section C of the case. This action may be of any suitable construction, comprising the usual up-rights *j*, which engage with the key levers *k* and operate the hammers *l* and other parts associated therewith. The frame *m*, which supports this action is preferably attached to the harp frame when the two sections of the case are together, by means of the clamping screws *n*.

The automatic playing action comprises the pumping and store bellows I and J which are arranged in the section C of the case and above the base board E. Above these parts is a valve chest K for the key actuated pneumatics L, the latter being arranged in a plurality of tiers beneath the key bed and actuating the key levers through an intermediate connection. This connection, which forms no part of my invention, is shown as comprising the levers M, fulcrumed on the under side of the key bed and the flexible connection N passing through the slot in the key bed and connected to the forward ends of the keys. Thus, whenever the pneumatics are operated, the corresponding levers M will be rocked and will pull upon the connection N to draw down upon the connecting keys. As has been stated, it is an object of my invention to limit the size of the case as much as possible over the size of the ordinary piano case. To attain this result, the front board of the case is moved slightly outward from the position it would occupy with the ordinary piano, thereby providing space beneath the key bed for the parts I, J and K, which has been described. There is not, however, sufficient space to permit of placing in the valve box K the entire pneumatic action. The primary pneumatics are therefore arranged above the key bed and the keys thereon, and are connected by tubes with the chest K.

The primary pneumatics and valves controlled thereby are preferably arranged in the chest O, which extends longitudinally of the instrument above the keys and is supported at its opposite ends upon the case section C. As the keys completely bar passage for the pneumatic connections directly from the chest O to the chest K and as it is not desirable to cut away these keys sufficient to provide for such connections, I preferably first pass the tubes rearward between the up-right rods *j* of the piano action and then downward in rear of the key bed to the chest K. The space for the passage of these tubes is very limited and to avoid interference, I arrange a bar P in rear of the rods *j*, said bar

being preferably supported on top of the bar P', which is a part of the ordinary piano action and forms the fulcrum for the links *j'*, connected to the rods *j*. This bar P is supported, having the horizontal passages *o* which intersect with the vertical passages *p*, the former connecting with nipple tubes *q*, which project between the rods *j* and the latter connecting with nipples *r* to which the downwardly extending flexible tubes *s* are attached, said tubes leading from the chest K. The nipples *q* are connected by the curved tubes *q'* with the ports in the chest O. This construction permits of using substantially straight tubes for *s*, which extend downward in rear of the key bed and in front of the strings without interference with any parts of the mechanism. It is usual to support the key bed intermediate the sides of the case by resting upon it the lugs *u* formed integral with the metallic frame of the harp. These lugs *u* cross the space between the strings and the key bed and to avoid interference therewith by the tubes *s*, I preferably deflect these tubes on opposite sides of the lug and secure them by loops *s'* to the rear edge of the key bed.

The tracker box G' or winding mechanism for the music sheet is preferably supported upon the shelf G and the tracker G' is connected to the pneumatics in the box O by conduits *v*. This shelf is detachable from the case, and the tracker box which is rigidly mounted thereon may be moved with the shelf, so as to provide access to the piano action for the purpose of tuning.

The instrument is provided with suitable expression devices, by means of which the automatic action may be softened when desired. These devices comprise essentially collapsible regulating chambers which diminish the effective pressure of the air passing therethrough to the pneumatic action. To conveniently locate these expression regulators, I have arranged them in the space within the key bed between the longitudinal bars and cross bars thereof, as indicated at Q.

The regulators R are preferably of the well known type, in which a collapsible bellows controls a valve for restricting the port, through which the regulated wind must pass. As shown in Figs. 10 and 11, the regulators R are mounted on the chests R', which are pivoted to the valve chest K. This chest R' contains the chamber R², which is in communication with a channel R³, leading to the store bellows. The chest also contains two chambers R⁴ and R⁵, which are respectively connected to the treble and base portions of the pneumatic action. The chamber R² communicates with each of the regulators R, through ports R⁶, while the chambers R⁴ and R⁵ communicate with said regulators through ports R⁷, said ports being variably restricted by valves R⁸ operated by the collapsing of

the bellows. Thus, the air pressure in the chambers R^4 and R^5 is governed by their respective regulators and is less than the pressure in the chamber R^2 . In addition to the passage by way of the regulators, the chambers R^4 and R^5 may be placed in communication with the chamber R^2 through direct ports controlled by the valves R^9 and R^{10} . These valves are operated by pneumatics R^{11} , which are connected through conduits R^{12} with valves R^{13} operated by push buttons R^{14} , said push buttons being preferably located at the front of the key bed.

For controlling the winding and re-winding of the music sheet, a tempo lever S and a re-winding lever T are provided and are preferably arranged adjacent to the buttons R^{14} at the front of the key bed. The tempo lever is connected by a link S' to a rock shaft S^2 , which operates the connections S^3 and S^4 , one leading to the valve box U containing the tempo valve S^5 and the other being connected through the medium of a lever S^6 to a link S^7 with a tempo index S^8 . This index is preferably arranged to travel adjacent to the scale S^9 , located at the base of the tracker box, as shown in Fig. 3.

The lever T is connected through suitable mechanism, such as the link T' , rock arm T^2 , link T^3 and lever T^4 with a rod T^5 , controlling the shiftable gear for reversing the action of the winding mechanism and this winding mechanism being of any suitable construction (not shown). In addition to the mechanical connection to the lever T , said lever controls a pneumatic connection for operating the valve U' in the valve box U , this valve controlling a port U^2 , through which high pressure air is permitted to pass to the motor when said valve is open. The pneumatic U^3 for operating the valve U' is located within the chest U and is connected by a conduit U^4 with a port U^5 in the key bed. This port is so located that the lever T in its position for causing the forward movement of the winding mechanism, will close the port. When, however, this lever is adjusted to the position shown in Fig. 12, so as to cause the re-winding of the music sheet the port U^5 will be uncovered, which will permit air to enter the pneumatic U^3 and open the valve U' , thereby admitting high pressure air to the motor. The motor may be of any suitable construction, as indicated diagrammatically at V (Fig. 3), the connections to the valve box U not being shown.

The instrument being constructed as has been described, in use it may be operated either manually or automatically. In the former case, the pneumatic attachments remain inoperative, but when the pneumatic action is used, the keys are also actuated. The arrangement of the tempo indicator adjacent to the tracker box enables the opera-

tor to keep in view both the markings upon the music and the position of the tempo index. Expression may be given to the music through the operation of the buttons R^{14} and when the music is to be re-wound, the operation of the lever T for shifting the gears, causes the simultaneous operation of the valve U' for admitting high pressure wind to the motor.

What I claim as my invention is:—

1. In a piano, a case therefor divided in a vertical longitudinal plane into two separable sections a key-bed carried by the forward section and cheek plates on said forward section adjacent to said keybed and secured to the sides of the opposite section.

2. In a piano, a case therefor divided in a vertical longitudinal plane into two separable sections, projecting cheek plates on the forward section underlapping the sides of the opposite section, and means for clamping said cheek plates to the sides of the opposite section.

3. In a piano, a case therefor divided in a vertical longitudinal plane into two separable sections, base rails projecting forward from the rear section upon which the forward section is slidably supported and cheek plates projecting rearwardly from said forward section and means for clamping said cheek plates to the sides of the rear section.

4. In a piano, a case therefor divided in a vertical longitudinal plane into two separable sections, the harp mounted in the rear section, a key bed forming the integral part of the forward section, a cheek plate on said forward section projecting rearward therefrom adjacent to said key bed, and a clamping bolt for securing said cheek plate to the sides of the rear section to hold said key bed in rigid relation thereto.

5. In a piano, a case therefor divided in a vertical longitudinal plane into two separable sections, a keybed carried by the forward section a cheek plate having an open ended slot therein projecting from one section and adjacent to said keybed, lapping the side of the other section and a clamping bolt engaging the open-ended slot in said cheek plate, adapted to secure the same to said side.

6. In a piano, a case therefor divided in a vertical longitudinal plane into two separable sections, the rear section comprising the base, sides and top and having the harp mounted therein and the forward section comprising the key bed supporting the sides beneath and cheek plates above the same, the latter projecting rearward and lapping the sides of the rear section slotted bearings in said cheek plates and clamping bolts engaging said slotted bearings and securing the same to the sides of the rear section.

7. In an automatic and manually operable piano, a case section including the sup-

porting base, a harp mounted in said section, a section having a base superposed on the base of the first mentioned section, said sections being separable from each other, and an automatic action and a manually operable action mounted in the last mentioned section.

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

AURA E. WHITEHEAD.

Witnesses:

H. C. SMITH,
JAS. P. BARRY.