

No. 871,123.

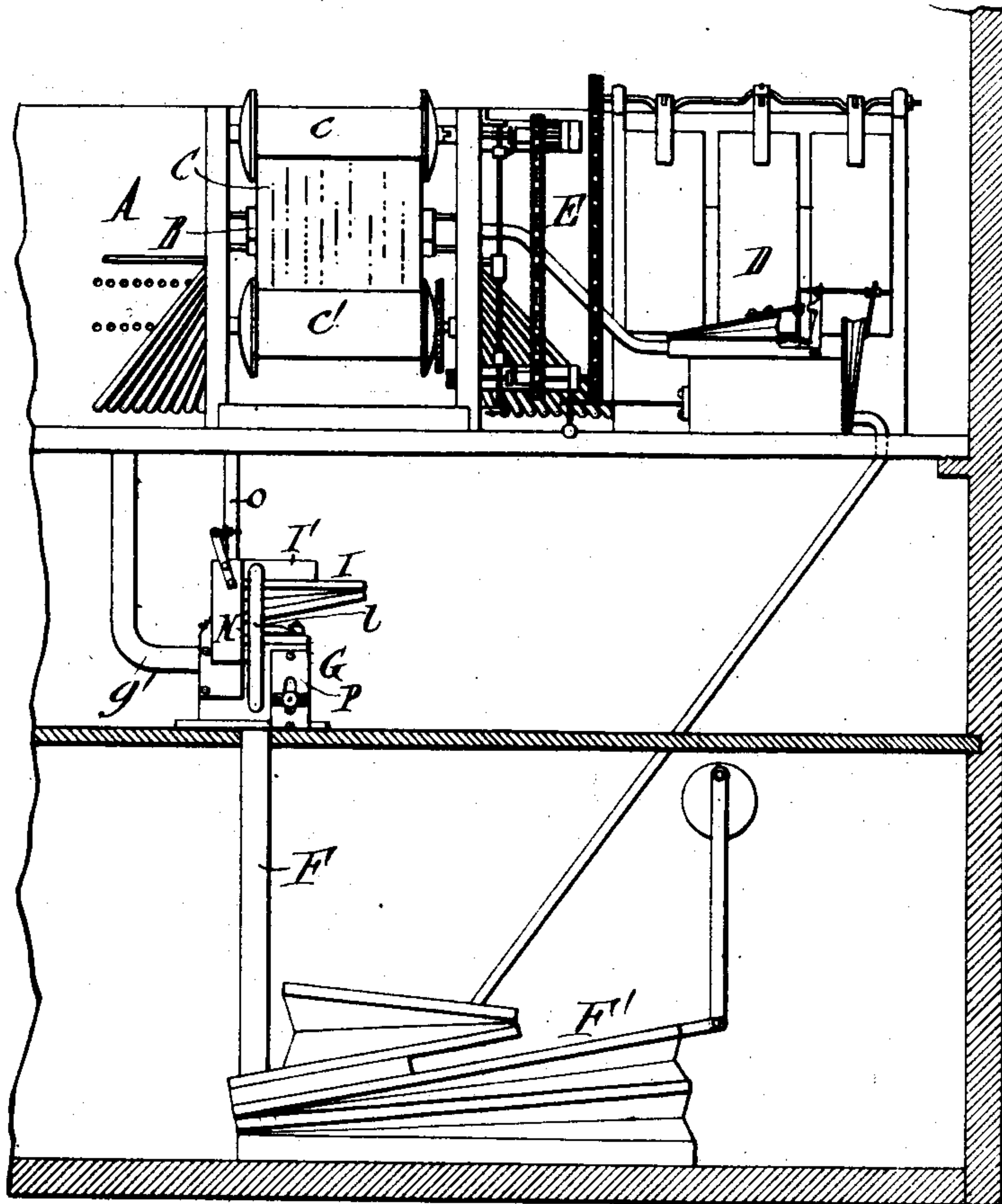
PATENTED NOV. 19, 1907.

E. DE KLEIST.
CUT-OFF FOR PNEUMATIC MUSICAL INSTRUMENTS.

APPLICATION FILED JAN. 13, 1906.

3 SHEETS—SHEET 1.

Fig. 1.



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3 SHEETS—SHEET 2.

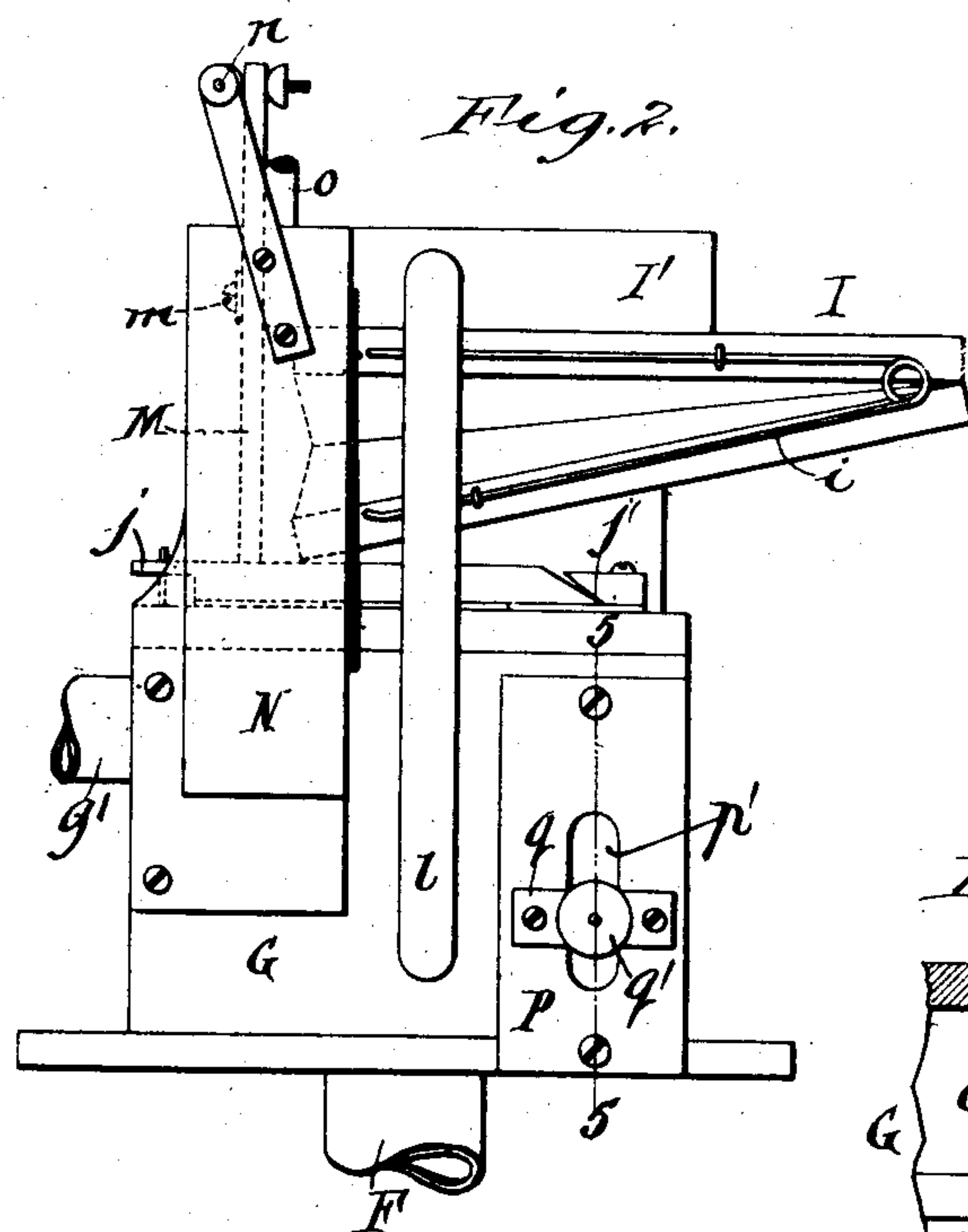


Fig. 5.

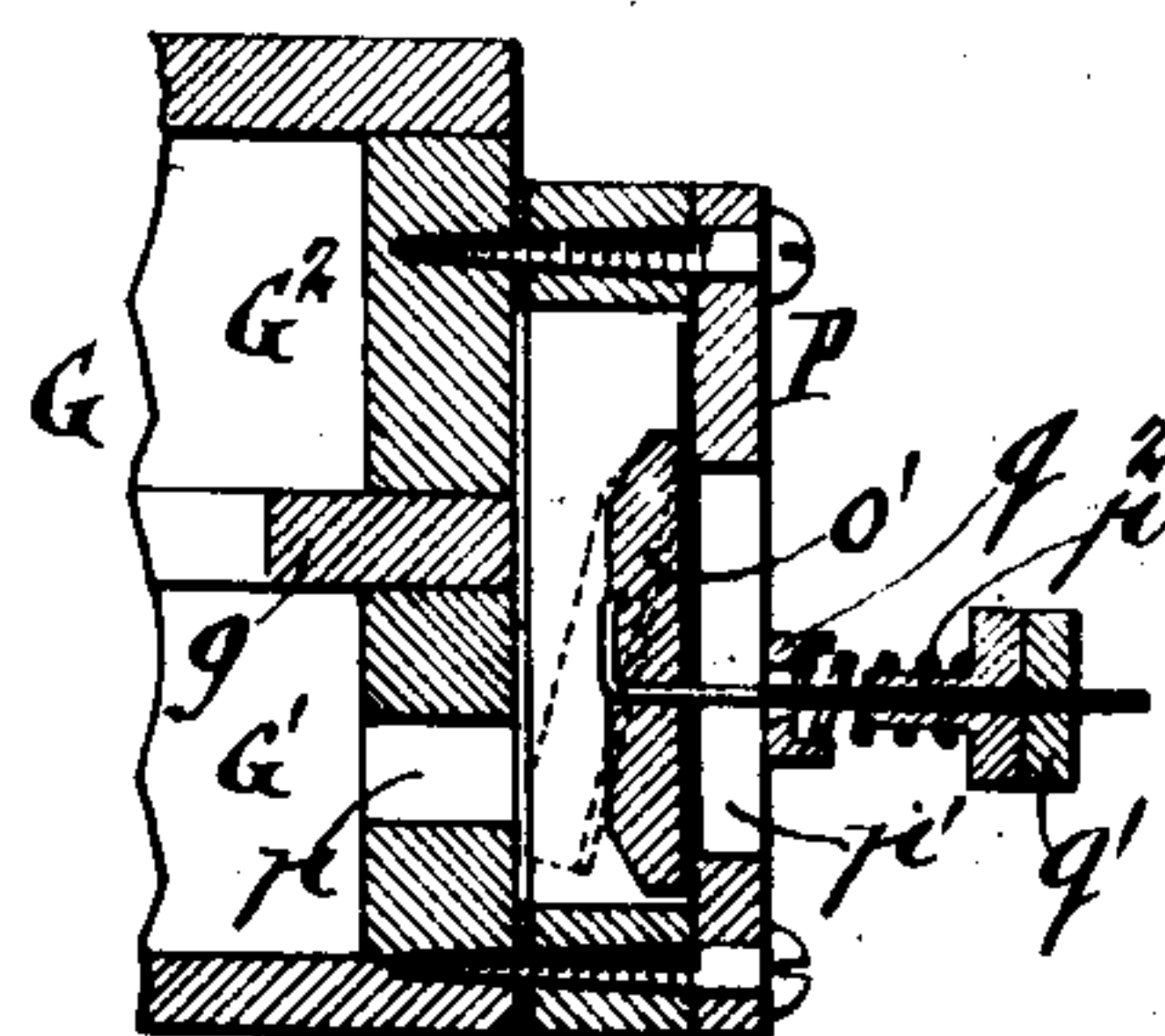


Fig. 3.

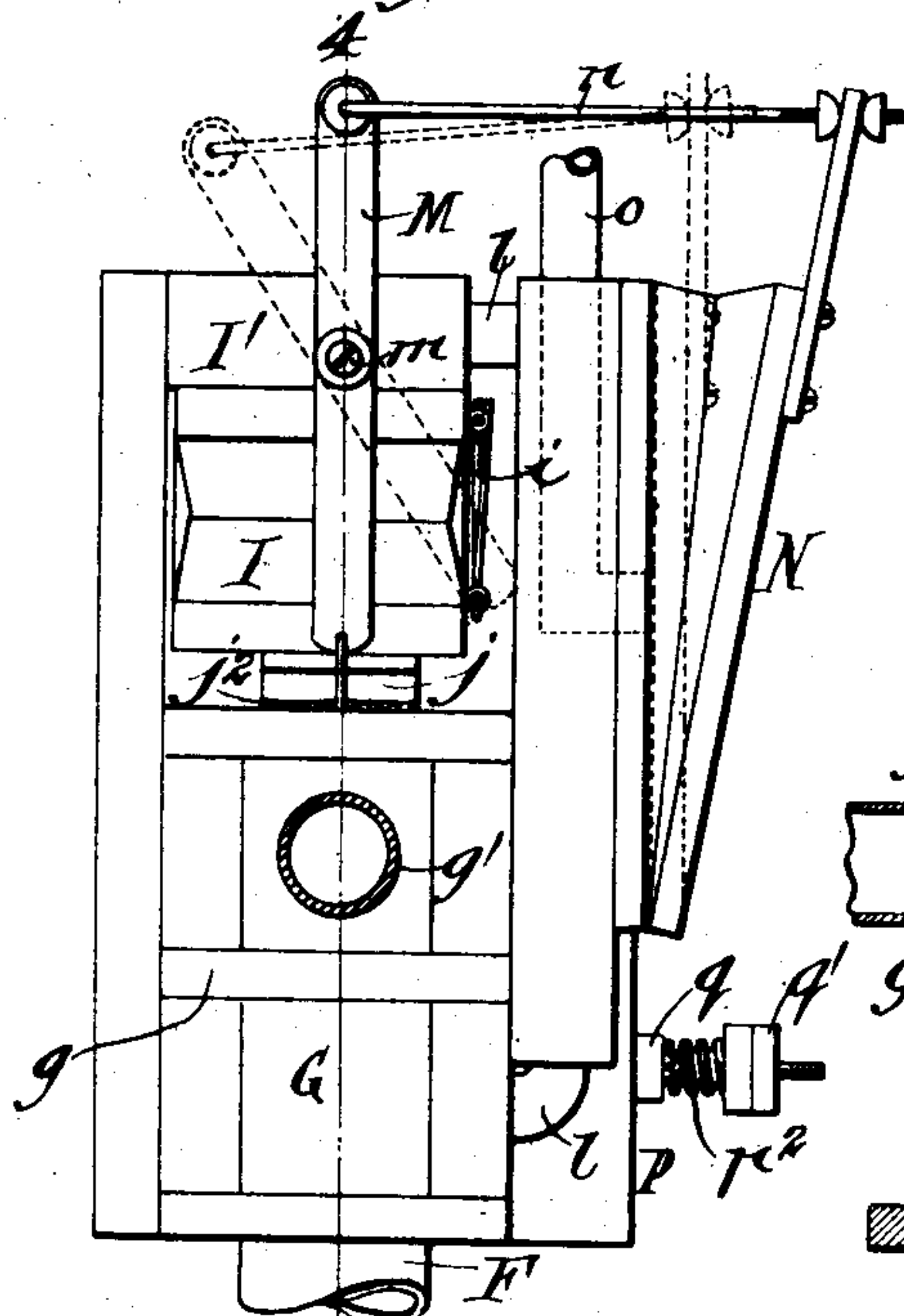
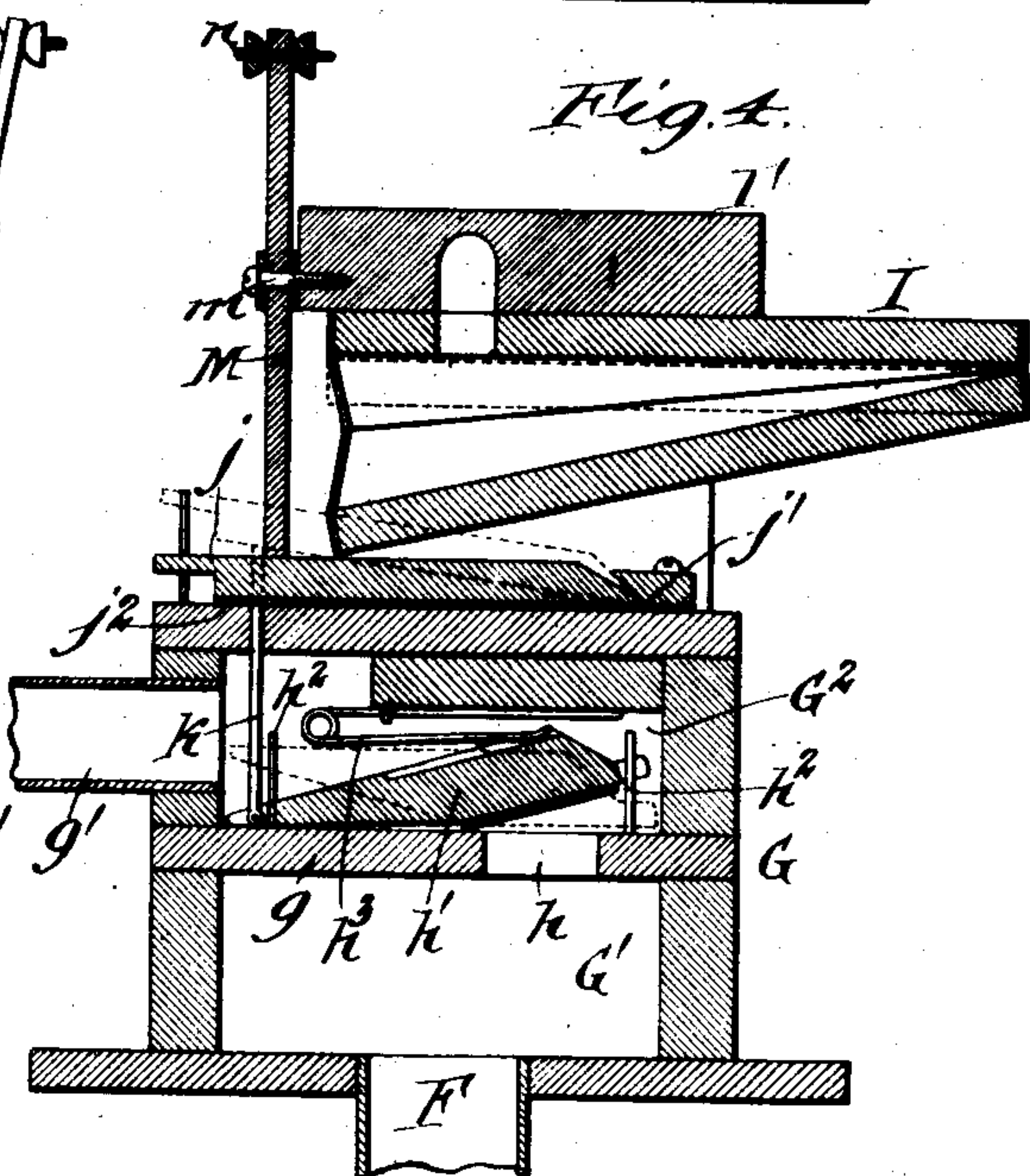


Fig. 4.



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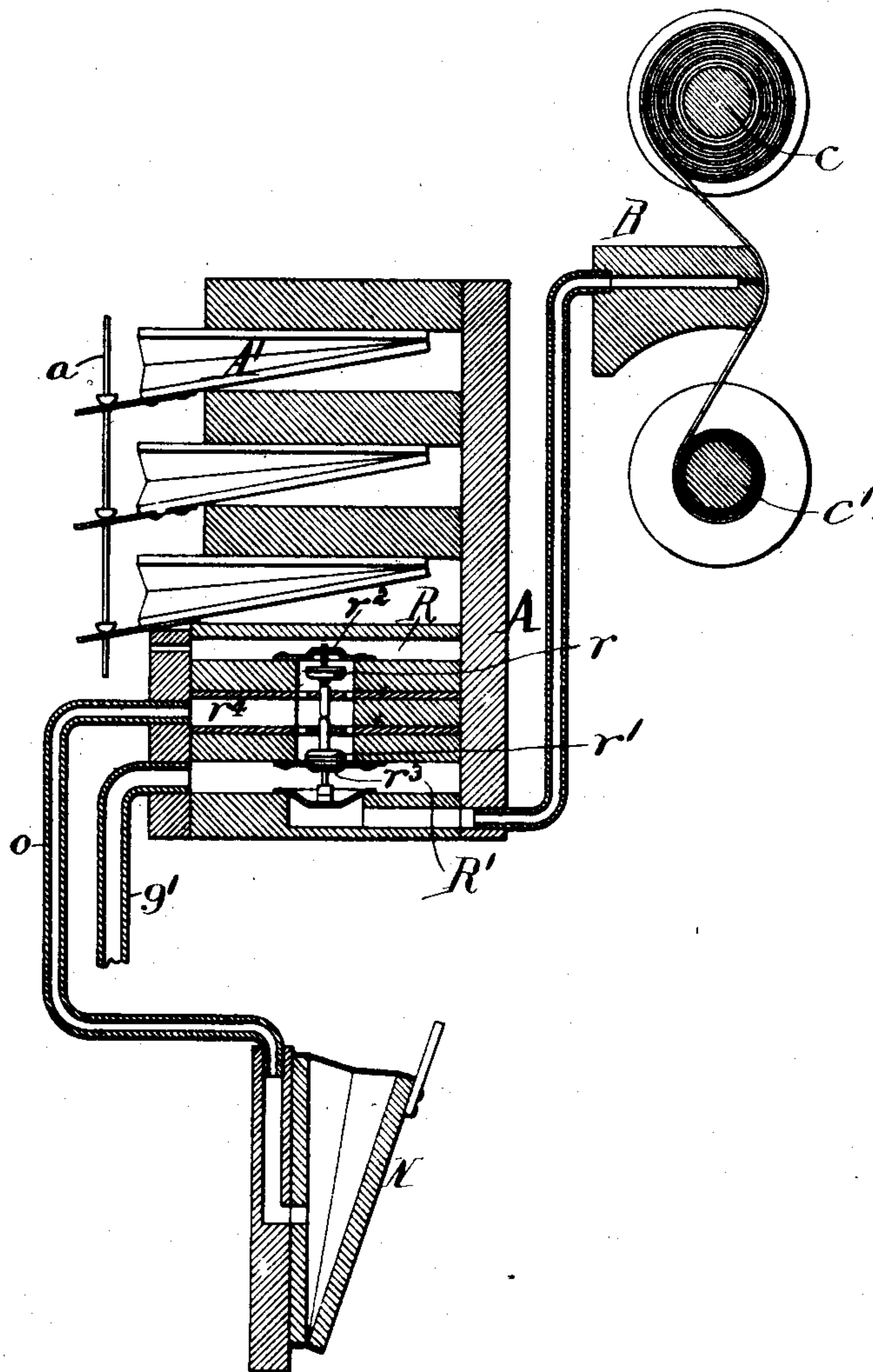
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3 SHEETS—SHEET 3.

Fig. 6.



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UNITED STATES PATENT OFFICE.

EUGENE DE KLEIST, OF NORTH TONAWANDA, NEW YORK.

CUT-OFF FOR PNEUMATIC MUSICAL INSTRUMENTS.

No. 871,123.

Specification of Letters Patent.

Patented Nov. 19, 1907.

Application filed January 13, 1906. Serial No. 295,915.

To all whom it may concern:

Be it known that I, EUGENE DE KLEIST, a citizen of the United States, residing at North Tonawanda, in the county of Niagara and State of New York, have invented a new and useful Improvement in Cut-Offs for Pneumatic Musical Instruments, of which the following is a specification.

This invention relates to the cut-off devices employed in pneumatic pianos and other automatic musical instruments for cutting off communication between the main bellows and the wind-chest during the automatic rewinding of the perforated music sheet.

It is the object of my invention to provide a reliable device of this character which shall be simple in construction.

In the accompanying drawings consisting of three sheets:—Figure 1 is a fragmentary front elevation of an automatic piano embodying the invention. Fig. 2 is an enlarged front elevation of the cut-off device. Fig. 3 is an end view thereof. Fig. 4 is a vertical longitudinal section of the same in line 4—4, Fig. 3. Fig. 5 is a transverse section in line 5—5, Fig. 2, showing the automatic suction regulating valve. Fig. 6 is a diagrammatic transverse section, on an enlarged scale, of the wind chest and the tracker mechanism.

Similar letters of reference indicate corresponding parts throughout the several views.

A indicates the wind chest containing a pneumatic action of any suitable construction and A¹, Fig. 6, the motor pneumatics which operate the customary stickers *a* which in turn act upon the piano-action, not shown.

B indicates the customary tracker board; C the perforated music sheet wound on the rollers *c c'*, D the air motor and E the driving gear of ordinary construction by which motion is transmitted from the motor to said rollers and which contains the usual reversing means controlled by the tracker board and music sheet, for automatically rewinding the latter after the last tune on the sheet has been played.

F is the tube or conduit which leads from the main suction bellows F' and between which and the wind chest the cut-off device is interposed. This device consists of a box or case G divided by a horizontal partition *g* into two chambers G' G², the lower one

G' being connected with the suction-bellows by the tube F and the upper one G² with the main exhaust channel of the wind chest A by a tube *g'*. These chambers communicate with each other by means of a port *h* formed in the partition *g* and controlled by a valve *h'*, preferably of the rocking type shown. This valve is arranged in the upper chamber G² and guided by the usual pins *h*², and it is held in its closed position by a spring *h*³ bearing upon its front portion, as shown in Fig. 4. The valve *h* is opened by the movable board of a bellows or pneumatic I which bears upon a vertically swinging arm *j* which in turn bears upon a sticker *k* passing through the top of the upper chamber G² and attached at its lower end to the tail of the valve. The arm *j* is suitably hinged at *j'* to the upper side of the case G and preferably provided on its under side with a strip *j*² of leather or similar material which covers the hole through which the sticker *k* passes, thus effectually excluding the outer atmosphere at this point when the arm is lowered, as shown by full lines in Fig. 4.

The pneumatic I is secured horizontally to the underside of a bracket or support I' and provided with an expansion spring *i* of ordinary construction which normally causes its movable board to depress the arm *j*, so as to hold the valve *h* open, said spring being more powerful than the valve-closing spring *h*³. The pneumatic I is constantly connected with the lower chamber G' of the cut-off case by a tube *l*, Fig. 2, so that the pneumatic is collapsed as soon as the main suction bellows is operated and remains in that condition as long as the instrument plays.

M is a locking device for retaining the arm *j* in its depressed position so as to keep the valve *h* open during the time that the pneumatic I remains collapsed. This locking device preferably consists of an upright lever arranged above the arm *j* and pivoted between its ends to the bracket I' by a horizontal pin or screw *m*, the lower arm of the lever bearing upon the depressed arm in the normal vertical position of the lever. This lever is controlled by a pneumatic or bellows N which has its movable board connected with the upper arm of the lever by a rod *n*. This pneumatic is controlled by a corresponding valve mechanism of the pneumatic action and a perforation of the music sheet

arranged to register with the companion duct of the tracker board when the music sheet is nearly unwound, so as to collapse said pneumatic and cause it to swing the locking lever M out of engagement with the arm *j*, thus allowing the valve *h*¹ to be closed by its spring *h*³. Fig. 6 shows this valve mechanism which preferably comprises the customary double puppet valve *r*, *r*¹ controlling the usual air and exhaust ports *r*², *r*³ which communicate respectively with the air chamber R and the exhaust chamber R¹, the latter chamber being connected with the upper chamber G² of the cut-off box by the tube *g*¹. The pneumatic is connected by a tube *o* with the exhaust and flushing channel *r*⁴ of the corresponding valve mechanism. When the perforation of the music sheet corresponding to the pneumatic N registers with the companion duct of the tracker board, the puppet valve *r*, *r*¹ is raised in a well known manner, placing said pneumatic in communication with the exhaust chamber R¹ and collapsing it, while when said duct is covered by the music sheet, the puppet valve descends, placing the pneumatic in communication with the air chamber R and expanding it.

The operation of the cut-off device is as follows:—When the instrument is not in operation, the pneumatics I and N are both expanded and the lever M occupies its locking position as shown by full lines in Figs. 3 and 4, thereby holding the cut-off valve *h*¹ open and placing the wind chest A in communication with the main suction bellows F'. When the latter is operated the pneumatic I is collapsed, as hereinbefore described, but the cut-off valve is held open by the locking lever M. The parts remain in this position until the tune on the music sheet has been finished, when the perforation thereof which controls the cut-off device registers with the corresponding tracker-duct and causes the unlocking pneumatic N to collapse, thus disengaging the locking lever from the valve-operating arm *j*, allowing the valve *h*¹ to close and cutting off the wind chest from the main suction bellows during the rewinding of the music sheet, which is effected by the automatic reversal of the driving mechanism E, in a common manner. The lever M is held in its unlocked position by contact with the adjacent edge of the elevated valve-operating arm *j*, thus preventing the unlocking pneumatic N from expanding under these conditions and permitting the use of a small perforation or short slot in the music sheet for controlling this pneumatic. After the music sheet has been rewound, the operation of the main suction bellows ceases and the restoring pneumatic I therefore expands under the reaction of its spring *i*, its movable board depressing the arm *j* and causing the same to open the cut-off valve *h* preparatory to the next operation of the instrument. The de-

pression of the arm *j* releases the deflected locking lever which is now returned to its locking position by the expansion of the pneumatic N, thereby holding the cut-off valve open during the next operation of the instrument as hereinbefore described.

An automatic valve *o*¹ is preferably combined with the cut-off box or case G for regulating the intensity of the vacuum produced in the same and the wind chest and hence the force with which the hammers of the piano action strike the strings. As shown in Fig. 5, this valve is arranged in a case P secured to one side of the cut-off box and communicating with the lower chamber thereof by a passage *p* and with the atmosphere by a port or opening *p*¹. The valve *o*¹ is applied to the inner side of this port and preferably hinged to the outer wall of its case. It is yieldingly held closed by a spring *p*² applied to its stem between a fixed bridge piece *q* extending across the outer side of the port *p*¹ and a screw nut or adjustable button *q*¹ mounted on the stem on the outer side of the bridge-piece. The spring *p*² is so tensioned as to resist opening of the regulating valve *o*¹ by the atmospheric pressure under a normal vacuum in the wind chest, but so as to permit the valve to open to a greater or less extent when the vacuum becomes excessive, the resistance of the valve being increased by screwing the regulating nut *q*¹ inwardly and diminished by screwing it outwardly.

I claim as my invention:

1. A cut-off for pneumatic musical instruments, comprising a case containing two chambers connected by a passage, one of said chambers having an air-inlet and the other an air outlet, a cut-off valve controlling said passage, a pneumatic for opening said valve, retaining means for holding said valve open, and a second pneumatic controlling said retaining means, substantially as set forth.

2. A cut-off for pneumatic musical instruments, comprising a case containing two chambers connected by a passage, one of said chambers having an air inlet and the other an air outlet, a cut-off valve controlling said passage, a pneumatic for opening said valve, a locking lever for holding said valve open, and a second pneumatic controlling said locking lever, substantially as set forth.

3. A cut-off for pneumatic musical instruments, comprising a case containing two chambers connected by a passage, one of said chambers having an air inlet and the other an air outlet, a cut-off valve controlling said passage, a pivoted arm arranged outside of said chambers and acting upon said valve to open the same, a pneumatic acting on said arm, a locking lever cooperating with said arm, and a second pneumatic controlling said locking lever, substantially as set forth.

4. A cut-off for pneumatic musical instru-

ments, comprising a case containing two chambers connected by a passage, one of said chambers having an air inlet and the other an air outlet, a cut-off valve controlling said passage, a pivoted arm arranged outside of said chambers, a rod interposed between said arm and the cut-off valve, a valve-opening pneumatic having its removable board arranged to act on said arm, a locking lever cooperating with said arm, and a second pneumatic having its movable board connected with said locking lever, substantially as set forth.

5. A cut-off for pneumatic musical instruments, comprising a case containing two chambers connected by a passage, one of said chambers having an air inlet and the other an air outlet, a cut-off valve controlling said passage, a pivoted arm acting on said valve to open the same, a pneumatic acting on said arm, a locking lever for said arm pivoted to swing at an angle thereto, the lever when in position to unlock the arm being arranged to bear against the side thereof, and a second pneumatic connected with said lever, substantially as set forth.

6. In a pneumatic musical instrument, the combination with a suction bellows, a wind chest and a pneumatic action, of a cut-off comprising a case containing two chambers connected by a passage and communicating with the suction bellows and the wind chest, respectively, a cut-off valve controlling said passage, a pneumatic for opening said valve, retaining means for holding said valve open, and a second pneumatic controlled by the pneumatic action and controlling said retaining means, substantially as set forth.

7. In a pneumatic musical instrument, the combination with a suction bellows, a wind chest and a pneumatic action, of a cut-off comprising a case containing two chambers connected by a passage and communicating with the suction bellows and the wind chest, respectively, a cut-off valve controlling said passage, a pneumatic constantly communicating with the suction bellows and arranged to open said valve when expanded, retaining means for holding said valve open, and a second pneumatic controlled by the pneumatic action and controlling said retaining means, substantially as set forth.

8. In a pneumatic musical instrument,

the combination with a suction bellows, a wind chest and a pneumatic action, of a cut-off comprising a case containing two chambers connected by a passage and communicating with the suction bellows and the wind chest, respectively, a cut-off valve controlling said passage, a pneumatic constantly communicating with the suction bellows and arranged to open said valve when expanded, a locking lever for holding said valve open, and a second pneumatic controlled by the pneumatic action and controlling said lever, substantially as set forth.

9. In a pneumatic musical instrument, the combination with the wind chest and the main suction bellows, of a cut-off device interposed between the wind-chest and said bellows, and having a passage for the admission of the atmosphere, and an automatic regulating valve controlling the last-named passage, substantially as set forth.

10. In a pneumatic musical instrument, the combination with the wind chest and the main suction bellows, of a cut-off comprising a box or case containing two connected chambers communicating with the wind chest and said bellows respectively, a cut-off valve controlling the passage between said chambers, the cut-off box having a passage for the admission of the atmosphere, and an automatic regulating valve controlling the last named passage, substantially as set forth.

11. In a pneumatic musical instrument, the combination with the wind chest and the main suction bellows, of a cut-off comprising a box or case containing two connected chambers communicating with the wind chest and said bellows respectively, a cut-off valve controlling the passage between said chambers, the cut-off box having a passage for the admission of the atmosphere, a regulating valve applied to the last-named passage, a spring for resisting the opening movement of said regulating valve, and means for regulating the tension of said spring, substantially as set forth.

Witness my hand this 6th day of January, 1906.

EUGENE DE KLEIST.

Witnesses:

C. F. GEYER,
E. M. GRAHAM.