

No. 791,550.

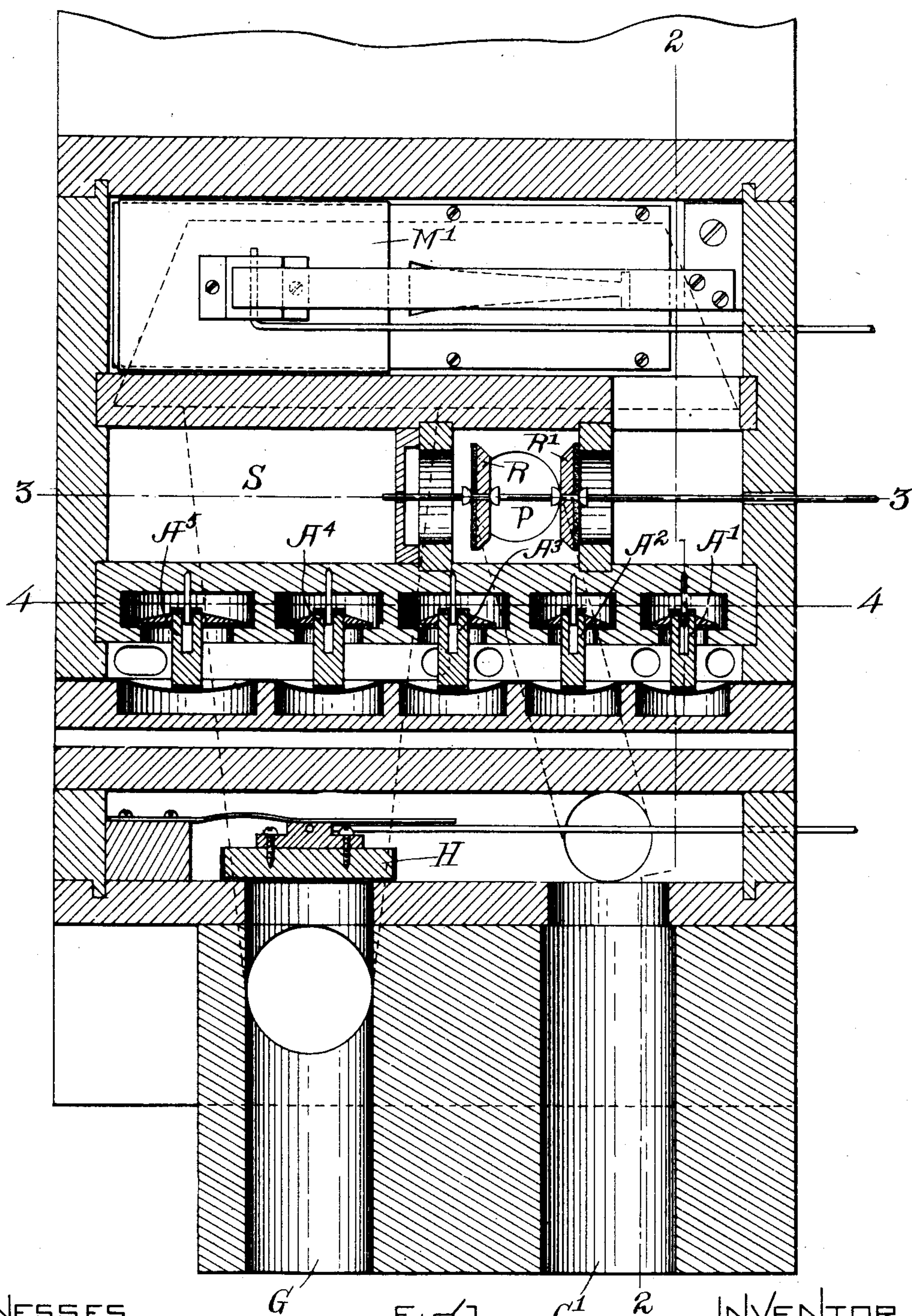
PATENTED JUNE 6, 1905.

J. C. HAGEY.

TRAVELING SHEET SPEED REGULATING DEVICE.

APPLICATION FILED APR. 14, 1904.

4 SHEETS—SHEET 1.



WITNESSES.

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FIG. 1.

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4 SHEETS—SHEET 2.

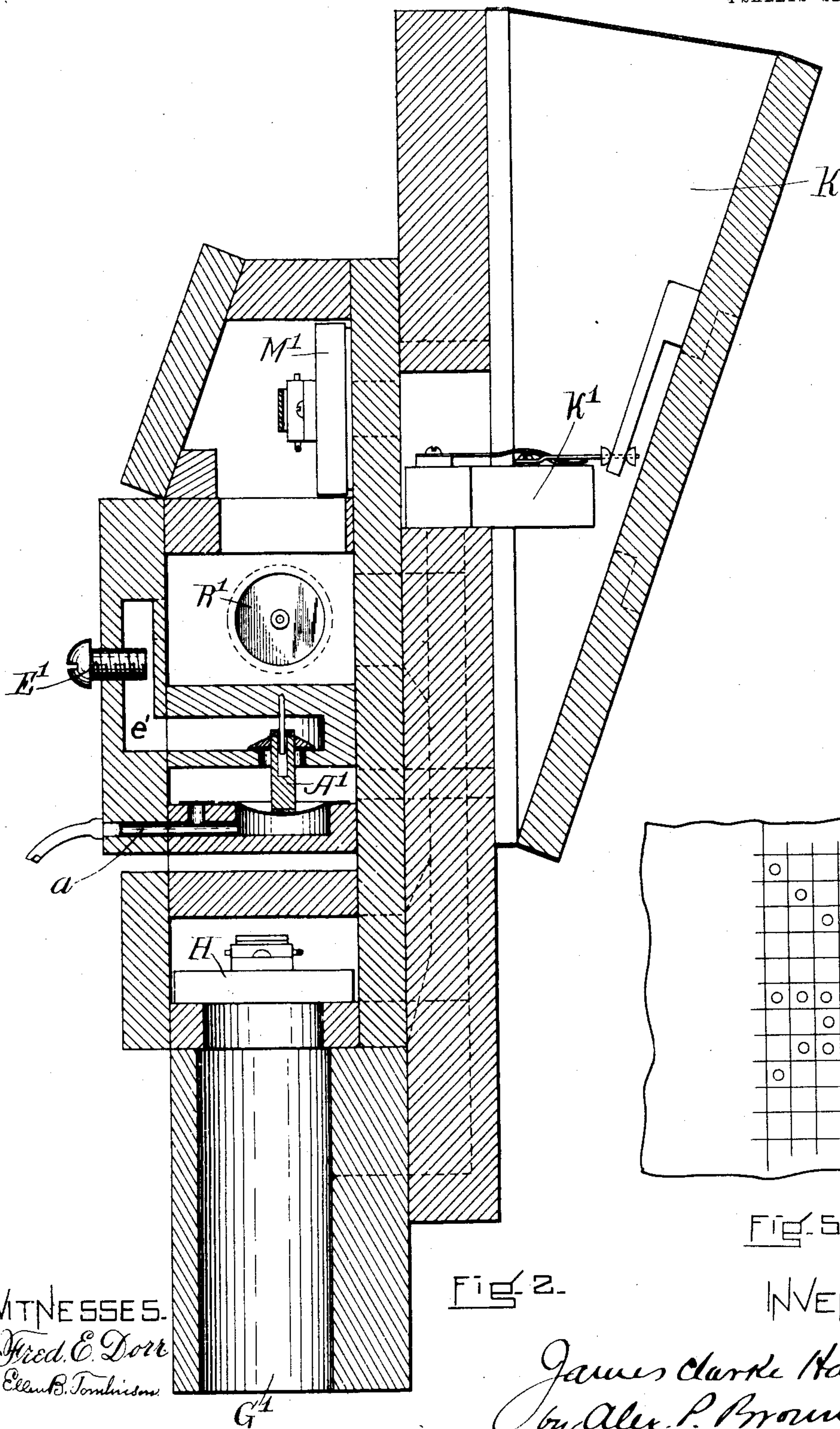


FIG. 2.

FIG. 5.

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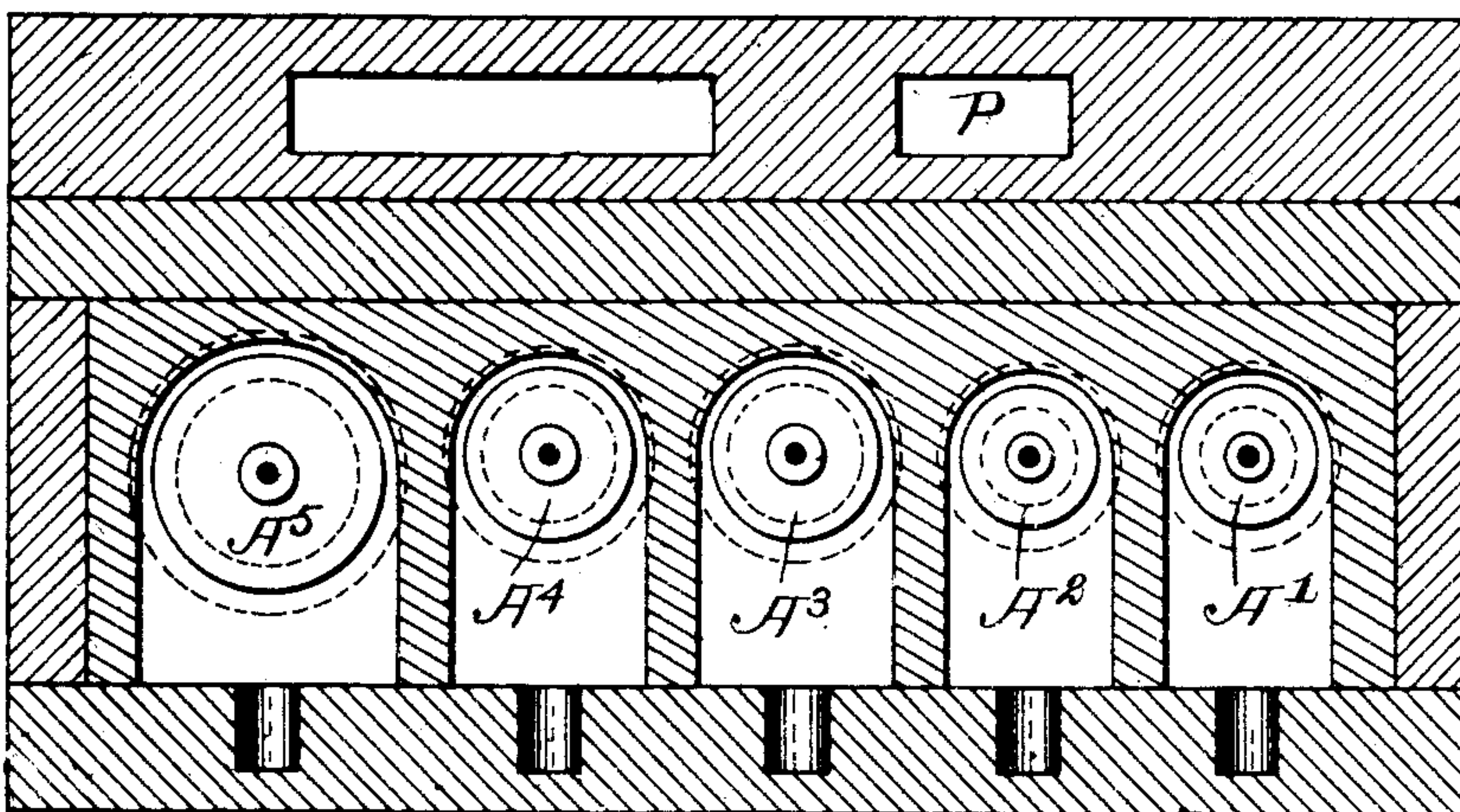
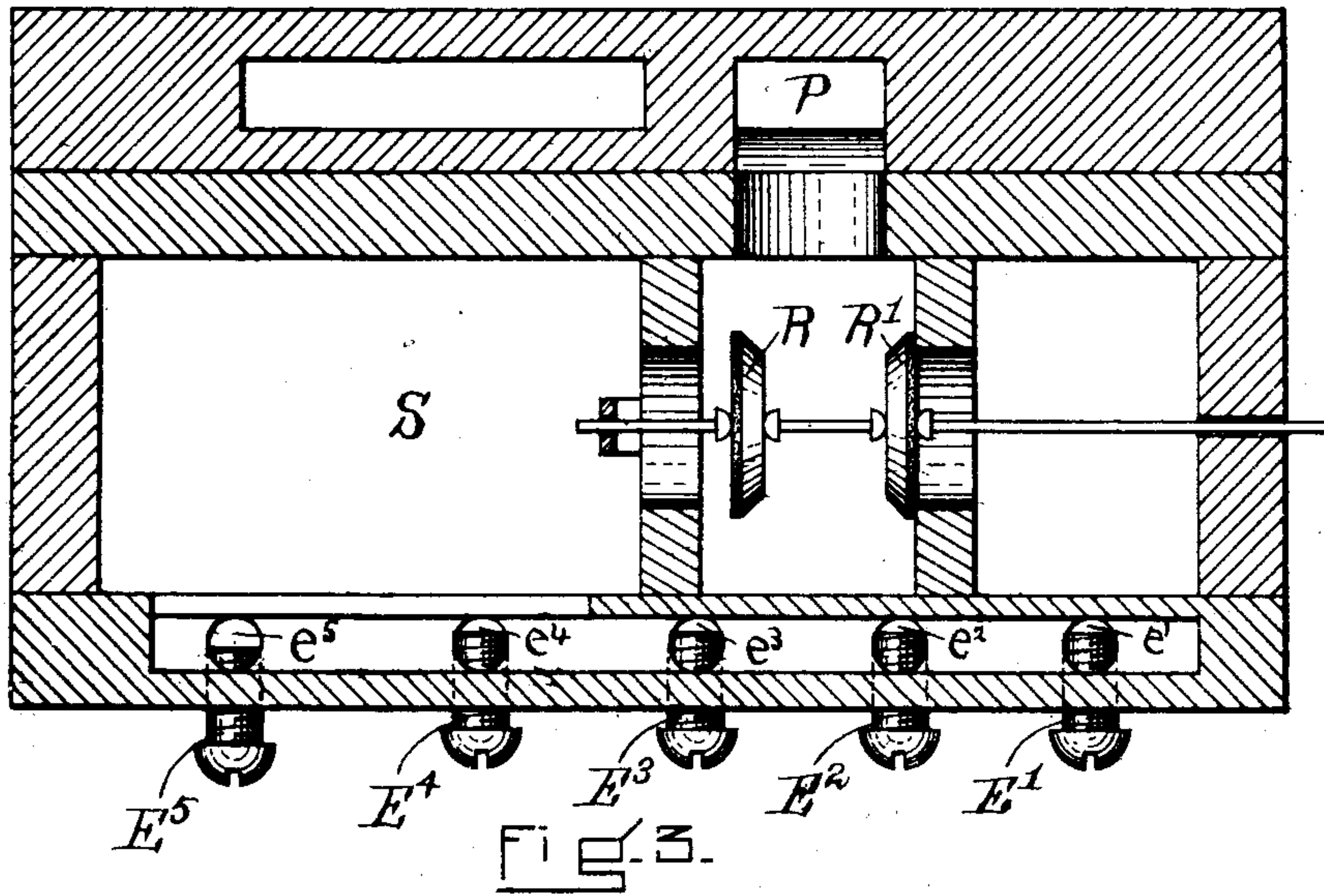
WITNESSES.
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4 SHEETS—SHEET 3.



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4 SHEETS—SHEET 4.

Fig. 6.

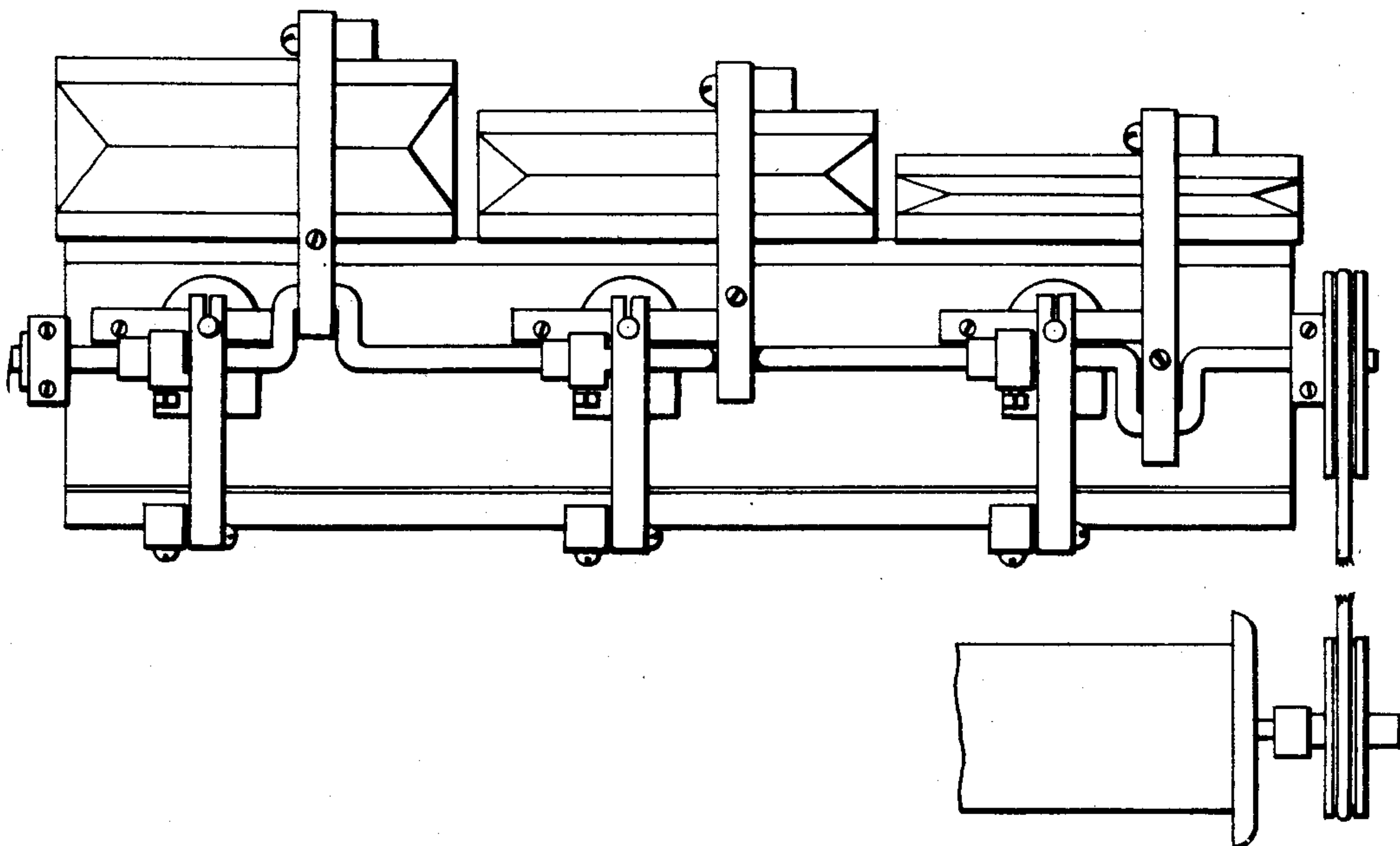
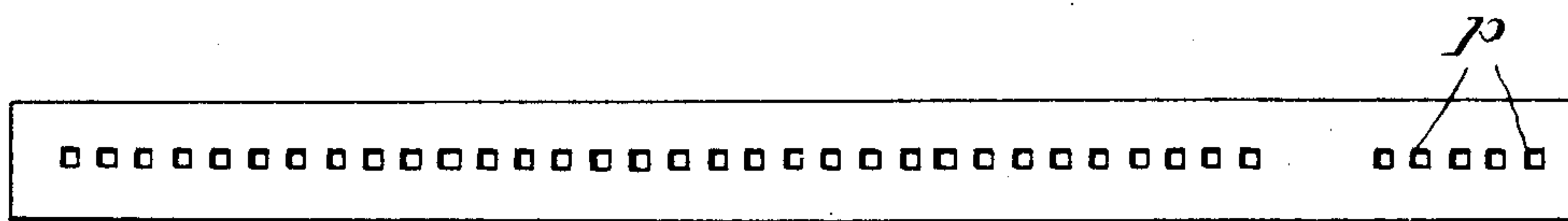


Fig. 7.



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UNITED STATES PATENT OFFICE.

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TRAVELING-SHEET-SPEED-REGULATING DEVICE.

SPECIFICATION forming part of Letters Patent No. 791,550, dated June 6, 1905.

Application filed April 14, 1904. Serial No. 203,139.

To all whom it may concern:

Be it known that I, JAMES CLARKE HAGEY, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Traveling-Sheet-Speed-Regulating Devices, of which the following is a specification.

My invention relates to improvements in means for automatically regulating the speed of a traveling sheet, such as is used in the class of instruments commonly called "self-players," wherein the playing mechanism is operated by such a perforated sheet.

There are already in extensive use devices for manually regulating the speed of the sheet so as to vary the tempo of the performance, these devices consisting, essentially, of a valve located in the passage which connects the sheet-motive mechanism with the wind-supplying mechanism, and an extension of this valve is carried to a convenient location, where the operator may manually operate it, and thereby vary the speed of the sheet, and consequently the tempo of the performance, at pleasure. It has also been proposed to automatically regulate a speed-controlling valve of the same general construction by means of mechanism attached to and operating the valve, said mechanism being operated automatically by means of extra perforations in the traveling music-sheet.

My present invention relates to an improved means for accomplishing this result of automatic speed regulation, and to that end instead of using a single valve and varying the extent of movement of that valve I employ a plurality of valves and a corresponding plurality of lines of perforations. I further adjust what I may call the "pneumatic value" of the plurality of valves and also by causing perforations to appear simultaneously in two or more of the lines may operate two or more valves simultaneously.

I have considered it desirable to so arrange my improvement that it may be employed upon existing types of self-playing instruments and, further, that it may be so employed in connection with the present single tempo-regulating valve that either this valve or my

plurality of valves may be operative or inoperative at will. By such application it will be obvious that the performer may by using the present single valve regulate the tempo by operating the valve, or regulations of tempo predetermined by the relative location of sheet-perforations may automatically be produced in the performance.

In the accompanying drawings I have shown, in Figure 1, a front view, in vertical section, of my invention adapted to a self-playing instrument of the so-called "piano-player" type; at Fig. 2, a view in sectional elevation upon the line 2 2 of Fig. 1, and at Figs. 3 and 4 views of the same device in horizontal section upon the lines 3 3 and 4 4 of Fig. 1. At Fig. 5 I have shown the extra perforations on the traveling sheet and their arrangement to produce variations of tempo. At Fig. 6 I have illustrated conventionally a pneumatic motor for driving the music-sheet mechanism, and at Fig. 7 have shown a face view of the tracker-bar employed in carrying out the present invention.

It will be seen by an examination of these figures that the structure illustrated contains the usual passages for air between the pedal-operated bellows (not shown) and the sheet-motive mechanism, said passages being represented at G and G' in Fig. 1; also the usual so-called "rewind-valve" (shown at H) and the usual tempo-valve M'; also the usual equalizing-chamber K, Fig. 2, provided with its regulating-valve K'. In connection with these devices and for convenience intermediately located between them is shown an embodiment of my present improvement. This consists, essentially, of a plurality of valve mechanisms, preferably of ordinary pneumatic construction and commonly called "pneumatic valves." I have shown five of these, marked from A' to A⁵, respectively, each valve governing the flow of wind through its corresponding passage e' to e⁵.

The instrument shown is of the type in which the sheet-motive mechanism, conventionally illustrated in Fig. 5 and communicating with the air-passage G' as aforesaid, is operated by a vacuum produced by a pedal-operated pump, although my improvement is

equally applicable to the type which utilizes compressed air, as distinguished from a vacuum. Accordingly in my statement of claim at the close of this specification I shall use the expression "wind," that being a term which is applied to mechanism of either type.

It will be observed that the five valves A' to A^5 are shown with their pneumatic diaphragms and ports of varying area, and it will also be seen by reference to Figs. 2, 3, and 4 that the passage-ways or outlets e' to e^5 for the air passing each valve may be adjusted by means of the regulating-screws E' to E^5 , located therein. In this way, in addition to the variation in size of the valve diaphragm and aperture, an additional regulation of the amount of wind, or what I call "pneumatic value", may be obtained.

It will be understood that a passage a is provided in connection with the diaphragm of each valve A , which passage is connected by means of the ordinary tube with a corresponding passage p in the tracker-bar, so that in the particular device represented there will be five passages in the tracker-bar, one for each of the five valves A' to A^5 . Furthermore, there will be provided upon the traveling sheet lines of perforations, each line corresponding to and acting in combination with one of the said additional passages in the tracker-bar.

The apparatus is represented in operative position, it being adapted to be thrown into or out of this position by moving the valve $R R'$, and this valve is introduced simply for the purpose of rendering inoperative the automatic attachment at such times as it is desired to regulate the speed manually by means of the valve M' . The valve $R R'$, therefore, will be seen to perform no other part in the operation of my improved mechanism than to throw it into or out of operation, as desired. With this valve in its operative position, as shown, when a perforation in any or all of the five lines of perforations above referred to in the sheet registers with its corresponding passage in the tracker-bar air will be admitted to the diaphragm of the corresponding valve of the system A' to A^5 through its corresponding aperture a . This air operating upon the diaphragm will open the valve and permit suction to the equalizing-chamber K , past the regulating-screw, from the chamber S , and thence from the opening P from the passage G' , and thence from the sheet-motor mechanism.

At Fig. 5 I have for further illustration shown a small portion of the sheet representing the arrangement of the perforations which operate the valves A' to A^5 . In this figure let it be assumed that the perforations in the line farthest to the right communicate with the opening or passage p in the tracker-board that controls the operation of the diaphragm

of valve A' and that when this valve only be open the air thereby supplied will produce a motion of the sheet at rate one. This is the condition shown when the lowest perforation upon the sheet is passing the corresponding aperture in the tracker-bar. It will be seen that next come two perforations disposed in a line crosswise of the sheet and assumed to register with the passages leading to valves A' and A^2 . These will change the rate of travel of the sheet to the rate of one plus two, which equals three. The next perforation is shown as arranged to align with the opening in the tracker-board of the passage communicating with the valve A^5 , which valve may be assumed to impart a rate of five to the sheet. Next come two perforations arranged in a crosswise line, as before, and operating, respectively, valves A^3 and A^4 . These give to the sheet the rate of three plus four, equaling seven. In this manner by studying the rest of the arrangement of perforations it will be seen that a practically unlimited variation in speed can be obtained. This peculiar form of perforated sheet, which I believe to be original with myself, is not claimed herein, because it forms the subject-matter of another application.

I claim—

1. In a device of the character described, the combination with a music-sheet and a wind-operated sheet-moving mechanism, of a plurality of valves controlling the operation of said sheet-moving mechanism, and valve-operating mechanism governed by the music-sheet, whereby the wind operating said mechanism is governed permutatively or in varying combinations and the speed of the music-sheet is thereby regulated or controlled.

2. In a device of the character described, the combination with a music-sheet and a wind-operated sheet-moving mechanism, of a plurality of automatically-actuated valves, of differing operative area, controlling the operation of said sheet-moving mechanism, whereby the wind operating said mechanism is governed permutatively or in varying combinations and the speed of said sheet is thereby regulated or controlled.

3. In a device of the character described, the combination with a music-sheet and a wind-operated sheet-moving mechanism, of a plurality of valves controlling the operation of said sheet-moving mechanism, whereby the wind operating said mechanism is governed permutatively or in varying combinations and the speed of said sheet is thereby regulated or controlled, means for automatically operating said valves, and means for adjusting the pneumatic value of one or more of said valves.

4. In a device of the character described, the combination with a music-sheet and a wind-operated sheet-moving mechanism, of a plurality of valves of differing operative area, controlling the operation of said sheet-mov-

ing mechanism, whereby the wind operating the said mechanism is governed permutatively, or in varying combinations, and the speed of said sheet is thereby regulated or controlled, means for automatically operating said valves, and means for adjusting the pneumatic value of one or more of said valves.

5. In a device of the character described, the combination with a music-sheet and a wind-operated sheet-moving mechanism, of a plurality of valves controlling the operation of said sheet-moving mechanism, whereby the wind operating said mechanism is governed permutatively or in varying combinations, and the speed of said sheet is thereby regulated or controlled, and means for automatically operating said valves.

6. In a device of the character described, the combination with a music-sheet and a wind-operated sheet-moving mechanism, of a plurality of valves controlling the operation of said sheet-moving mechanism, whereby the wind operating said mechanism is governed permutatively or in varying combinations, and the speed of said sheet is thereby regulated or controlled, and means for automatically operating said valves in a predetermined sequence.

7. In a device of the character described, the combination with a music-sheet and a wind-operated sheet-moving mechanism, of a plurality of valves controlling the operation of said sheet-moving mechanism, whereby the wind operating said mechanism is governed permutatively, or in varying combinations, and the speed of said sheet is thereby regulated or controlled, and means, consisting of perforations formed in the moving sheet, for automatically operating said valves.

8. In a device of the character described, the combination with a music-sheet and a wind-operated sheet-moving mechanism, of a plurality of valves controlling the operation of said sheet-moving mechanism, whereby the wind operating said mechanism is governed permutatively, or in varying combinations, and the speed of said sheet is thereby regulated or controlled, and means, consisting of perforations formed in the said sheet for au-

tomatically operating said valves in a predetermined sequence. 50

9. In combination with a perforated music-sheet having note-perforations and a series of auxiliary perforations, a tracker-board having a range of note-ducts and a series of supplemental ducts arranged to cooperate with the auxiliary perforations in the music-sheet, a motor, a wind-chest, and pneumatically-actuated valves controlling communication between said motor and wind-chest, the action of said valves being governed by the establishment of cooperative relation between the auxiliary perforations in the music-sheet and the supplemental ducts in the tracker-board. 55 60

10. In combination with a perforated music-sheet having note-perforations and a series of auxiliary perforations; a tracker-board having a range of note-ducts and a series of supplemental ducts arranged to cooperate with the auxiliary perforations in the music-sheet, a motor, a wind-chest, and pneumatically-actuated valves controlling graded area ports to establish communication between said motor and wind-chest, the action of said valves being governed by the establishment of cooperative relation between the auxiliary perforations in the music-sheet and the supplemental ducts in the tracker-board. 65 70 75

11. In combination with a tracker-board having a range of note-ducts and a series of supplemental ducts, a music-sheet having note-perforations and a series of auxiliary perforations adapted to cooperate with the supplemental ducts in the tracker-board, pneumatic valves operable by the cooperative action of the auxiliary perforations in the music-sheet and the supplemental ducts in the tracker-board, a wind-chest, a motor for driving the music-sheet, and air-passages connecting said wind-chest and motor controlled or governed by said valves. 80 85 90

In testimony whereof I have hereunto subscribed my name this 12th day of April, 1904.

JAMES CLARKE HAGEY.

Witnesses:

ALEX. P. BROWNE,
CHAS. H. MATHEWS.