

No. 889,466.

PATENTED JUNE 2, 1908.

E. DE KLEIST.

SPEED REGULATOR FOR AUTOMATIC MUSICAL INSTRUMENTS.

APPLICATION FILED JAN. 13, 1906.

2 SHEETS—SHEET 1.

Fig. 1.

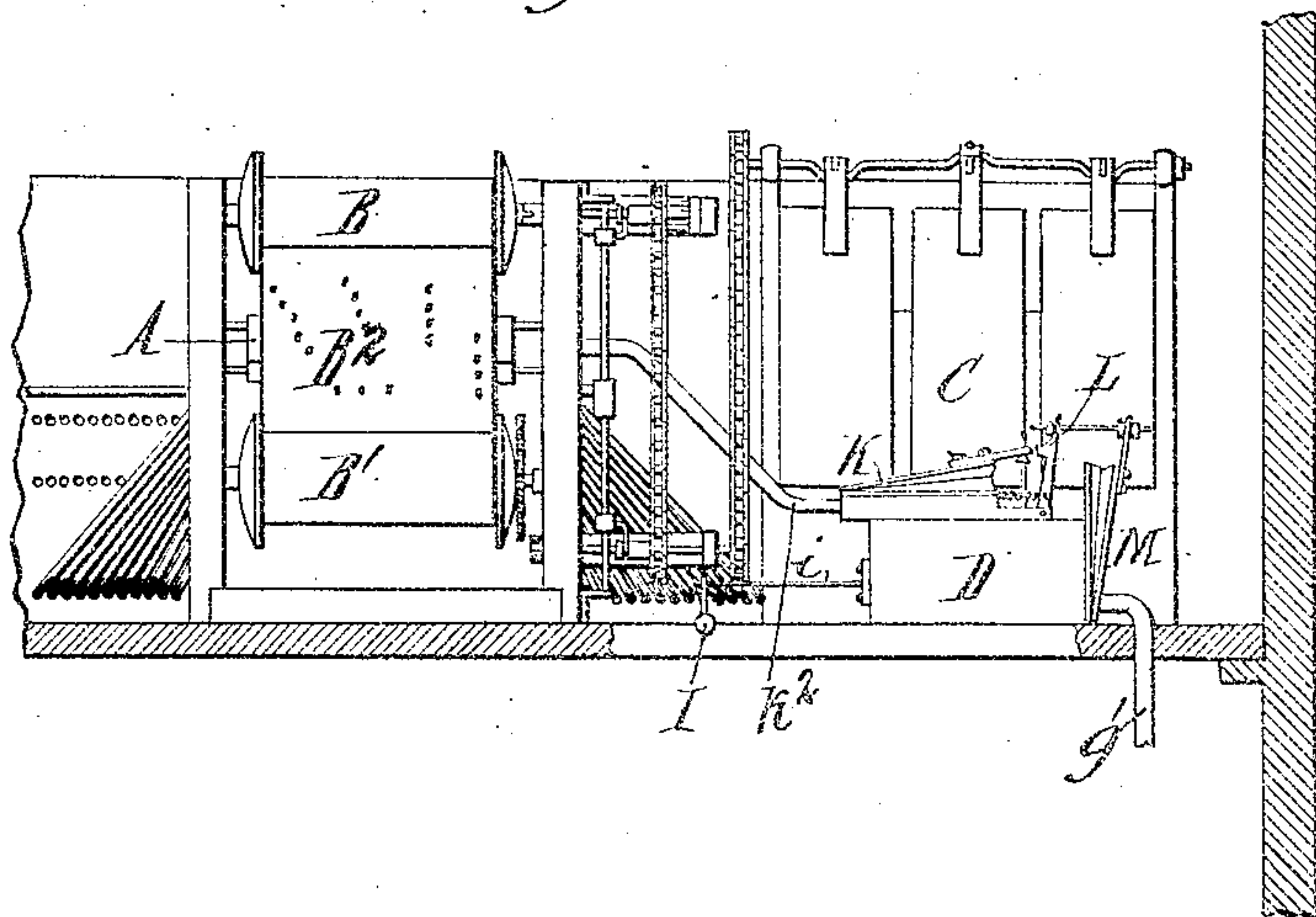
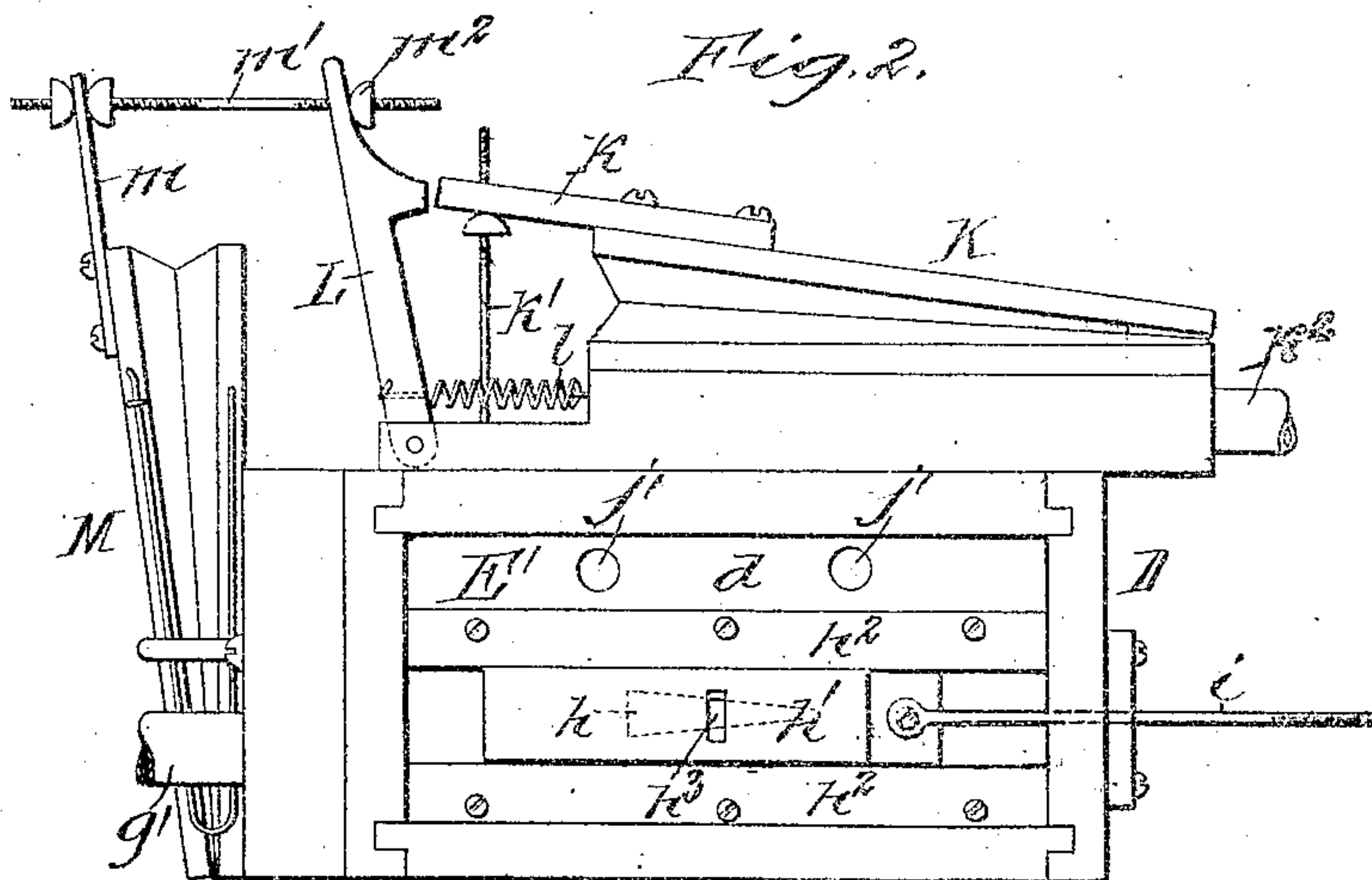


Fig. 2.



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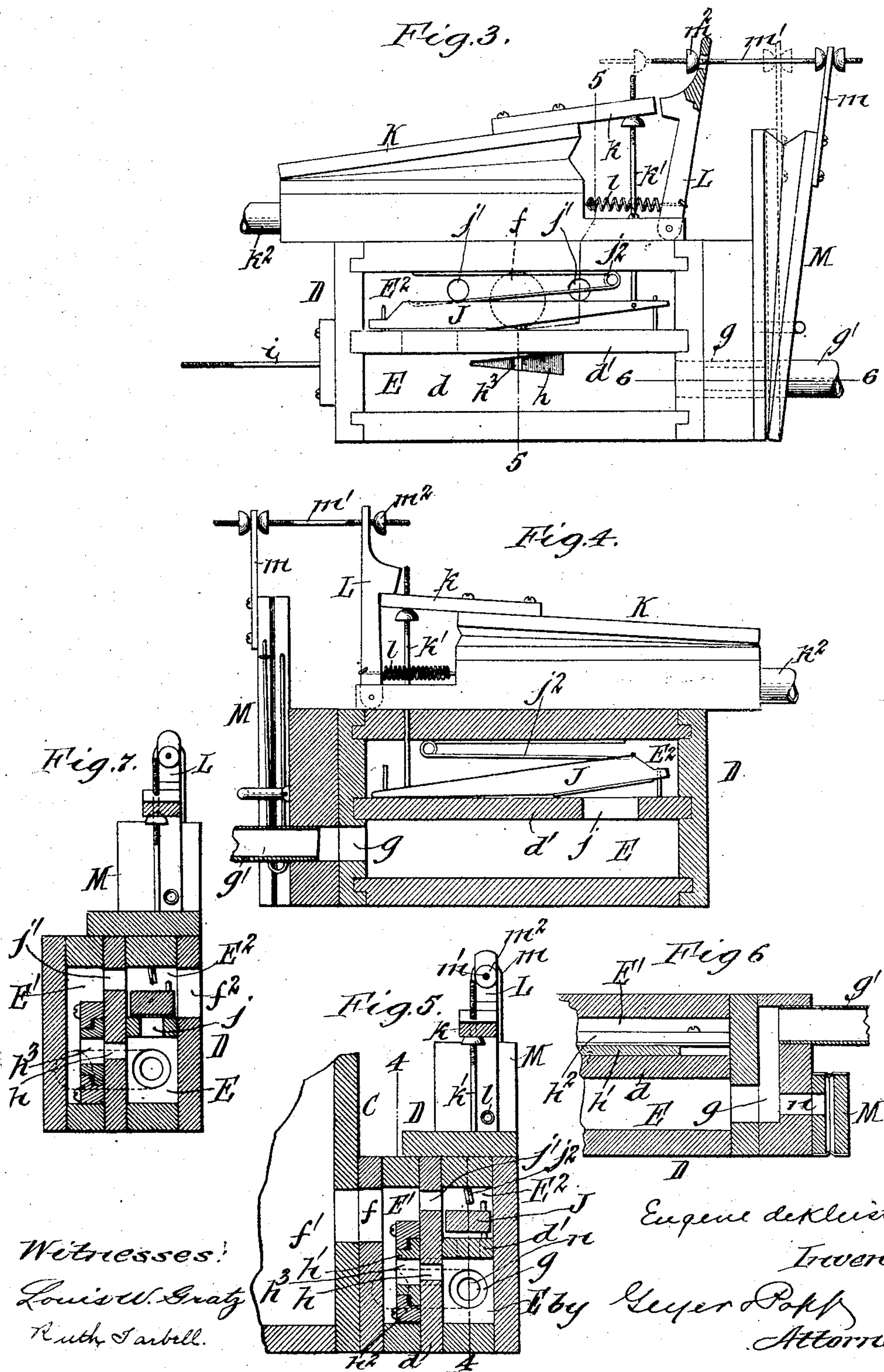
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2 SHEETS—SHEET 2.



UNITED STATES PATENT OFFICE.

EUGENE DE KLEIST, OF NORTH TONAWANDA, NEW YORK.

SPEED-REGULATOR FOR AUTOMATIC MUSICAL INSTRUMENTS.

No. 889,466.

Specification of Letters Patent.

Patented June 2, 1908.

Application filed January 13, 1906. Serial No. 295,916.

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 Speed-Regulators for Automatic Musical Instruments, of which the following is a specification.

This invention relates to the means employed in self-playing pneumatic pianos and other automatic musical instruments for regulating the speed of the air motor which propels the perforated music sheet and more particularly to regulating devices of this kind which produce a relatively rapid action of the motor in automatically rewinding the sheet.

The object of my invention is to provide a speed regulator of this character which is simple and compact in construction and reliable in action.

In the accompanying drawings consisting of 2 sheets: Figure 1 is a fragmentary front elevation of an automatic piano embodying the invention. Fig. 2 is a enlarged side elevation of the speed-regulator with its rear board removed, showing the position of the parts when the instrument is silent. Fig. 3 is a similar elevation of the regulator viewed from its opposite side with its front board removed. Fig. 4 is a vertical longitudinal section in line 4—4, Fig. 5, showing the pneumatic of the rewind-valve locked. Fig. 5 is a transverse section in line 5—5 Fig: 3. Fig. 6 is a horizontal section in line 6—6, Fig. 3. Fig. 7 is a section similar to Fig. 5, showing a modification of the invention.

Similar letters of reference indicate corresponding parts throughout the several views. A indicates the usual tracker-board. B B' the rollers on which the music sheet B² is wound and C the air motor for driving said rollers. The motor may be of any suitable construction but is preferably of the common type employing a plurality of bellows which act successively upon a crank shaft to impart rotary motion thereto. Any suitable or well known automatic reversing gear being included in the transmitting mechanism between the motor and said rollers for rewinding the music sheet.

D is the speed regulator which is preferably located immediately in front of the motor C. It consists of a box or case which is divided by an upright partition *d* and a horizontal partition *d'* into three chambers E E' E²

which may be termed exhaust, regulating and rewind chambers, respectively. These partitions extend lengthwise of the case and the regulating chamber is on the rear side thereof and provided in its rear wall with an opening *f* which communicates with the main exhaust channel *f'* of the air motor as shown in Fig. 5.

The exhaust chamber E is provided at one end with a horizontal exhaust channel *g* which is connected with the main suction bellows of the instrument (not shown) by a hose or conduit *g'*. The regulating chamber E' communicates with the exhaust chamber E by a port *h* controlled by a valve *h'* preferably of the sliding type, which is guided in ways *h*² secured to the partition *d*. The port *h* is tapered lengthwise of the valve *h'* and the latter contains a narrow vertical port *h*³ which registers therewith and is as long as the greatest width of the tapering port. By this construction, only so much of the tapering port is uncovered as registers with the valve-port and the effective area of the latter is increased or diminished as it is brought opposite a wide or narrow portion of the tapering port by the movements of the valve, thus exhausting a greater or less quantity of air from the bellows of the air motor and varying its speed accordingly.

The regulating valve *h* may be operated by any suitable means. In the construction shown in the drawings, it is operated by a hand lever I connected with the valve by a rod *i*.

The rewind chamber E² is located above the exhaust chamber E and connected therewith by a comparatively large port *j* arranged in the horizontal partition *d'* and with the regulating chamber E' by one or more ports *j'*.

To the upper side of the port *j* is applied a rewind-valve J preferably of the rocking type which is closed by a spring *j*² and opened by a small bellows or motor pneumatic K having its movable board provided with an arm *k* which is connected with the tail of said valve by a sticker *k'*. As shown in the drawings, this pneumatic is mounted horizontally on the case of the speed regulator and controlled by one of the units or valve mechanisms of the pneumatic action of the instrument and a perforation of the music sheet, in the same manner as the motor pneumatics of the piano hammers.

*k*² indicates the exhaust tube which leads

from the pneumatic K to the customary wind chest.

L indicates a locking device for temporarily holding the rewind-valve open. This device preferably consists of a vertically swinging pawl or catch pivoted at its lower end to the base of the pneumatic K and adapted to interlock with the arm *k* when the said pneumatic is collapsed, as shown in Fig. 4, the catch being automatically drawn into engagement with said arm by a spring *l*.

M is an unlocking bellows or pneumatic for withdrawing the catch L out of engagement with the bellows arm *k* and permitting the rewind valve to close. This pneumatic is arranged in an upright position at the right hand end of the case, and the arm *m* of its movable board is connected with the upper end of the catch L by a rod *m'*. This rod is free to slide on the catch towards the left in Fig. 3 so as not to affect the catch when the pneumatic M is collapsed but withdraws the catch when said pneumatic expands, the rod being provided for this purpose with a stop-nut or button *m²* arranged to engage the left side of the catch. The pneumatic communicates with the exhaust channel *g* by a passage *n* so as to remain collapsed as long as the instrument plays.

The operation of the speed regulator is as follows: When the main exhaust bellows of the instrument is operated, the unlocking pneumatic M is collapsed as shown by dotted lines in Fig. 3 and by full lines in Fig. 4, the same remaining in that condition as long as the instrument plays, thus moving the button *m²* a sufficient distance in advance of the catch L to permit it to swing to the left into engagement with the arm of the valve-opening pneumatic K when the latter is collapsed. During the playing of the instrument, the last-named pneumatic is expanded and the rewind-valve is closed. The air is now exhausted from the motor C through the passage *f*, regulating chamber E', valve port *h³*, tapering port *h*, exhaust chamber E, channel *g* and conduit *g'*, and the quantity of air exhausted from the bellows of the air-motor in a given time is controlled by the regulating valve as hereinbefore described, thus governing the speed of the motor and of the traveling music sheet accordingly.

When the music sheet has been fully wound upon the take-up roller, the perforation in the music sheet which controls the valve opening pneumatic K registers with the corresponding tracker-duct, causing said pneumatic to be collapsed and opening the rewind valve, the movable board of this pneumatic being at the same time locked in its depressed position by the automatic catch L. The air is now exhausted from the motor not only through the tapering port *h* and the valve port *h²*, but mainly through the large port *j*, the rewind chamber E² and

the ports *j'*. This causes the motor to operate more rapidly and by means of the customary reversing gear to quickly rewind the music sheet upon the roller B. After the music sheet has been rewound the electric or other motor which operates the main exhaust bellows is stopped automatically or otherwise thus allowing the unlocking pneumatic M to expand under the action of its expansion spring and retracting the catch L. This permits the valve-opening pneumatic K to expand and the rewind-valve J to close, restoring the parts to their original position.

By providing means for locking the pneumatic K of the rewind-valve in its collapsed condition, I avoid the formation of a slot in the music sheet of sufficient length to keep this pneumatic collapsed during the entire period of rewinding the sheet, which would otherwise be necessary.

If desired the passage which connects the air motor with the speed regulator may communicate with the rewind chamber as shown at *f²* in Fig. 7. In this modified construction when the rewind valve is closed the air is exhausted from the motor C through the rewind-chamber E², ports *j'* regulating chamber E' and regulating ports *h h³*, while when the rewind valve is opened, the air is exhausted directly through the port *j* without passing through the regulating chamber.

While I have herein shown and described a rocking rewind valve and a sliding regulating valve, other types of valves may obviously be substituted therefor without departing from the scope and spirit of the invention, and I do not therefore wish to be limited to the particular construction of these and other parts of the speed regulator.

I claim as my invention:

1. In a speed regulator for a pneumatic musical instrument, the combination of an air motor, a case containing an exhaust chamber, a regulating chamber connected with the exhaust chamber and a rewind chamber connected with said exhaust and regulating chambers, one of the two last-named chambers communicating with the air-motor, a regulating valve controlling the passage between the exhaust chamber and the regulating chamber, a rewind valve controlling the passage between the exhaust chamber and the rewind chamber, and means for operating said valves, substantially as set forth.

2. In a speed regulator for a pneumatic musical instrument, the combination of a pneumatic action, an air motor, a case containing an exhaust chamber, a regulating chamber connected with the exhaust chamber and a rewind chamber connected with said exhaust and regulating chambers, the motor being connected with said regulating chamber, a regulating valve controlling the passage between the exhaust chamber and

the regulating chamber, a rewind valve controlling the passage between the exhaust chamber and the rewind chamber, and an operating pneumatic for the rewind valve controlled by the pneumatic action, substantially as set forth.

3. In a speed regulator for the air motor of a pneumatic musical instrument, the combination of a pneumatic action, a case containing an exhaust chamber, a regulating chamber connected with the exhaust chamber and a rewind chamber connected with said exhaust and regulating chambers, a regulating valve controlling the passage between the exhaust chamber and the regulating chamber, a rewind valve controlling the passage between the exhaust chamber and the rewind chamber, a pneumatic for opening the rewind valve controlled by the pneumatic action, means for retaining the rewind valve in its open position, and means for releasing said retaining means, substantially as set forth.

4. In a speed regulator for the air motor of a pneumatic musical instrument, the combination of a pneumatic action, a case containing an exhaust chamber, a regulating chamber connected with the exhaust chamber and a rewind chamber connected with said exhaust and regulating chambers, a regulating valve controlling the passage between the exhaust chamber and the regulating chamber, a rewind valve controlling the passage between the exhaust chamber and the rewind chamber, a pneumatic for opening the rewind valve controlled by the pneumatic action, an automatic locking device for retaining said pneumatic in its collapsed condition, and a releasing device—acting upon said locking device, substantially as set forth.

5. In a speed regulator for the air motor of a pneumatic musical instrument, the combination of a pneumatic action, a case containing an exhaust chamber, a regulating chamber connected with the exhaust chamber and a rewind chamber connected with said exhaust and regulating chambers, a regulating valve controlling the passage between the exhaust chamber and the regulating chamber, a rewind valve controlling the passage between the exhaust chamber and the rewind chamber, a pneumatic for opening the rewind-valve controlled by the pneumatic action, an automatic locking device for retaining said pneumatic in its collapsed condition and a second pneumatic for releasing said locking device, substantially as set forth.

6. In a speed regulator for the air motor of a pneumatic musical instrument, the combination of a pneumatic action, a case containing an exhaust chamber, a regulating chamber connected with the exhaust chamber and a rewind chamber connected with said exhaust and regulating chambers, a regulating valve controlling the passage between the exhaust chamber and the regulating chamber,

a rewind valve controlling the passage between the exhaust chamber and the rewind chamber a pneumatic for opening the rewind-valve controlled by the pneumatic action, an automatic locking device for retaining said pneumatic in its collapsed condition, and a second pneumatic communicating with said exhaust chamber and controlling said locking device, substantially as set forth.

7. In a speed regulator for the air motor of a pneumatic musical instrument, the combination of a pneumatic action, a case containing an exhaust chamber, a regulating chamber connected with the exhaust chamber and a rewind chamber connected with said exhaust and regulating chambers, a regulating valve controlling the passage between the exhaust chamber and the regulating chamber, a rewind valve controlling the passage between the exhaust chamber and the rewind chamber, a pneumatic for opening said rewind-valve controlled by the pneumatic action, a pivoted catch arranged to interlock with the movable board of said pneumatic and an unlocking pneumatic connected with said catch, substantially as set forth.

8. In a speed regulator for the air motor of a pneumatic musical instrument, the combination of a pneumatic action, a case containing an exhaust chamber, a regulating chamber connected with the exhaust chamber and a rewind chamber connected with said exhaust and regulating chambers, a regulating valve controlling the passage between the exhaust chamber and the regulating chamber, a rewind valve controlling the passage between the exhaust chamber and the rewind chamber, a pneumatic for opening said rewind valve controlled by the pneumatic action, a pivoted catch arranged to interlock with the movable board of said pneumatic, an unlocking pneumatic and a connection between the last named pneumatic and said catch capable of sliding on the catch in one direction, substantially as set forth.

9. In a speed regulator for the air motor of a pneumatic musical instrument, the combination of a case containing an exhaust chamber, a regulating chamber connected with the exhaust chamber and a rewind chamber connected with said exhaust and regulating chambers, a regulating valve controlling the passage between the exhaust chamber and the regulating chamber, a rocking rewind valve controlling the passage between the exhaust chamber and the rewind chamber, a pneumatic for opening the rewind-valve mounted horizontally on said case, a locking device for retaining said pneumatic in its collapsed condition and a second pneumatic for releasing said locking device, communicating with said exhaust chamber, substantially as set forth.

10. In a speed regulator for a pneumatic

musical instrument, the combination of an
air motor, a case containing an exhaust
chamber, a regulating chamber communicat-
ing with said exhaust chamber and the main
5 exhaust channel of the air motor, and a re-
wind chamber connected with said exhaust
and regulating chambers, valves respectively
controlling the passages between the exhaust
chamber and the regulating and rewind

chambers, and means for operating said 10
valves, substantially as set forth.

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

EUGENE DE KLEIST.

Witnesses:

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