

No. 713,053.

Patented Nov. 11, 1902.

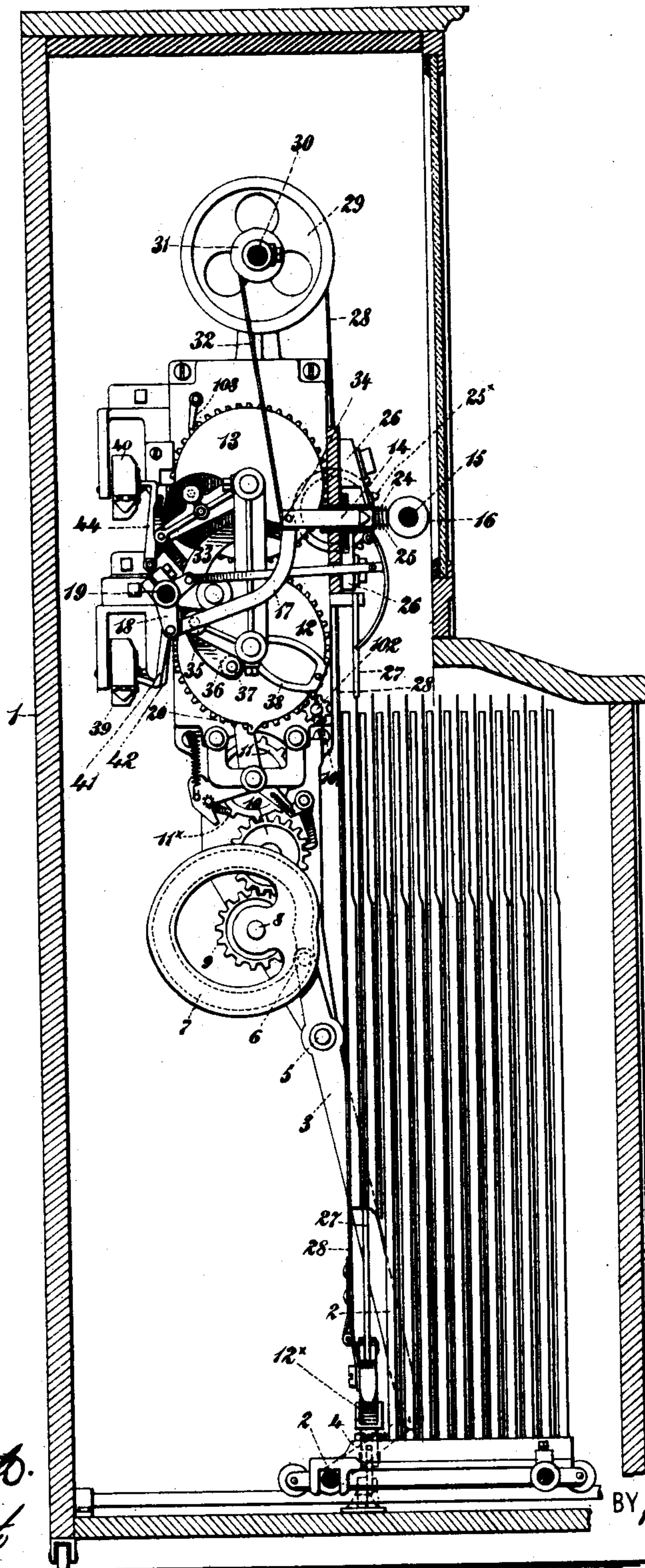
G. A. BRACHHAUSEN.
AUTOMATIC MUSICAL INSTRUMENT.

(Application filed June 2, 1900.)

(No Model.)

5 Sheets—Sheet 1.

Fig. 1.



WITNESSES:

Ch. Dietrich.
M. Smith

INVENTOR

G. A. Bradhausen

BY *Brier Knantz*

ATTORNEYS

No. 713,053.

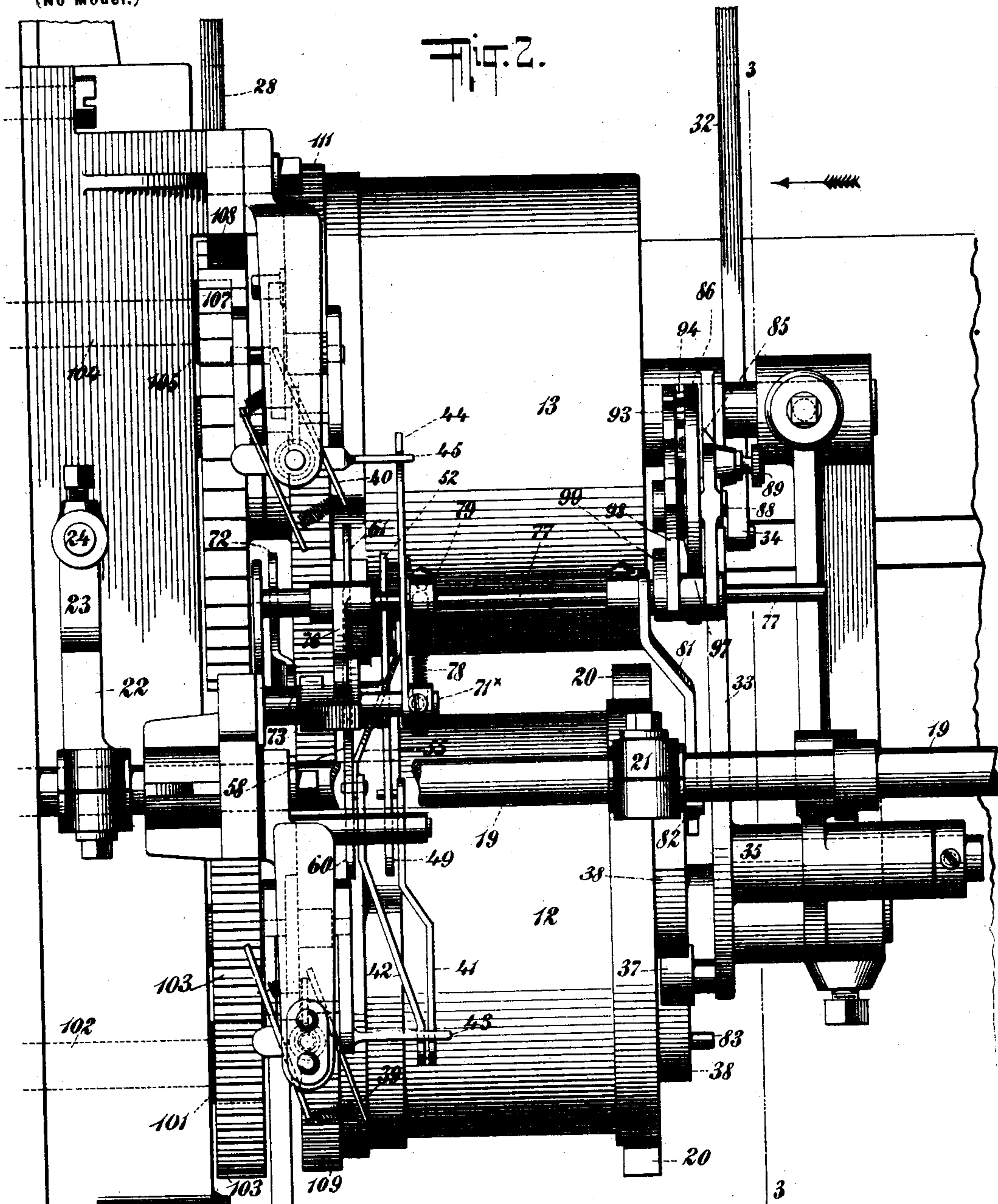
Patented Nov. 11, 1902.

G. A. BRACHHAUSEN.
AUTOMATIC MUSICAL INSTRUMENT.

(Application filed June 2, 1900.)

5 Sheets—Sheet 2.

(No Model.)

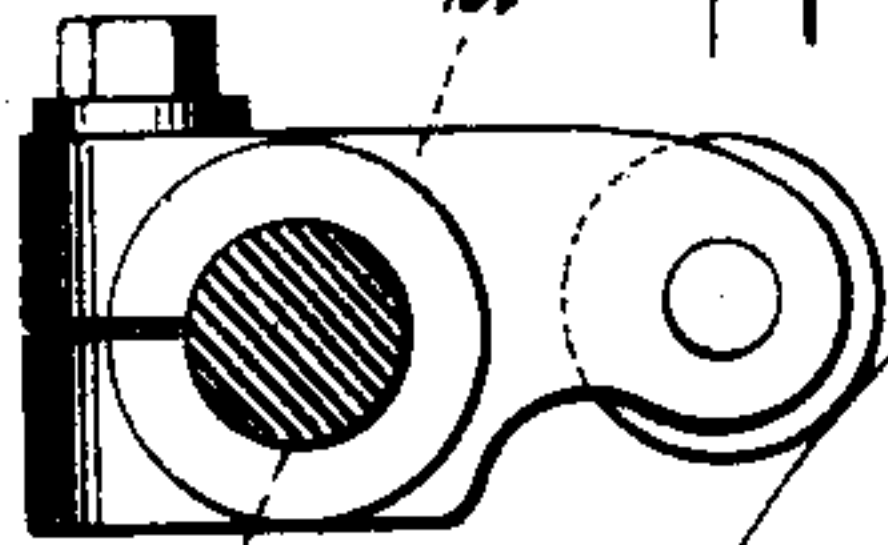


WITNESSES:

Gustave Dietrich

Wm. Smith

Fig. 11.



INVENTOR

Gustav A. Brachhausen

BY *Brisson Thumt*

ATTORNEYS

No. 713,053.

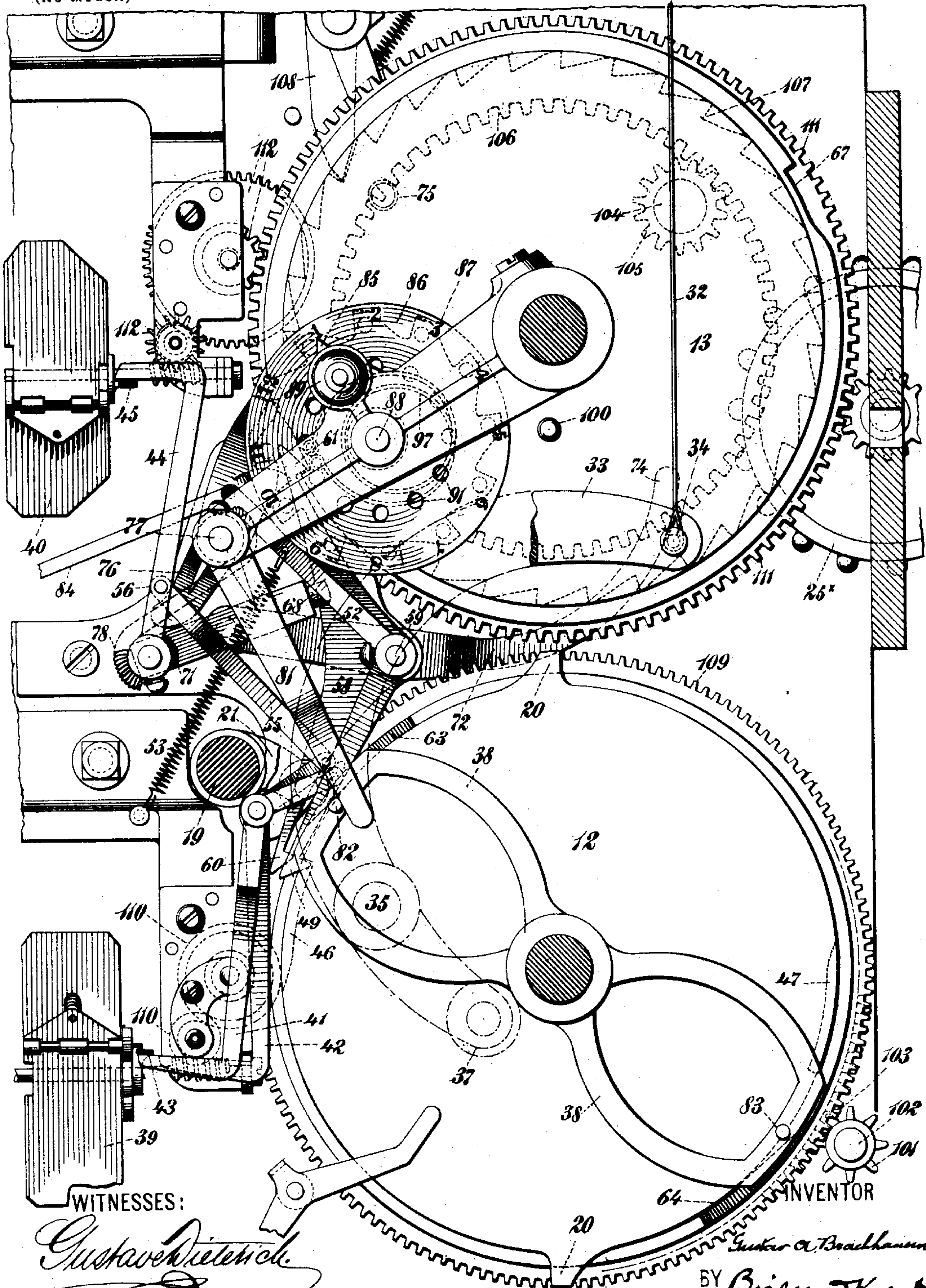
Patented Nov. 11, 1902.

G. A. BRACHHAUSEN.
AUTOMATIC MUSICAL INSTRUMENT.

(Application filed June 2, 1900.)

(No Model.)

5 Sheets—Sheet 3.



WITNESSES:

Gustave Dietrich

Wm. E. Smith

Fig. 3.

INVENTOR
Gustav A. Brachhausen
BY *Brian Thwaitz*

ATTORNEYS

No. 713,053.

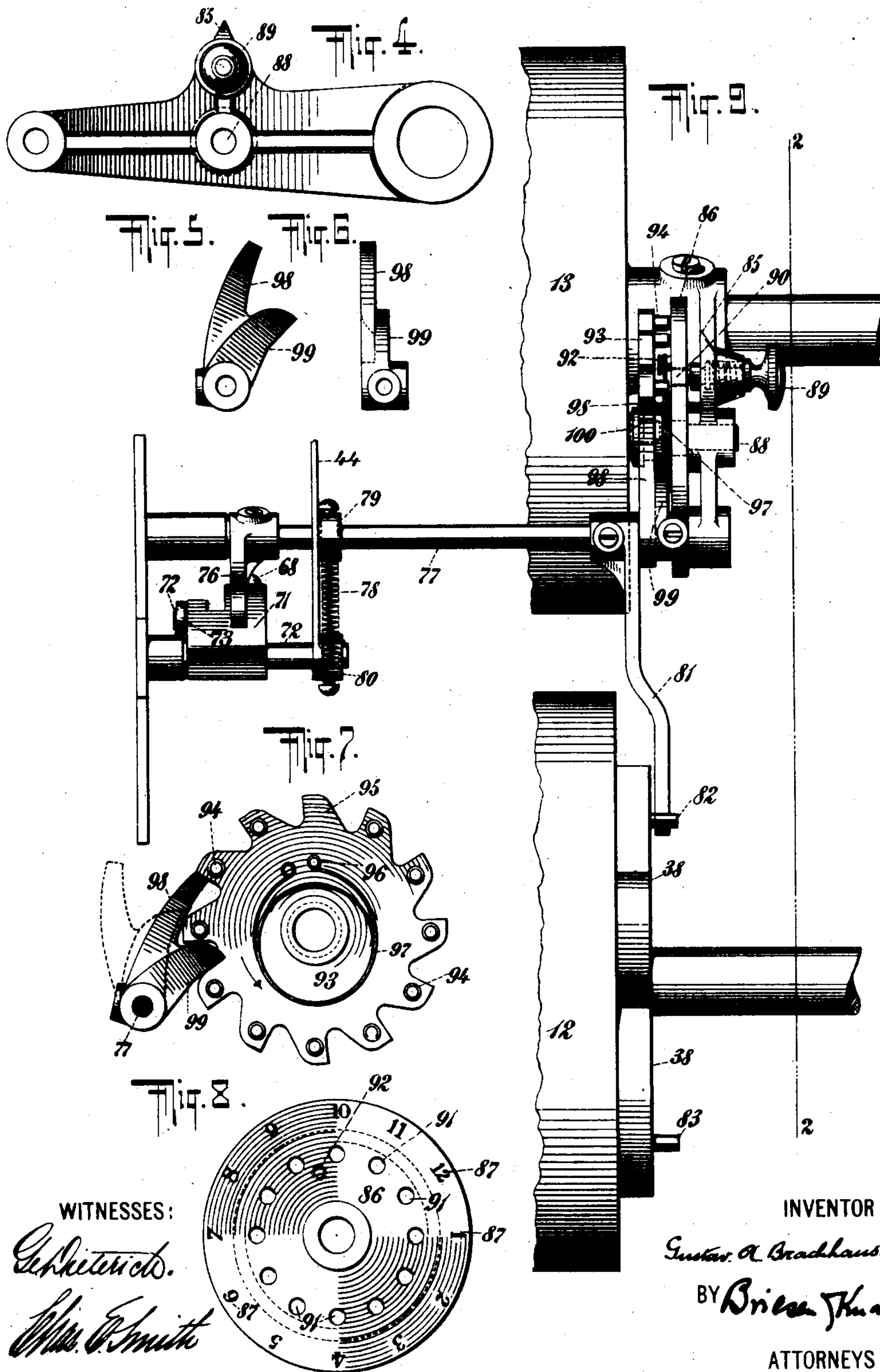
Patented Nov. 11, 1902.

G. A. BRACHHAUSEN.
AUTOMATIC MUSICAL INSTRUMENT.

(Application filed June 2, 1900.)

(No Model.)

5 Sheets--Sheet 4.



THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 713,053.

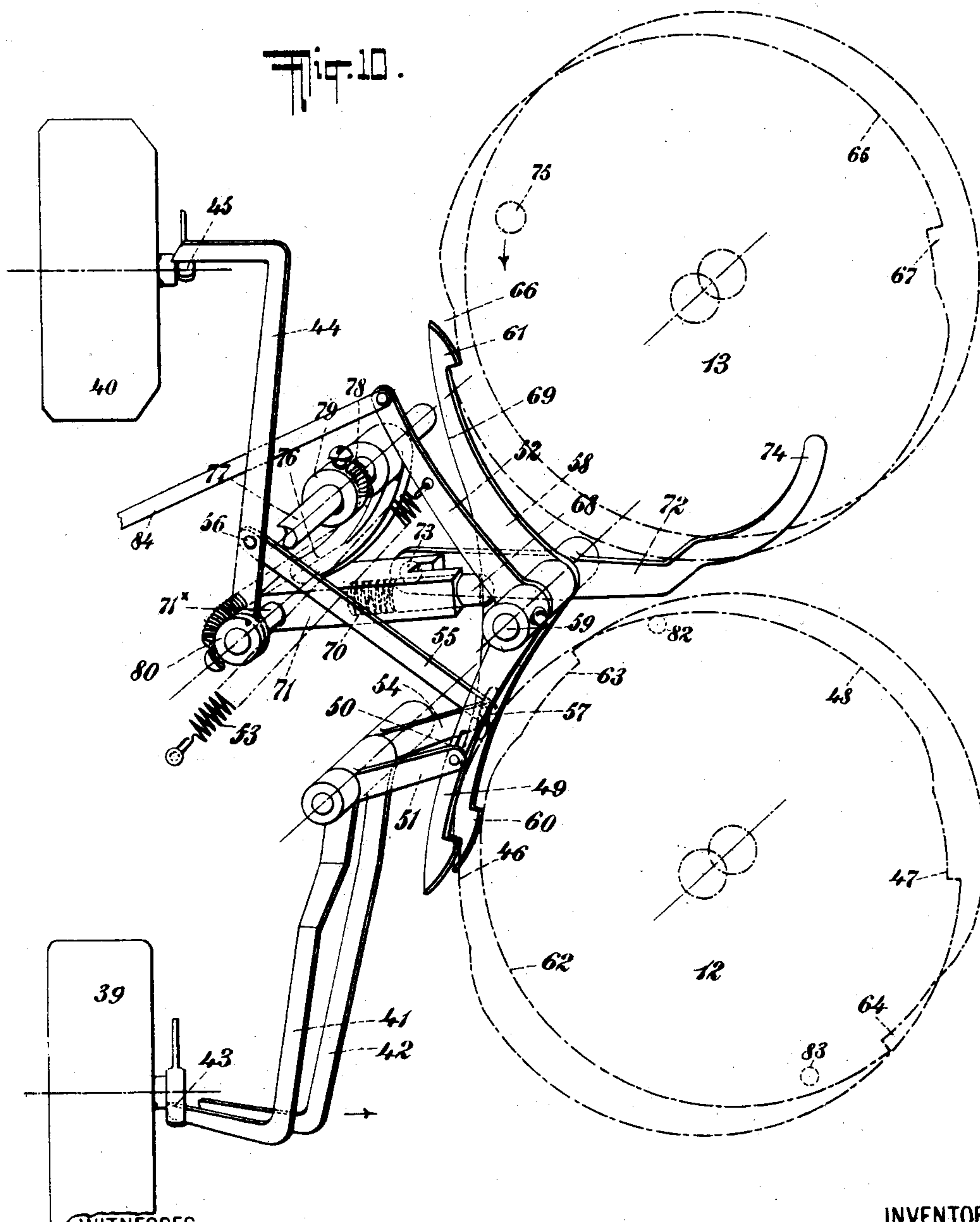
Patented Nov. 11, 1902.

G. A. BRACHHAUSEN.
AUTOMATIC MUSICAL INSTRUMENT.

(Application filed June 2, 1900.)

(No Model.)

5 Sheets—Sheet 5.



WITNESSES:

Gustave Dietrich
Walter E. Smith

INVENTOR

Gustav A. Brachhausen

BY

Briesen Knautz

ATTORNEYS

UNITED STATES PATENT OFFICE.

GUSTAV A. BRACHHAUSEN, OF RAHWAY, NEW JERSEY, ASSIGNOR TO
REGINA MUSIC BOX COMPANY, OF RAHWAY, NEW JERSEY, A COR-
PORATION OF NEW JERSEY.

AUTOMATIC MUSICAL INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 713,053, dated November 11, 1902.

Application filed June 2, 1900. Serial No. 18,827. (No model.)

To all whom it may concern:

Be it known that I, GUSTAV A. BRACHHAUSEN, a citizen of the United States, residing at Rahway, Union county, State of New Jersey, have invented certain new and useful Improvements in Automatic Musical Instruments, of which the following is a specification.

My invention relates more particularly to automatic musical instruments, and is directed to mechanism for controlling the number of automatic operations which may be given at each operation of the starting-lever or starting mechanism—that is to say, the invention has for its object to provide mechanism which in the present instance may be set to permit a tune to be played any desired number of times upon a single movement of the starting-lever or starting mechanism and which will cause the instrument to be automatically stopped when the tune has been played the predetermined number of times.

The invention will be found of great advantage in coin-controlled devices wherein a movement of the starting-lever or starting mechanism can only be effected with the aid of a coin. The employment of my invention in musical instruments, for instance, will enable the owner of the instrument to set it to play a tune one or more times upon the insertion of each coin, so that the number of times a tune is played by each coin depends upon the predetermined arrangement of the mechanism by the owner thereof.

To these ends my invention consists in the novel arrangement and combination of parts hereinafter described and claimed.

In the drawings, Figure 1 represents a central vertical sectional view of an automatic musical instrument embodying my invention, the section being taken from front to rear of the instrument. In this view portions of the device have been omitted for the purpose of clearer illustration. Fig. 2 is an enlarged detail rear elevation of a portion of the mechanism to be hereinafter described. Fig. 3 is a transverse vertical sectional view of the same, taken on the line 3-3 of Fig. 2 and looking in the direction of the arrow in said figure. Figs.

4 and 11 are detail side views of portions of the device to be hereinafter described. Fig. 5 is a detail side view of a portion of the mechanism to be hereinafter described. Fig. 6 is a front view of the same. Figs. 7 and 8 are detail face views of certain portions of the repeating mechanism to be hereinafter more fully described. Fig. 9 is a fragmentary detail rear view of portions of the repeating mechanism, together with the parts with which they cooperate. Fig. 10 is a diagrammatic view of the motor-controlling mechanism.

Referring specifically to Fig. 1 of the drawings, it will be observed that the instrument is contained within an inclosing casing 1 and that a suitable note-sheet carriage 2 is adapted to reciprocate in opposite directions therein to bring the note-sheets to a position to be conveyed to operative position in the instrument. The mechanism for effecting the movement of the carriage consists in the present instance of a lever 3, which is connected to a link 4, which in turn is connected to the carriage 2. The lever 3 is pivoted at 5, and the upper end thereof carries an antifriction-roller 6, which extends into an internal endless cam 7. The cam 7 is pivoted at 8 and is rigidly connected to a gear 9, which meshes with a cooperating gear 10. The gear 10 receives an intermittent rotary motion from a gear 11, that is moved intermittently by suitable pawl 11^x, which has movement imparted thereto by a spring-motor 12. This carriage may likewise be moved by hand in order to bring the desired sheet into the path of the conveying mechanism in any desired manner—such, for instance, as described in prior patents granted to me. The note sheet or disk which it is desired to play having been moved by the carriage into the path of suitable conveying mechanism 12^x will at the proper time be conveyed up into the operative position, when by mechanism which is to be hereinafter described the spring-motor 12 will be automatically stopped and the motor 13 will be automatically set in operation to effect a playing movement of the sheet. After the desired number of playing movements of

the sheet has taken place the spring-motor 13 is automatically stopped and the spring-motor 12 is set in operation to convey the sheet back into its respective position in the carriage. When the note-sheet has been raised into the operative position, the note sheet or disk pivot-pin 14 will be automatically projected through a central bearing therein and the clamping-rod 15 will be simultaneously moved, so as to bring the antifriction-rollers 16 thereon into contact with the sheet, and thus clamp it into operative position. The mechanism for effecting this movement of the pivot-pin and clamping-rod will now be briefly described. The movable pivot-pin 14 is adapted to be reciprocated in a suitable bearing by a link 17, which is connected to an arm 18, fixed upon a rock-shaft 19. Movement is transmitted to this rock-shaft 19 by the cams 20 on the spring drum or motor 12 contacting with a roller carried upon an arm 21, fixed upon the rock-shaft 19. (See Figs. 2, 3, and 11.) This rock-shaft 19 is likewise provided with arms 22, (see Fig. 2,) each of which contacts with an abutment 23, carried upon each of the rods 24. The rods 24 extend from the rear toward the front of the machine, where they are connected to the clamping-rod 15. The clamping-rod 15 is moved to the freeing position (illustrated in Fig. 1 of the drawings) by coiled springs 25, which surround said rods 24 and tend to force the clamping-rod outwardly.

It will be understood from the foregoing description that an oscillation of the rock-shaft 19 in one direction will cause an outward movement of the note-sheet pivot-pin and a simultaneous inward movement of the clamping-rod to bring about the insertion of the pivot-pin in the bearing in the note-sheet and to clamp the note-sheet in the operative position. This clamping of the note-sheet in the operative position in the manner described causes the note-sheet to be engaged by the driving-wheel 25^x, Figs. 1 and 3, therefore, so that when the movement of the motor 12 is arrested and the motor 13 is permitted to revolve a movement will be transmitted to the driving-wheel from said last-mentioned motor to effect a playing movement of the sheet. It will be understood that this playing movement of the sheet will bring about a playing operation, which in the present instance consists in transmitting movement to suitable star-wheels, which vibrate the tongues of one or more suitable steel combs 26. (See Fig. 1.) It will be understood that any suitable mechanism may be employed for conveying the note-sheets to and from operative position. In the present instance I have illustrated in Fig. 1 bifurcated conveying-fingers 12^x, which are moved up and down upon the guide-rods 27 therefor by the flexible connections 28, which are connected to said fingers. These flexible connections or bands 28 are in turn connected to band-pulleys 29, which are fixed upon the shaft 30. This shaft 30 likewise

has fixed thereon a band-pulley 31, to which is connected a flexible connection or band 32. The opposite end of this band 32 is connected to a lever 33, as indicated at 34. The lever 33 is pivoted to a fixed pintle, as indicated at 35, and has an oppositely-extending depending arm 36, which carries an antifriction-roller 37, that is adapted to bear upon the cam 38, which is carried by the drum 12. It will thus be seen that a rotation of the drum 12 will cause the lever 33 to be vibrated on its pivot, thus moving the band 32 and transmitting motion to the shaft 30 and to the flexible connections 28, which are connected to the pulleys 29 upon said shaft, thereby effecting the raising and lowering of the bifurcated fingers 12^x and conveying the note-disks to and from operative position in the instrument. Each of the motors 12 and 13 is likewise provided with a cooperating governor 39 and 40, respectively, which control the movement of said motors and are themselves stopped and permitted to rotate by suitable stop-arms. Thus the governor 39 is provided with two stop-arms 41 42, which are adapted to contact with an arm 43, carried by the governor, whereas the governor 40 has a cooperating stop-arm 44, which is adapted to contact with an arm 45, carried by the governor 40. Suitable intermediate mechanism between the spring-motors 12 and 13 is provided for setting one motor in operation when the other is stopped. I will now proceed to describe this intermediate controlling mechanism for the motors.

Special reference being had to the diagrammatic view shown in Fig. 10, it will be seen that the spring-drum 12 is provided with oppositely-disposed recesses or notches 46 47 in a cam-track 48. This cam-track 48 is on the periphery of the drum, and a lever 49 is adapted to cooperate therewith. The lever 49 is connected by a pin-and-slot connection 50 to an arm 51, which is rigidly connected to the stop-arm 41. The lever 49 is provided with a second arm 52, which is connected to a spring 53, which normally maintains the nose of the lever 49 in contact with the cam-track 48 on the drum 12. The relation of the parts just described is such that when the instrument is in a state of rest, as illustrated in Fig. 10 of the drawings, the nose of the lever 49 will be depressed by the spring 53 into one of the notches or depressions 46 47 in the cam-track 48 and the stop arm or lever 41 will be projected into the path of the cooperating arm 43 of the governor 39, thus maintaining the motor 12 against movement. The stop-arm 42 is rigidly connected to an arm 54, which in turn is pivotally connected to a link 55. This link 55 is pivoted at its opposite end to the stop arm or lever 44, as indicated at 56. The pivot 57, which connects the arm 54 to the link 55, extends into a slot in the piece 58 (see Fig. 10) and forms a connection between said arm and link and the piece 58, which latter I term a "controlling-piece." This controlling-

piece 58 is adapted to oscillate upon a pivot 59 and is provided at one end with a nose 60 and upon the opposite end with the nose 61. It will thus be seen that the position of the
 5 controlling-piece 58 determines the positioning of the stop-arms 42 and 44—that is to say, if it effects a movement of the stop-arm 42 in the direction of the arrow in Fig. 10 it will cause the arm 44 to be projected into the path
 10 of the arm 45 of the governor 40. The nose 60 of this controlling-piece 58 is adapted to bear upon a cam-track 62 on the periphery of the spring-drum 12 and at intervals to be depressed into either of the oppositely-disposed
 15 depressions 63 64 in said cam-track. The nose 61 upon the opposite end of this controlling-piece 58 is adapted to cooperate with a cam-track 65 and to be forced at intervals into one or the other of the oppositely-disposed de-
 20 pressions 66 67 in said cam-track. The positioning of the controlling-piece 58 is determined by a spring-pressed pin 68, which is bifurcated at its end, so as to straddle and bear upon one edge 69 of said controlling-piece
 25 and to exert a pressure thereon through the spring 70. This pin 68 and its spring are carried by an oscillating piece 71, which is pivoted at 71^x. Connection is made between the piece 71 and the lever 72, which is
 30 pivoted upon the rod 59. This pivotal connection between the piece 71 and the lever 72 is indicated at 73. The lever 72 has an arm 74, that is adapted to project into the path of a pin 75 upon the spring-drum 13 and to be op-
 35 erated thereby to shift the piece 71 to one side of the pivot 59 of the controlling-piece 58, as represented in Fig. 10 of the drawings. This movement of the lever 72 causes a pressure to be exerted upon the upper end of the con-
 40 trolling-piece 58 to depress the nose 61 thereof into one or the other of the depressions 66 67 in the cam-track 65 when a depression is brought opposite the nose. This movement of the controlling-piece 58 causes the stop-
 45 arm 44 to be projected into the path of the arm 45 on the governor 40 to arrest its movement. When, however, the piece 71 has been moved upon its pivot to the opposite side of the pivot 59 of the controlling-piece, a pres-
 50 sure will be exerted upon the lower end of the controlling-piece to force the nose 60 thereof into one of the depressions 63 64 when the same arrives at a point opposite the nose. This movement of the controlling-piece 58
 55 forces the arm 42 into the path of the arm 43 of the governor 39 to arrest its movement and simultaneously withdraws the arm 44 from the path of the arm of the governor 40, thus releasing the governor 40 to permit a free
 60 movement of the motor 13. The mechanism for effecting a movement of the piece 71 in a downward direction to bring about this last-mentioned movement of the parts comprises an arm 76, connected to a rock-shaft 77. This
 65 rock-shaft 77 is maintained in the normal position by a spring 78, fixed at one end to a sleeve 79, carried by said rock-shaft, and at

its opposite end to a pin carried by a fixed sleeve 80. This rock-shaft 77 is likewise pro-
 70 vided with a depending arm 81, (see Fig. 3,) which is adapted to project into the path of suitable abutments 82 83, carried by the spring-drum 12. It will thus be understood that each half-revolution of the drum 12 will cause a movement to be transmitted to the
 75 arm 81 and to the rock-shaft 77. This oscillation of the rock-shaft 77 in the manner described causes the arm 76 to depress the piece 71, thereby causing a spring-pressure to be exerted upon the lower arm of the control-
 80 ling-piece 58.

Upon reference to Fig. 10 of the drawings it will be observed that a suitable starting-lever 84 is connected to the stop-arm 41 of the governor 39. This starting-lever may be
 85 of any suitable construction and is controlled from the outside of the inclosing casing either by means of the insertion of a coin or by suitable connection therewith of other auxiliary levers. (Not shown.) 90

In order to effect an operation of the apparatus, motion is transmitted to the starting-lever 84 by means of the insertion of a coin in the instrument or otherwise to move the lever or stop-arm 41 in the direction of the
 95 arrow in Fig. 10. This movement of the stop-arm 41 permits a free rotation of the governor 39 and at the same time withdraws the nose of the lever 49 from the recess 46 or 47 in which it was lodged. The release of the
 100 governor 39 permits the rotation of the spring-drum 12, and when the starting-lever has been released the nose upon the lever 49 will bear upon the highest portion of the cam-track 48 and will prevent the stop-arm 41
 105 from returning to the normal position until the nose of the lever 49 again arrives at one of the depressions 46 47 in the cam-track 48. During this movement of the drum 12 from one notch 46 to the other notch 47 an abut-
 110 ment 82 or 83 will be brought into contact with its cooperating arm 81 (see Fig. 3) and will oscillate the shaft 77, thereby moving the arm 76 and depressing the free end of the piece 71, so that it will exert a pressure upon
 115 the lower end of the controlling-piece 58. When this depression of the piece 71 has taken place, the nose 60 of the controlling-piece 58 will be forced into a notch or depression 63 64 when the same arrives opposite
 120 said nose. This movement of the nose 60 into a depression in the cam-track 62 causes the stop-arm 42 to be projected into the path of the arm 43 of the governor 39 to arrest its movement, thereby stopping the motor 12.
 125 At this same instant and by the same movement motion will be transmitted through the link 55 to the stop-arm 44, and said stop-arm will be withdrawn from the arm 45 of the governor 40, when the motor 13 will be free
 130 to move. The rotation of the motor or spring-drum 13 will bring the pin 75 thereon into contact with the arm 74 on the lever 72, thereby moving the piece 71 to exert a spring-pres-

sure upon the upper end of the controlling-piece 58. A movement of the spring-drum continues until a notch 66 or 67 arrives opposite the nose 61, when it will be depressed into the notch or depression and will force the stop-arm 44 into the path of the arm 45 of the governor 40, thereby arresting further movement of the spring-drum 13. By this same movement of the controlling-piece 58 motion is transmitted to the stop-arm 42 to withdraw the same from the path of the arm 43, carried by the governor 39, and the motor 12 will be free to rotate. This further rotation of the motor 12 will bring a depression 46 or 47 opposite the nose on the lever 49 and will permit a movement of the nose into the depression, thus forcing the stop-arm 41 into the path of the arm of the governor 39, thereby arresting the motor 12 and bringing the entire apparatus to a standstill. No further movement will be automatically transmitted to the parts until the starting-lever 84 is again operated.

The essential features of the present invention consist in providing mechanism for bringing about automatically the repetition of the piece for a predetermined number of playing operations. This is effected by a mechanism which coöperates with the controlling mechanism above described.

In the present instance the device comprises a pointer 85, secured to a stationary portion of the instrument. Coöperating with this pointer 85 is a dial 86, provided with numbers, as indicated at 87, that are adapted to register with the pointer 85. These numerals correspond to the number of repetitions which the instrument is capable of making, twelve being shown in the present instance, though it is obvious that any suitable number may be provided. This dial 86 is pivoted at 88 and is free to be rotated when disengaged by the locking mechanism. This locking mechanism comprises in the present instance a spring-pressed locking-bolt 89, the free end 90 of which is adapted to take into any one of the series of openings 91 which correspond in number to the number of playing operations which the instrument is capable of performing for each operation of the starting-lever. Thus the locking-bolt is adapted to lock the dial in any one of twelve positions to bring any one of the twelve numerals on the dial opposite to the pointer 85. Upon the inner face of the dial 86 is a laterally-extending pin 92. Adjacent to and upon the same pivot as the dial 86 is mounted a ratchet-wheel 93. This ratchet-wheel has laterally-extending pins 94, which are one less in number than the number of playing operations capable of being performed by a single depression of the starting-lever. From an examination of Fig. 7 of the drawings it will be seen that these pins 94 are equidistant apart, and that a blank space has been left at the point indicated by the numeral 95, and that one tooth is provided upon the ratchet-

wheel for each of the pins 94 and the blank space 95. Projecting from the same face of the wheel 93 is a pin 96, which is in the same concentric path of movement as the pin 92 upon the dial 86. This ratchet-wheel is free to rotate on its pivot, and the dial 86 and the ratchet-wheel 93 are united by a coiled spring 97. This coiled spring is connected at one end to the pin 96 and at its opposite end to the pin 92, so that when the ratchet-wheel is turned with relation to the dial the spring will exert a pressure tending to rotate the ratchet-wheel in the direction of the arrow in Fig. 7. When the ratchet-wheel is free to rotate, it will be caused to move around its pivot by the spring 97 until the pin 96 comes in contact with the pin 92 upon the dial, when the movement of the ratchet-wheel will be arrested. Coöperating with the teeth of the ratchet-wheel 93 is a pawl 98, whereas a pawl 99 coöperates with the pins 94 upon said wheel. The two pawls are connected to move together and are mounted upon the rock-shaft 77.

From an inspection of Fig. 7 of the drawings it will be observed that the blank space 95 of the ratchet-wheel is on the same radial line with the pin 96, and the pin 92 being on substantially the same radial line as the numeral "10" on the dial will cause the pin 96 to be arrested at this point, so as to bring the blank space of the ratchet-wheel opposite the numeral "10" on the dial. This being the case the blank space 95 on the ratchet-wheel will be under the pawl 99 when the dial is set so as to bring the numeral "1" into register with the pointer, as indicated in Fig. 3. The drum 13 is provided with a laterally-extending pin 100, which rotates with the drum and in each rotation thereof is adapted to engage one of the teeth of the ratchet-wheel, as indicated in Fig. 3 of the drawings, so as to transmit an intermittent rotary motion to said ratchet-wheel. The extent of this movement transmitted to the ratchet-wheel corresponds substantially to the space between two teeth thereof, and the movement of the ratchet-wheel transmits motion to the rock-shaft 77 through a pin 94 on the ratchet-wheel coming in contact with the pawl 99. This movement of the rock-shaft 77 is effective to force the piece 71 of the controlling mechanism to the lowermost position through the arm 76, as has been hereinbefore described. As soon as the pawl 99 is released from the pin 94 which transmitted movement thereto said pawl will be forced by the spring 78 between said pin and the next succeeding pin, and the nose of the pawl 98 will be brought into engagement with the next succeeding tooth of the ratchet-wheel and will prevent the ratchet-wheel from being rotated in the direction of the arrow, Fig. 7, to its normal position by the action of its spring 97. It will be understood that a movement is transmitted from the ratchet-wheel 93 through its pins 94 and the pawl 99 and shaft 77 to the piece 71 at each intermit-

tent movement of the ratchet-wheel transmitted by the spring-drum 13 and that as long as the piece 71 is maintained in the lowermost position, so as to exert a pressure upon the lower end of the controlling-piece 58, the motor 13 will continue to operate. The number of operations transmitted to the rock-shaft 77 and the piece 71 will depend upon the number of pins 94 which operate upon the pawl 99 before the blank space 95 is reached. When this blank space 95 is reached, the ratchet-wheel 93 will receive movement from the spring-drum 13 in the usual manner, but no movement will be transmitted to the pawl 99 by reason of the absence of the pin at the point 95. The piece 71 will therefore be allowed to remain in the elevated position, where it has been moved by the pin 75 on the drum 13 contacting with the arm 74 of the lever 72, so that a further rotation of the drum 13 will bring one of the notches 66 67 into register with the nose 61 on the controlling-piece 58, thereby permitting the nose to be depressed in the recess or depression to effect an arrest of the governor 40 and its motor 13 and to permit a movement of the governor 39 and its motor 12. The movement of the motor 12 will bring one of the recesses 46 47 opposite the nose of the lever 49, and the governor 39 will be stopped, thus bringing the entire mechanism to a standstill. It will therefore be seen that a movement of the dial 86 from left to right will carry with it the ratchet-wheel 93 and that the relative position of the blank space 95 on the ratchet-wheel to the pointer 85 will determine the number of playing operations. Thus if the dial is rotated to bring the numeral "12" thereon opposite the pointer 85 it will require a complete revolution of the ratchet-wheel before it is turned to a point where the blank space thereon arrives at the pawl 99. When this blank space arrives at the pawl 99, no motion will be transmitted thereto, and consequently no motion will be transmitted to the finger or arm 76, so that the piece 71 will be allowed to remain in the uppermost position, where it has been moved by the lever 72, and the motor 13 will be arrested in the manner hereinbefore described, after which the motor 12 will be set in operation and after having performed its several functions will be brought to a standstill. The final operation of the motor 12 will cause an abutment 82 or 83 thereon to contact with the depending arm 81 on the rock-shaft 77, thereby moving said rock-shaft and the pawls 98 99 to the dotted-line position represented in Fig. 7 of the drawings. It will be observed that this position of the pawls entirely frees the ratchet-wheel from engagement therewith and that it is free to be rotated to the normal position by its coiled spring 97. The next operation of the starting lever or mechanism 84 of the device will therefore bring about twelve repetitions of the piece to be played, and so on at each operation of the starting-lever. The spring-drums

or motor mechanism 12 and 13 may be of any desired construction and may be wound up from the exterior of the instrument in any suitable manner. In the present instance I have illustrated a winding-pin 101, which is connected to a winding-post 102, said pinion 101 meshing with a winding-gear 103, which is suitably connected with the inner end of the spring to wind the drum 12. The drum 13 is wound by a suitable winding-post 104, which carries at its inner end a pinion 105, that meshes with an internal gear 106. The periphery of this gear 106 is provided with or formed as a ratchet-wheel 107, which ratchet-wheel is engaged by a pawl 108 to prevent a backward movement thereof. The combined ratchet-wheel and gear 107 106 is connected to the inner end of a spring contained within the spring-drum 13 in any suitable manner, so as to wind the same. The drum 12 carries a driving-gear 109, that transmits motion to a train of gear 110, that operates the governor 39. The spring-drum 13 is likewise provided with a driving-gear 111, which coöperates with a train of gear 112, that transmits motion to the governor 40 of the spring-motor 13.

From the foregoing description it is thought that a clear understanding of the construction and operation of the various parts of the apparatus may be arrived at without a further description of the operation thereof.

While I have described with considerable detail one form of mechanism embodying my invention, I would have it understood that various changes in detail may be made without departing from the spirit of my invention and in order to adapt the invention to the various uses to which it is applicable.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. An automatic musical instrument which is played by the rotation of note-disks, having mechanism substantially as described for predetermining the number of revolutions each disk is to make.

2. The combination of mechanism for conveying separate sheets to operative position and out of operative position, mechanism for actuating said conveying means and controlling mechanism for predetermining the number of rotations of each note-disk, as described.

3. The combination of mechanism for conveying separate sheets to operative position and for returning said sheets to the place from which they were conveyed, starting means for rendering said conveying means effective and controlling mechanism for varying the number of playing operations transmitted to the sheet for each operation of the starting means.

4. The combination of mechanism for automatically conveying separate sheets to operative position and for automatically returning said sheets to the place from which they

were conveyed, starting means for rendering said conveying means effective and adjustable controlling mechanism for varying the number of playing operations transmitted to a sheet for each operation of the starting means, whereby a predetermined setting of the controlling means will determine the number of playing operations to be given each sheet for each operation of the starting means and the sheets will be automatically replaced after the completion of the playing operations.

5. The combination of an inclosing casing, mechanism for automatically conveying separate sheets to operative position and for automatically returning said sheets to the place from which they were conveyed, starting means controllable from the outside of the casing for rendering said conveying means effective and adjustable controlling mechanism for varying the number of playing operations transmitted to a sheet for each operation of the starting means, said controlling mechanism being contained within the inclosing casing, whereby a predetermined setting of the controlling means will determine the number of playing operations to be given each sheet for each operation of the starting means and the sheets will be automatically replaced after the completion of a playing operation.

6. The combination of mechanism for conveying separate sheets to operative position and for returning said sheets to the place from which they were conveyed, mechanism for clamping the sheets in the operative position, driving mechanism for operating a sheet when the same is in the operative position, starting means for rendering said conveying, clamping and driving mechanisms effective and adjustable mechanism for varying the number of operations of said driving mechanism at each operation of the starting means.

7. The combination of automatic mechanism for conveying separate sheets to operative position and for returning said sheets to the place from which they were conveyed, automatic mechanism for clamping the sheets in the operative position, automatic driving mechanism for operating a sheet when the same is in the operative position, starting means for rendering said automatic conveying, clamping and driving mechanisms effective and adjustable mechanism for varying the number of automatic operations of said driving mechanism at each operation of the starting means and determining when the clamping and conveying mechanisms shall be effective to replace the sheet being played.

8. The combination of an inclosing casing, automatic mechanism for conveying separate sheets to operative position and for returning said sheets to the place from which they were conveyed, automatic mechanism for clamping the sheets in the operative position, automatic driving mechanism for operating a sheet when the same is in the operative po-

sition, starting means for rendering said automatic conveying, clamping and driving mechanisms effective, automatic mechanism for bringing about the successive operation of the sheet conveying the clamping and driving mechanisms and adjustable mechanism contained within the inclosing casing for varying the number of automatic operations of said driving mechanism at each operation of the starting means and for determining when the clamping and conveying mechanisms shall be effective to replace the sheet being played.

9. The combination of mechanism for automatically conveying separate sheets to operative position, automatic mechanism for clamping a sheet in the operative position, a movable pivot upon which each of said sheets is adapted to rotate when the same is in the operative position, mechanism for automatically inserting the movable pivot in a bearing in a sheet, driving mechanism for rotating a sheet around its pivot, starting means for rendering the said conveying, clamping and pivot-moving mechanisms effective and mechanism for varying the number of playing operations for every movement of said conveying, clamping and pivot-moving mechanisms.

10. The combination of an inclosing casing, mechanism for automatically conveying separate sheets to operative position and for automatically returning said sheets to the place from which they were conveyed, automatic mechanism for clamping a sheet in the operative position, a movable pivot upon which each of said sheets is adapted to rotate when the same is in the operative position, mechanism for automatically inserting the movable pivot in a bearing in a sheet, automatically-operated driving mechanism for rotating a sheet around its pivot, means for successively bringing about the operation of the conveying, clamping and driving mechanisms, starting means controllable from the outside of the casing for rendering said conveying, clamping and pivot-moving and driving mechanisms effective and mechanism contained within the inclosing casing for varying the number of playing operations for each movement of said conveying, clamping and pivot-moving mechanisms.

11. The combination of mechanism for conveying separate sheets from one position to another and for returning the sheets to the original position, means for starting said conveying mechanism, mechanism for controlling the number of playing operations of a sheet for each operation of the starting means and index mechanism for determining the proper setting of the controlling mechanism to bring about the desired number of playing operations.

12. The combination of mechanism for conveying separate sheets to operative position and for returning said sheets to the place from which they were conveyed, starting means for rendering said conveying means ef-

fective, mechanism for varying the number of playing operations transmitted to a sheet for each operation of the starting means and index mechanism for determining the proper setting of the controlling mechanism to bring about the desired number of playing operations.

13. The combination of mechanism for conveying separate sheets to operative position, a motor for operating said conveying mechanism, starting means for said motor, driving mechanism for effecting a movement of a sheet when it has been conveyed to the operative position, a motor for operating said driving mechanism, intermediate motor-controlling mechanism between said motors for starting one motor when the other is stopped and controlling mechanism for permitting any desired number of operations of the motor that operates the driving mechanism for each operation of the starting means and for automatically effecting an arrest of said last-mentioned motor when the desired number of operations have taken place.

14. The combination of automatic mechanism for conveying separate sheets to operative position and for returning said sheets to the place from which they were conveyed, a motor for automatically operating said conveying mechanism, starting means for said motor, driving mechanism for automatically effecting a movement of a sheet when it has been conveyed to the operative position, a motor for operating said driving mechanism, intermediate automatically-operated motor-controlling mechanism between said motors for freeing one motor when the other is stopped and adjustable controlling mechanism for permitting any desired number of operations of the motor which operates the driving mechanism for each operation of the starting means for automatically effecting an arrest of said last-mentioned motor when the desired number of operations have taken place.

15. The combination of automatic mechanism for conveying separate sheets to operative position and for returning said sheets to the place from which they were conveyed, mechanism for automatically clamping a sheet in the operative position, a motor for automatically operating said conveying and clamping mechanisms, starting means for said motor, driving mechanism for automatically effecting a movement of a sheet when it has been conveyed to the operative position and is clamped therein, a motor for operating said driving mechanism, intermediate automatically-operated motor-controlling mechanism between said motors for starting one motor when the other is stopped and adjustable controlling mechanism for permitting any desired number of operations of the motor that operates the driving mechanism for each operation of the starting means and for automatically effecting an arrest of said last-mentioned motor when the desired number of operations have taken place.

16. The combination of a sheet-carriage, mechanism for automatically moving said carriage, automatic mechanism for conveying separate sheets to operative position and for returning said sheets to their respective places in the carriage, mechanism for automatically clamping a sheet in the operative position, a motor for automatically operating said carriage moving, conveying and clamping mechanisms, starting means for said motor, driving mechanism for automatically effecting a movement of a sheet when it has been conveyed to the operative position and is clamped therein, a motor for operating said driving mechanism, intermediate automatically-operated motor-controlling mechanism between said motors for starting one motor when the other is stopped and adjustable controlling mechanism for permitting any desired number of operations of the motor that operates the driving mechanism for each operation of the starting means and for automatically effecting an arrest of said last-mentioned motor when the desired number of operations have taken place.

17. In an automatic mechanical musical instrument, the combination of motor mechanism for effecting a playing of the instrument, starting mechanism for rendering said motor mechanism effective and controlling mechanism having a movement automatically transmitted thereto for each playing operation and hand-operated means for positioning the controlling mechanism to vary the number of playing operations for each operation of the starting means.

18. In an automatic mechanical musical instrument, the combination of motor mechanism for effecting a playing of the instrument, starting mechanism for rendering said motor mechanism effective and controlling mechanism having a movement automatically transmitted thereto for each playing operation, hand-operated means for positioning the controlling mechanism to vary the number of playing operations for each operation of the starting means and index mechanism cooperating with said hand-operated positioning means for indicating the number of playing operations for each operation of the starting means.

19. In an automatic mechanical musical instrument, the combination of motor mechanism for effecting a playing of the instrument, starting mechanism for rendering said motor mechanism effective, controlling mechanism having a movement automatically transmitted thereto for each playing operation, hand-operated means for positioning the controlling mechanism to vary the number of playing operations for each operation of the starting means and means cooperating with said controlling mechanism for effecting a restoration of the controlling mechanism to the normal position after the number of movements determined by the hand-operated positioning means have taken place.

20. In an automatic mechanical musical instrument, the combination of motor mechanism for effecting a playing of the instrument, starting mechanism for rendering the said
 5 motor mechanism effective, controlling mechanism having a movement automatically transmitted thereto for each playing operation, hand-operated means for positioning the
 10 controlling mechanism to vary the number of playing operations for each operation of the starting means, index mechanism cooperating with said hand-operated positioning means for indicating the number of operations for each operation of the starting means and
 15 means cooperating with the said controlling mechanism for effecting a restoration of the controlling mechanism to the normal position after the number of movements determined by the hand-operated positioning means have
 20 taken place.

21. In a mechanical musical instrument, the combination of playing mechanism, a wheel which is moved at each playing operation of the instrument, means for automatically effecting an arrest of the playing mechanism and means cooperating with the wheel
 25 and the arresting means for determining when the arresting means shall be effective to stop the playing mechanism.

30 22. In a mechanical musical instrument, the combination of playing mechanism, a wheel which is moved at each playing operation of the instrument, means for automatically effecting an arrest of the playing mechanism,

means cooperating with the wheel and the arresting means for determining when the arresting means shall be effective to stop the playing mechanism and means for restoring said wheel to its normal position after a predetermined number of movements. 35 40

23. In a mechanical musical instrument, the combination of playing mechanism, an adjustable wheel which is moved at each playing operation of the instrument, means for automatically effecting an arrest of the playing mechanism, and mechanism cooperating with said wheel and the arresting means to move the latter to a point where it is effective to stop the playing mechanism. 45 50

24. In a mechanical musical instrument, the combination of playing mechanism, an adjustable wheel which is moved at each playing operation of the instrument, means for automatically effecting an arrest of the playing mechanism, intermediate mechanism between the wheel and the arresting means to move the latter to a point where it is ineffective to stop the playing mechanism, means for restoring said wheel to its normal position after a predetermined number of movements and index mechanism for indicating the adjustment of the wheel and the number of playing operations that will take place for each starting of the instrument. 55 60

GUSTAV A. BRACHHAUSEN.

Witnesses:

CHARLES E. SMITH,
 HANS V. BRIESEN.