

No. 788,265.

PATENTED APR. 25, 1905.

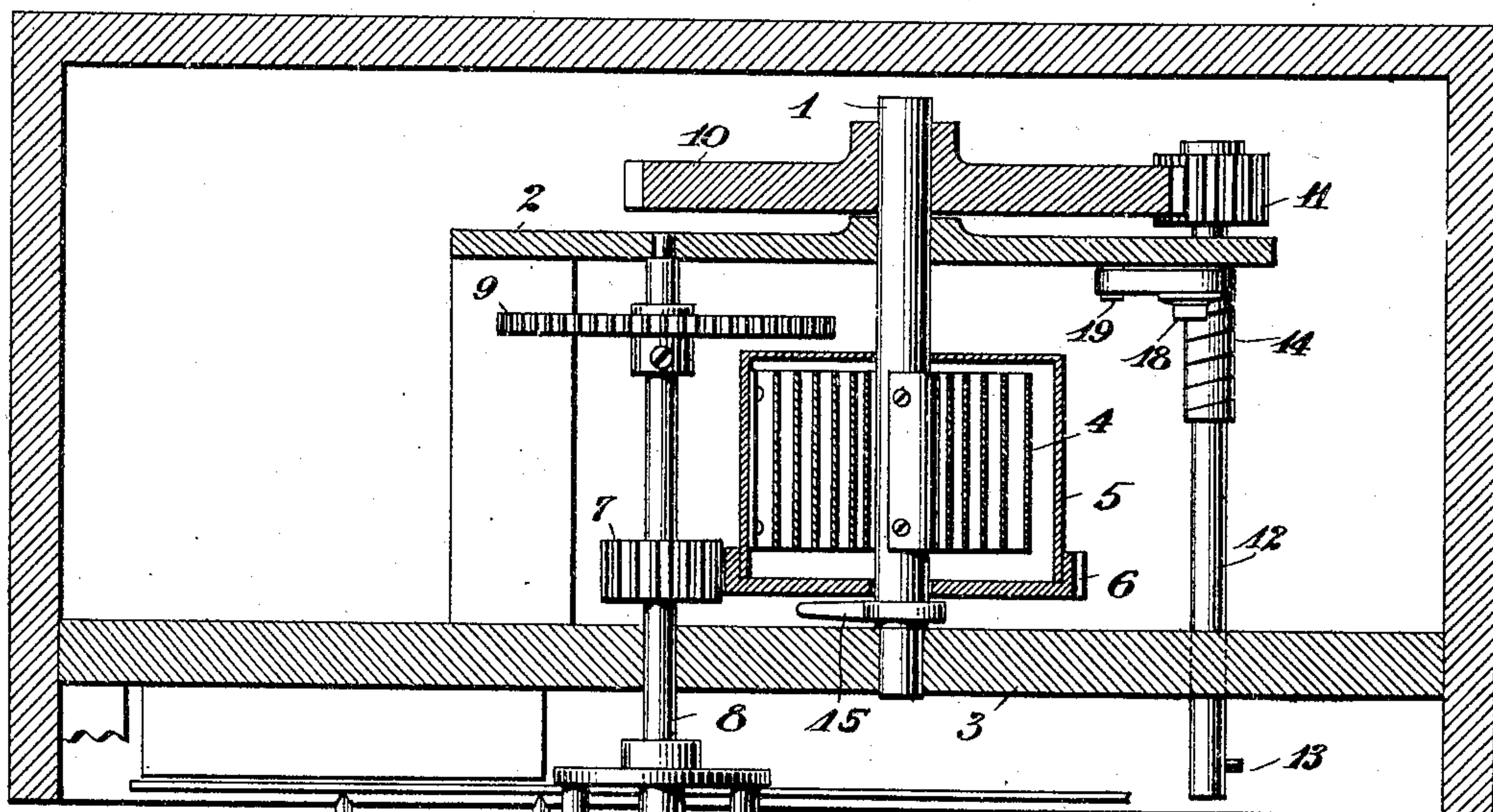
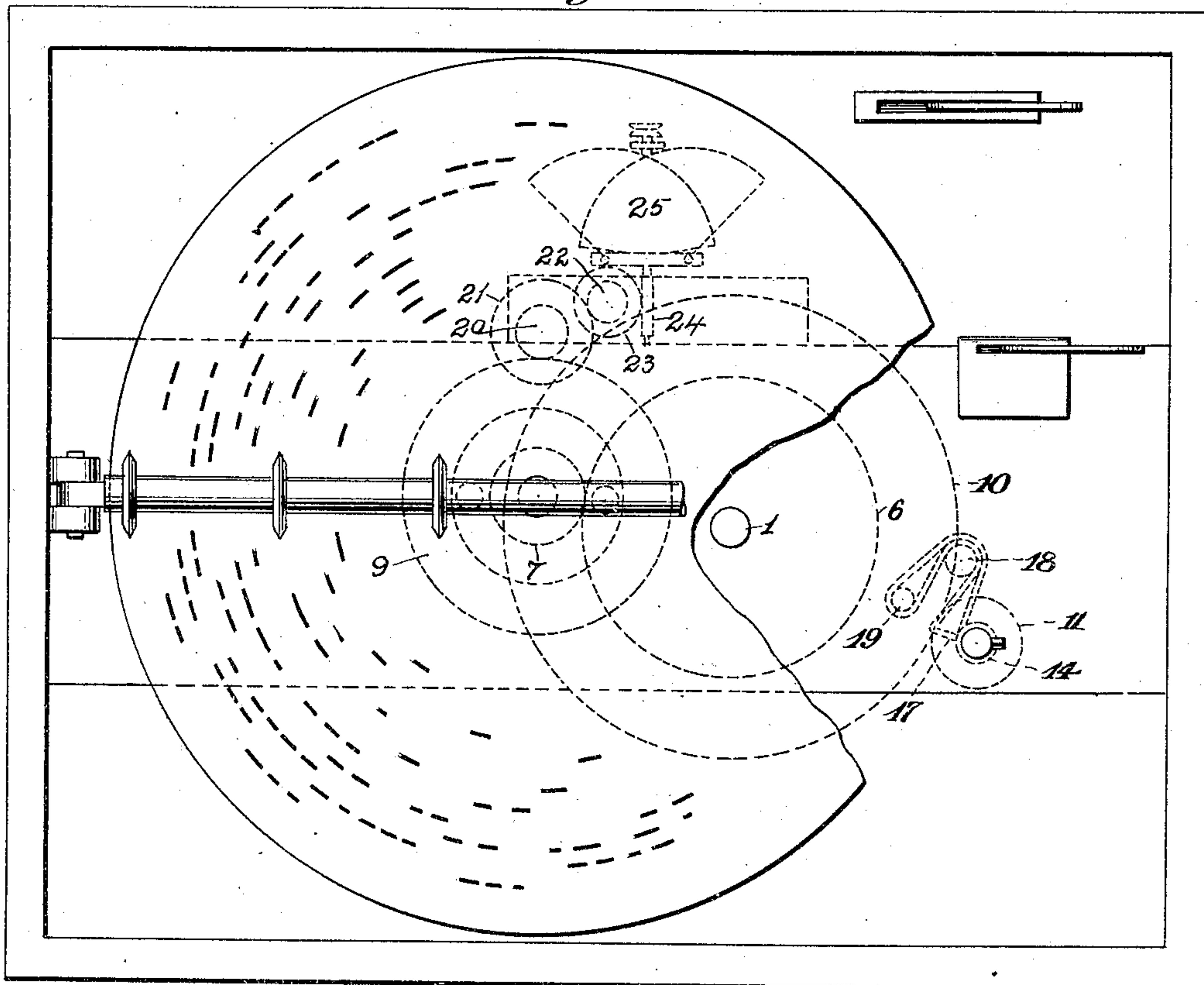
A. KELLER.

OPERATING MECHANISM FOR AUTOMATIC MUSICAL INSTRUMENTS.

APPLICATION FILED APR. 22, 1903.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses
Fayle A. Ober
[Signature]

Fig. 2.

By his Attorney

Inventor
ALFRED KELLER

[Signature]

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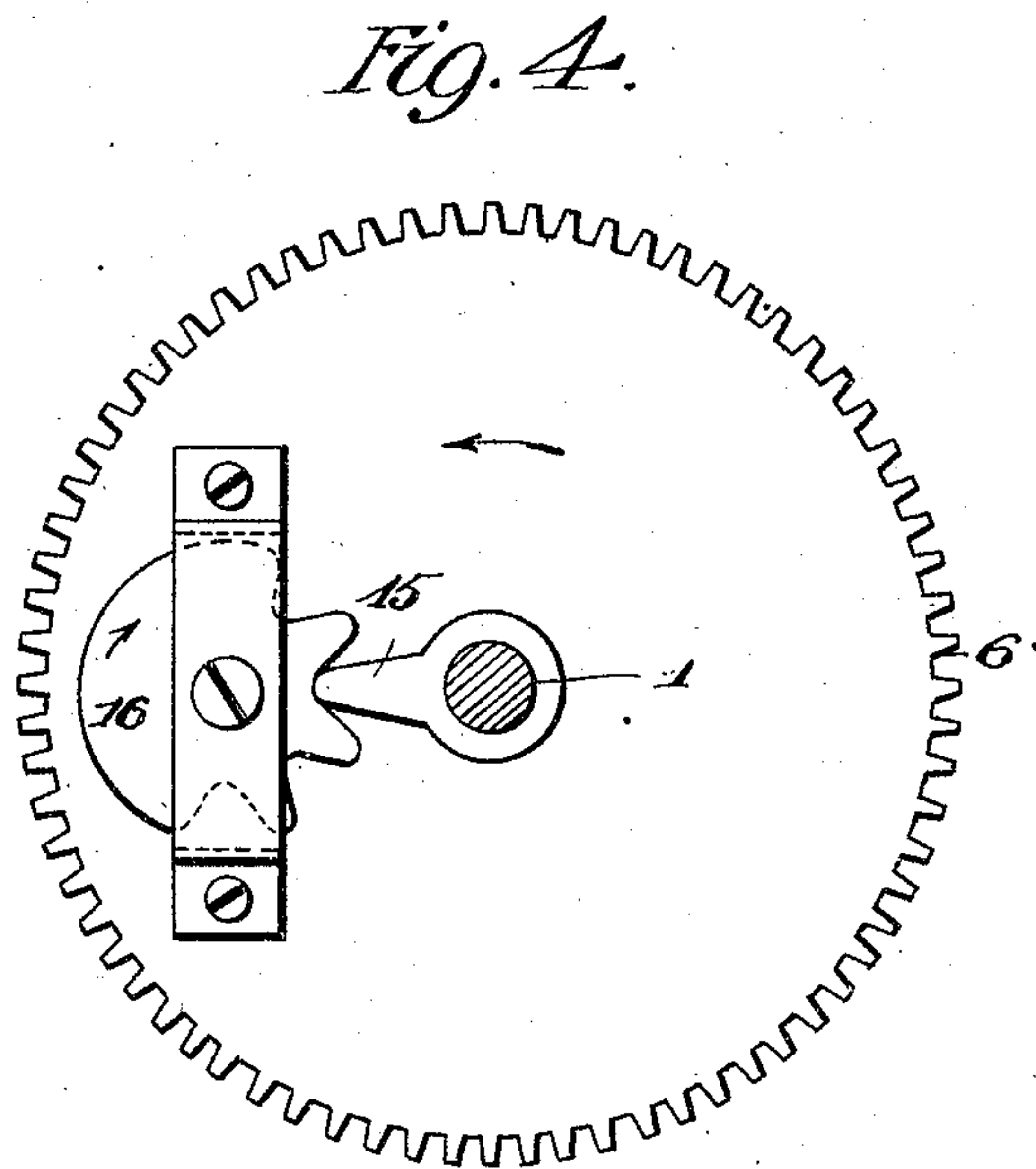
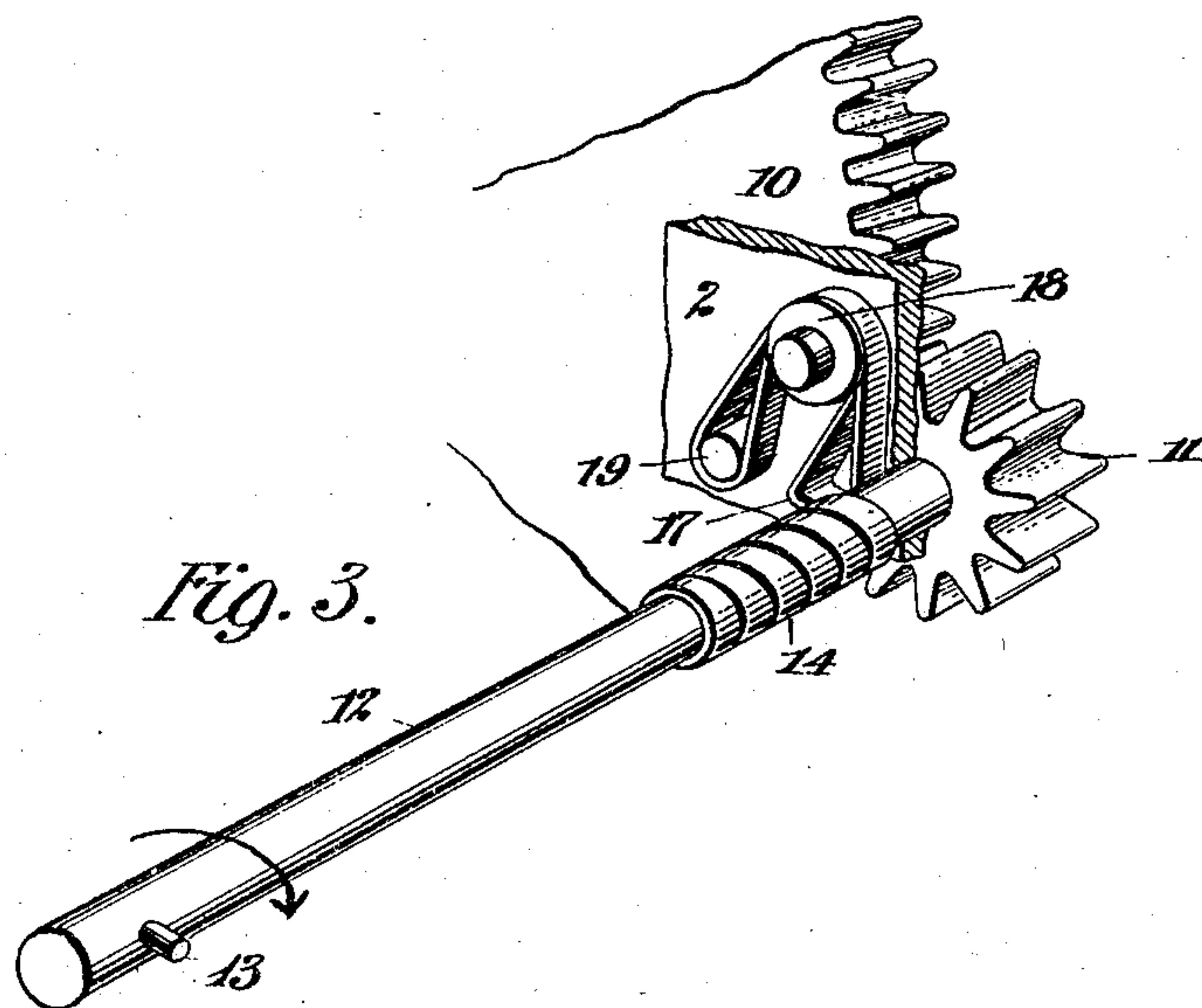
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2 SHEETS—SHEET 2.



Witnesses

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UNITED STATES PATENT OFFICE.

ALFRED KELLER, OF ST. CROIX, SWITZERLAND, ASSIGNOR TO LOUIS PHILIPPE MERMOD, GUSTAVE ALFRED MERMOD, AND LEON MARCEL MERMOD, COPARTNERS TRADING AS MERMOD FRÉRES, OF ST. CROIX, SWITZERLAND.

OPERATING MECHANISM FOR AUTOMATIC MUSICAL INSTRUMENTS.

SPECIFICATION forming part of Letters Patent No. 788,265, dated April 25, 1905.

Application filed April 22, 1903. Serial No. 153,736.

To all whom it may concern:

Be it known that I, ALFRED KELLER, a citizen of Germany, residing at St. Croix, in the canton of Vaud, Switzerland, have invented certain new and useful Improvements in Operating Mechanism for Automatic Musical Instruments, of which the following is a full, clear, and exact description.

My invention relates to operating mechanism for automatic musical instruments, and particularly to mechanism for winding and driving.

The object of this invention is to provide a simple, durable, and reliable construction by means of which the tune sheet or disk of an automatic musical instrument may be driven and which itself may be wound readily and will be locked automatically on releasing the winding-arbor to prevent unwinding. The construction provides also that the spring may not be overwound. The winding of the driving mechanism of this character is performed in a manner which is practically noiseless.

For these purposes the invention consists in providing a frictional clutch device for one shaft of the winding mechanism and in the construction and arrangement of the other parts of the driving gears or gearing in such a manner as to coöperate with the winding mechanism to produce the most efficient and satisfactory results. The construction is more particularly shown in the drawings and described in the following specification.

Figure 1 is a plan view of an instrument embodying the improvements of my invention, parts being broken away and the interior gearing shown dotted. Fig. 2 is a vertical cross-section and elevation of mechanism embodying my invention. Fig. 3 is a perspective fragmentary detail, on an enlarged scale, of the clutch on the winding-arbor and the parts adjacent thereto. Fig. 4 is a plan view of the winding-drum, the power-shaft being shown in cross-section.

1 is the main power-shaft of the instru-

ment, which has its lower bearing in the plate 2 and its upper bearing in the sound-board 3.

4 is the driving-spring, the inner end of which is attached to the power-shaft 1 and the outer end of which is attached to the drum or case 5.

6 is a gear attached to the drum 5 and which receives an impulse from the spring 4 when this is wound up.

7 is a pinion mounted on the main driving-shaft 8, which meshes with the gear 6.

9 is another gear carried by the driving-shaft 8, which coacts with suitable mechanism for starting, stopping, and regulating the speed of the instrument.

A suitable brake or stop mechanism is provided to coact with this gearing or mechanism, so as to hold the gear 9, and consequently the driving-shaft 8 and the drum 5, stationary when the instrument is desired to be at rest. This mechanism is particularly shown in my application, Serial No. 153,735, filed herewith.

10 is the main winding-gear, attached to the shaft 1 at its lower end and in mesh with the winding-pinion 11, carried by the winding-arbor 12.

13 is a pin or projection carried by the winding-arbor 12, which may serve to coact with a suitable winding-handle or may be considered to represent a winding handle or device by means of which the shaft 12 may be rotated by hand or otherwise. When the winding-arbor 12 is rotated in the direction of the arrow, as shown particularly in Fig. 3, the winding-gear 10 and the power-shaft 1 are rotated in the opposite direction. This causes the winding up of the spring 4 and the consequent storing of energy therein.

At each rotation of the power-shaft 1 the pawl 15 carried thereby engages with a tooth of the segmental gear or automatic lock 16 and rotates this one tooth. When the last tooth of the lock 16 has been rotated, the next revolution of the shaft 1 will cause the pawl 15 to engage with the outer circumfer-

ence of the lock 16, and thus prevent further winding of the spring 4. When the winding has ceased and the arbor 12 is released, the tension of the spring 4 obviously tends to rotate the parts in the reverse direction. This unwinding is prevented by means of the clutch 14. The construction of this clutch is particularly shown in Fig. 3. The clutch is formed of a band wound spirally and rather tightly about the arbor 12. 17 is the lower end of this strip, which thence passes around the two supporting and guiding pins 18 and 19. When the arbor is turned in the direction of the arrow, it tends to unwind the band 14, and consequently the arbor is free to revolve. When the arbor is released and the tension of the spring 4 tends to rotate the arbor in the opposite direction, friction is set up between the cylindrical surface of the arbor and the interior surface of the coil of the clutch 14. This results in a tightening of the clutch 14 until the friction becomes so great as to bind the two, and thus securely lock the arbor 12 against rotation in the reverse direction. Obviously the arbor will rotate a short distance until it comes to a stop under the frictional engagement of the clutch. This is but a small part of a revolution and brings the arbor to rest gradually in a somewhat yielding manner, so that there is no danger of a shock which might cause injury to the mechanism.

The stopping or braking mechanism which is connected with the main driving-shaft 8 consists of a train of gears meshing with the gear 9, as suggested in dotted outline in Fig. 1. The gear 9 meshes with the pinion 20, which rotates with the gear 21. The gear 21 meshes with a pinion 22, which latter rotates with the worm-gear 23. The worm-gear 23 meshes with a worm 24, which rotates a fan-governor of a suitable construction. By this reduction-gearing the speed of the shaft 8 is regulated and the shaft thus

prevented from running away when the usual disk of the instrument is removed.

The construction will therefore be seen to be simple and reliable. The clutch is located, preferably, on the arbor in such a position relatively to the parts of the mechanism that it can be readily got at for purposes of repair or inspection, as desired. The band 14 is preferably of metal, such as steel, tempered or of a springy character, so that in the normal action it will lightly grip the arbor, but in winding it will assume a slightly-larger diameter than the diameter of the winding-arbor, so that the winding process may be accomplished with as little friction as possible.

The operation is simple and accompanied with little friction, so that it is practically noiseless, all ratchets and spring-pawls being dispensed with.

What I claim is—

1. In an operating mechanism for an automatic musical instrument, the combination of a stationary plate, a winding-arbor and a wide, flat clutch-band surrounding said arbor having one end free and the other end secured to said stationary plate and a spring-pressed train of gears normally restrained by said clutch and winding-arbor for the purpose specified.

2. In an operating mechanism for an automatic musical instrument, the combination of a system of gears, a driving-spring for rotating the same, a stationary plate, a rotary shaft pivoted in said plate, and a friction clutch-band wound around said shaft having one end absolutely free and the other end secured to said plate, and normally holding one end of said spring stationary, substantially as described.

Signed at Geneva, Switzerland, this 8th day of April, 1903.

ALFRED KELLER.

Witnesses:

CHARLES KIENLE,
L. H. MUNION.