

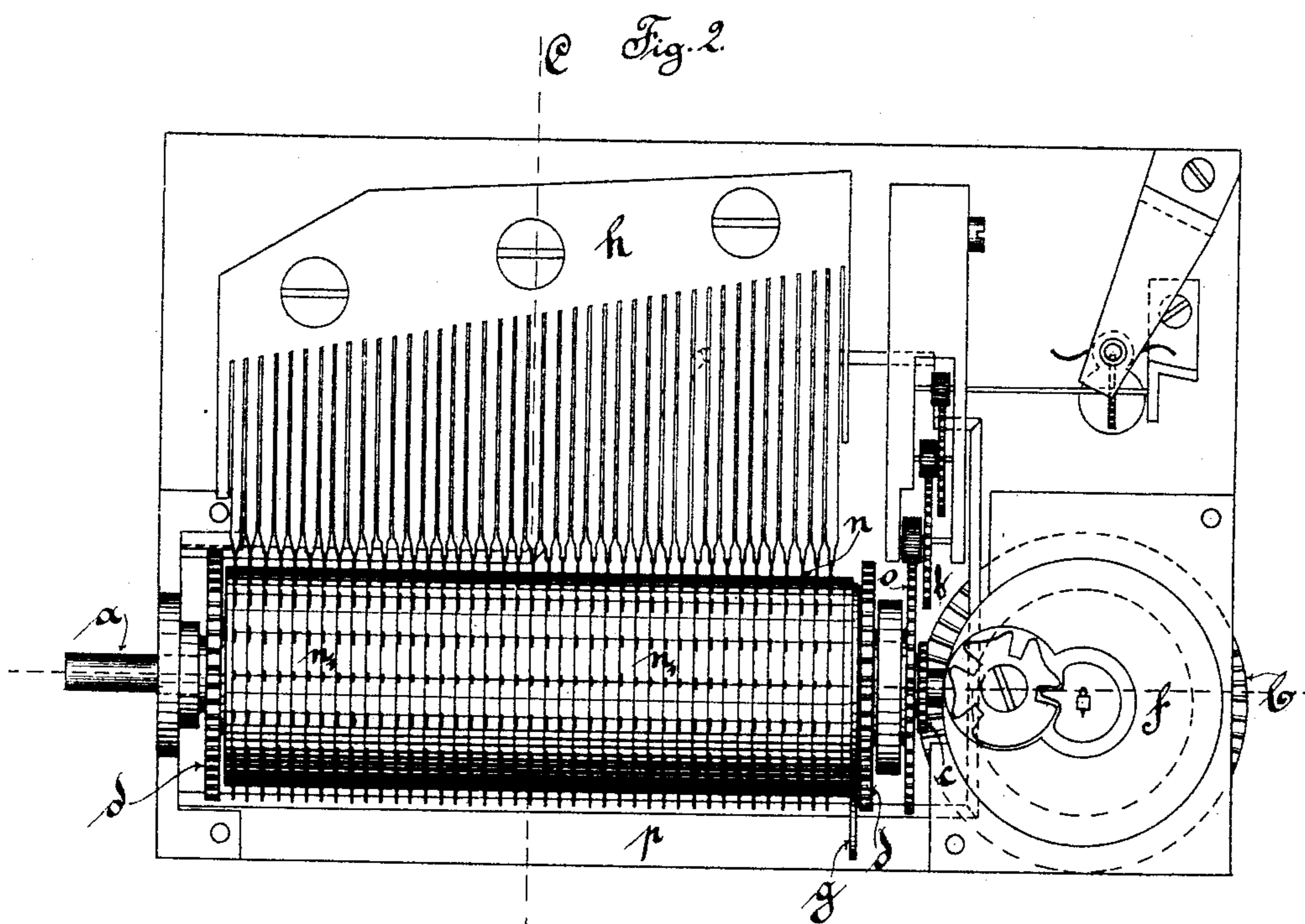
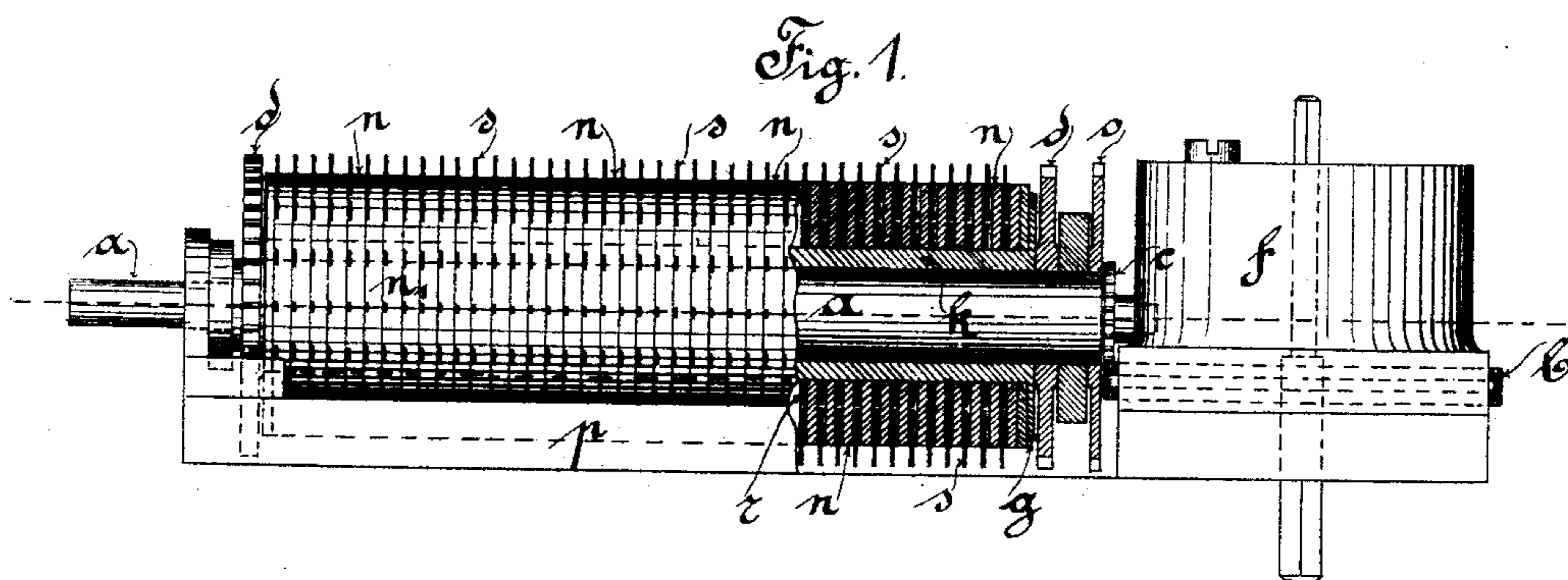
(No Model.)

3 Sheets—Sheet 1.

E. SCHILLING.  
MECHANICAL MUSICAL INSTRUMENT.

No. 450,257.

Patented Apr. 14, 1891.



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Fig. 3.

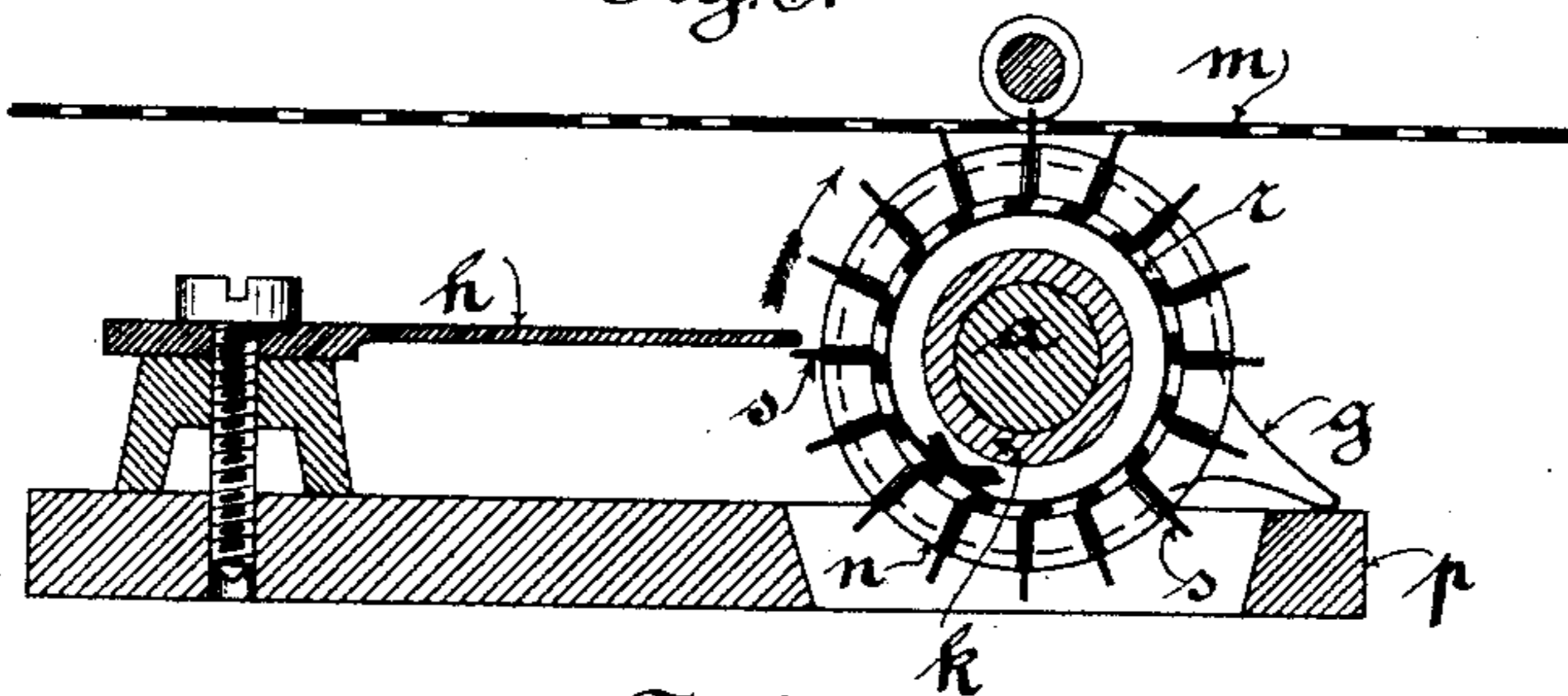


Fig. 4.

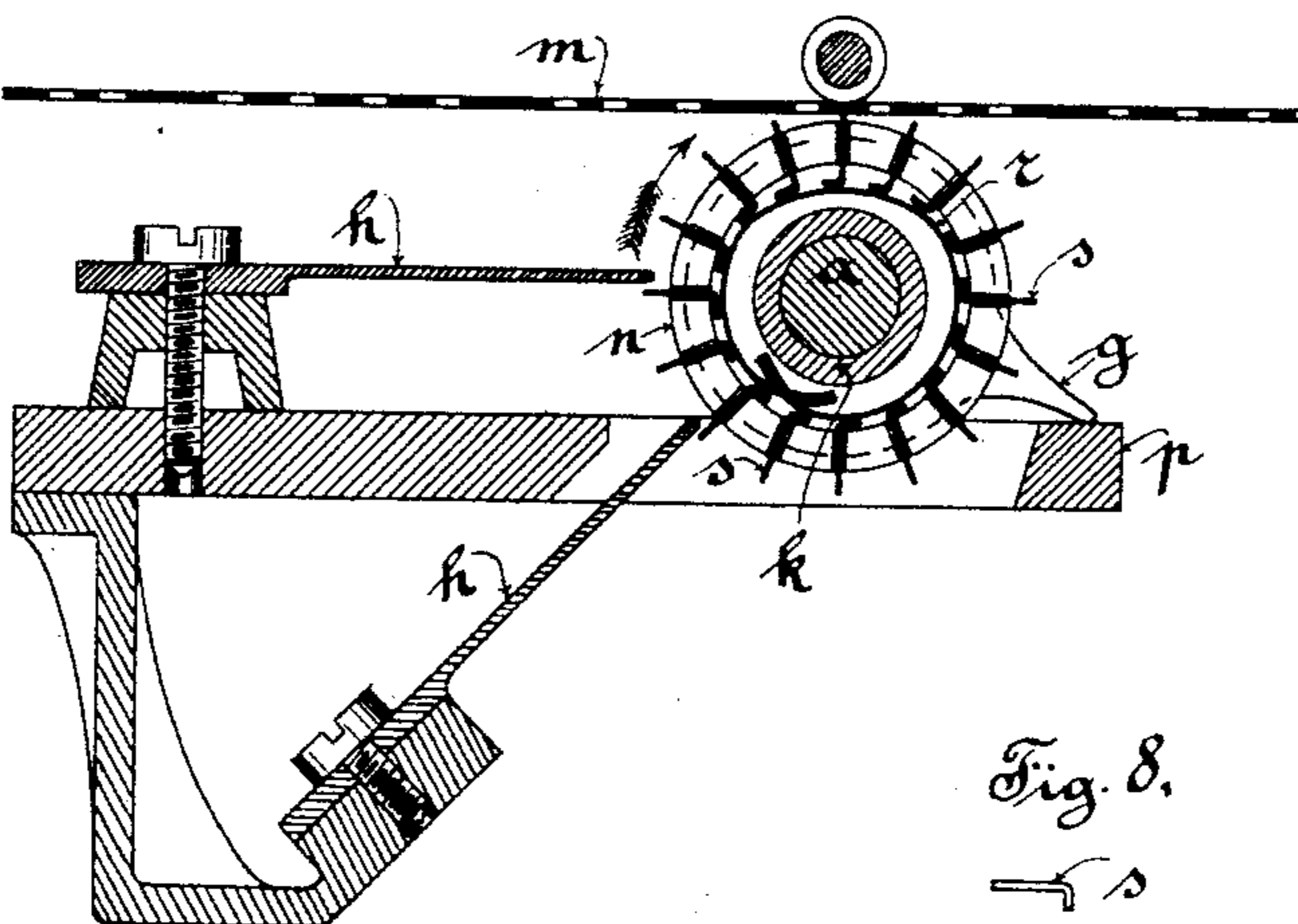


Fig. 8.



Fig. 7.

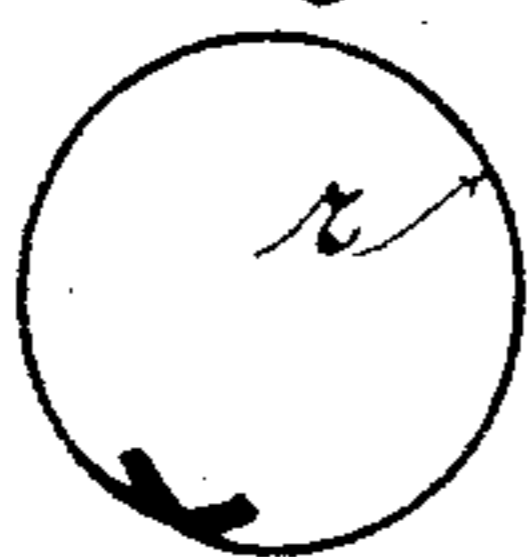


Fig. 5.

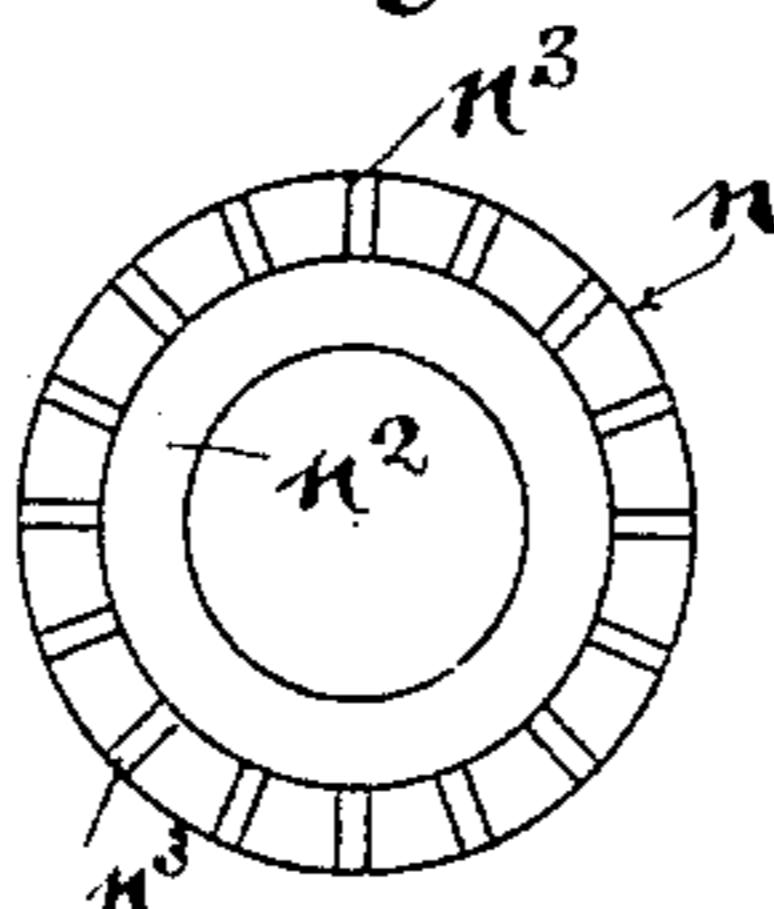
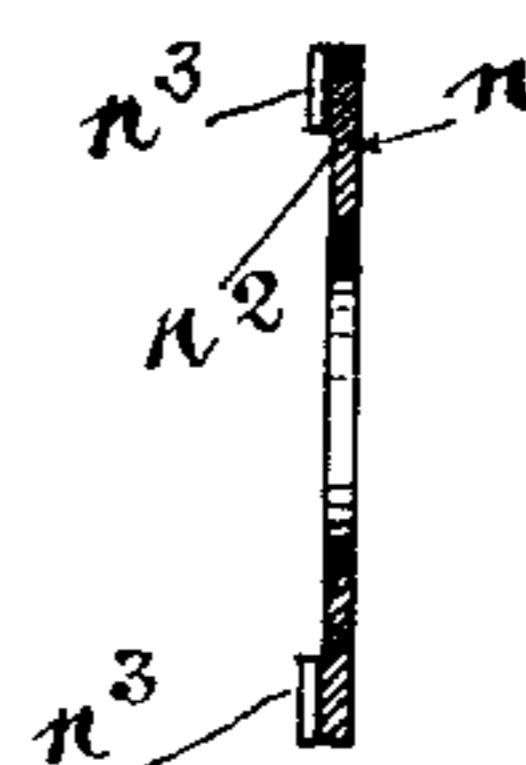


Fig. 6.



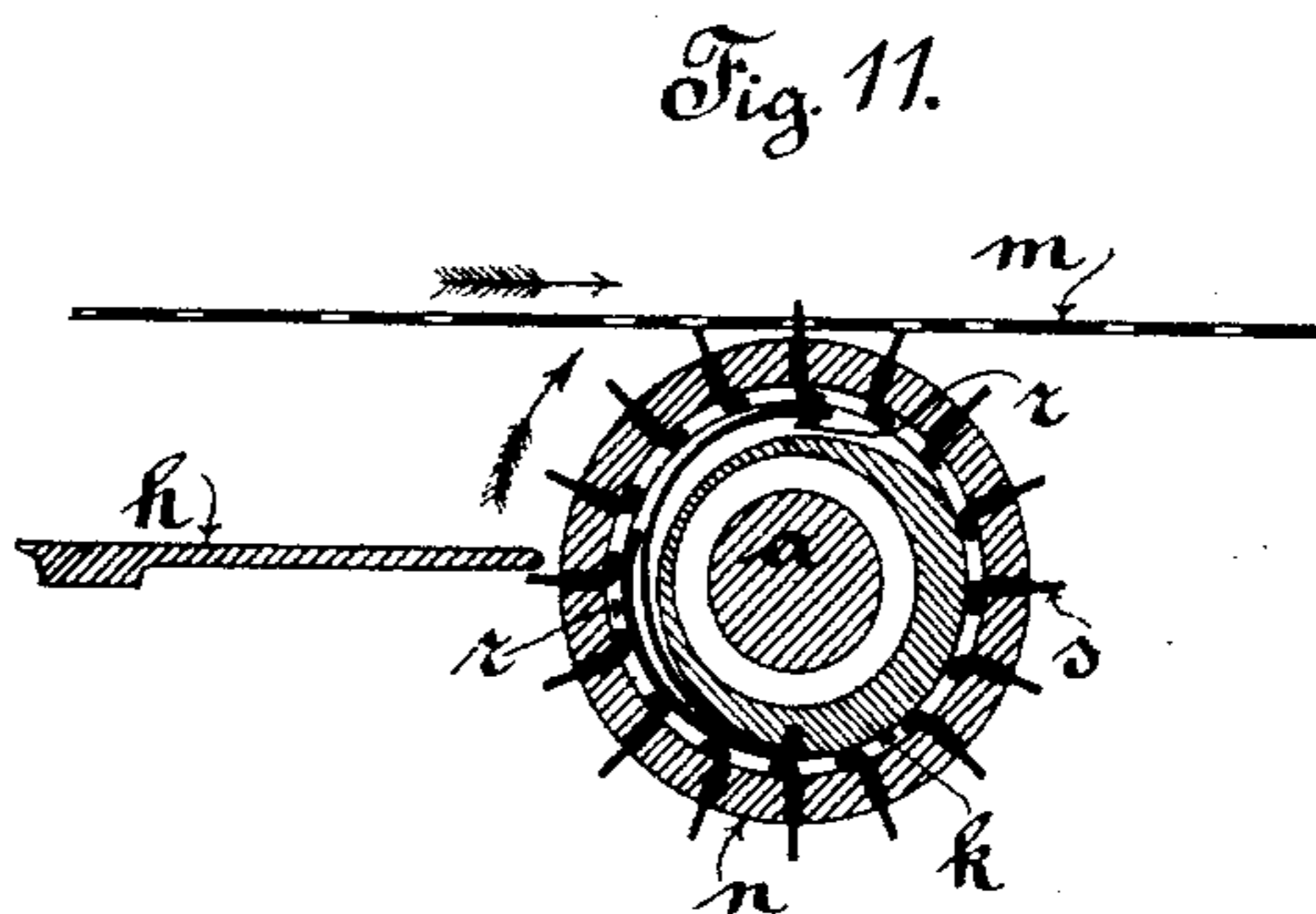
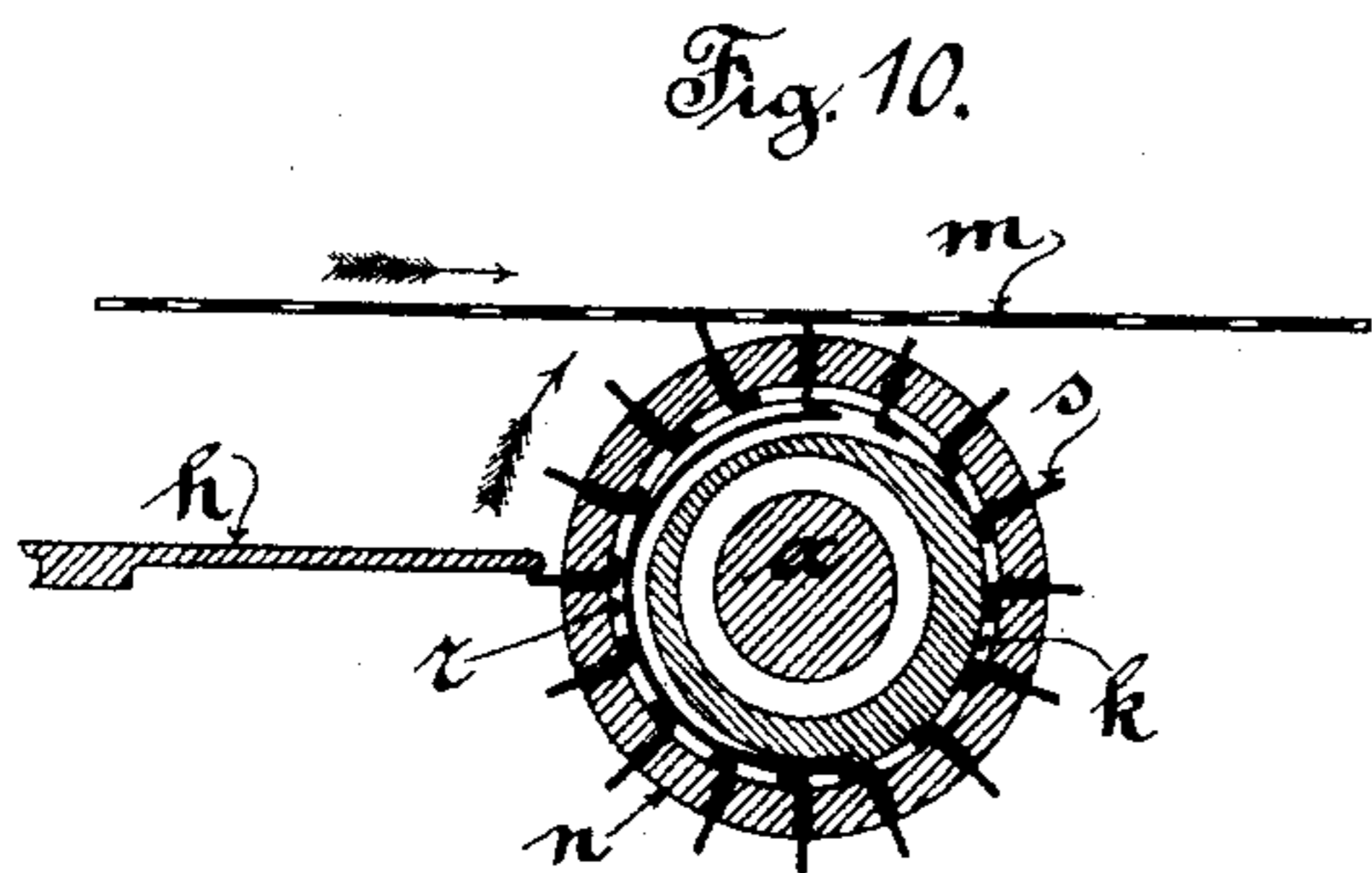
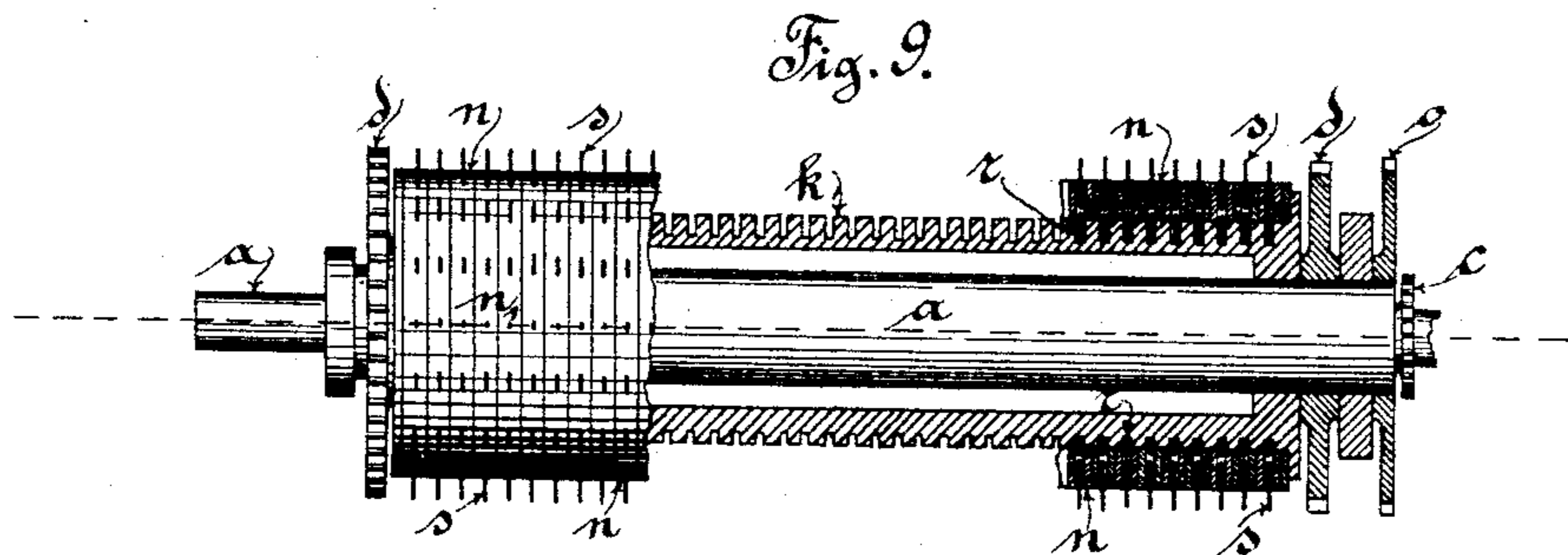
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# UNITED STATES PATENT OFFICE.

ERNST SCHILLING, OF LEIPSIC, GERMANY.

## MECHANICAL MUSICAL INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 450,257, dated April 14, 1891.

Application filed December 9, 1890. Serial No. 374,109. (No model.)

*To all whom it may concern:*

Be it known that I, ERNST SCHILLING, a subject of the German Emperor, residing at Leipzig, in the Empire of Germany, have invented a certain new and useful Improvement in Mechanical Musical Instruments, of which the following is a specification.

This invention relates to mechanical musical instruments; and it consists in an improved arrangement therein of an improved pin-wheel by means of which the sound-producing devices may be operated by a suitably-slotted music-sheet, the improved pin-wheel being suitable, according to its size, for musical boxes in which sounds are produced by vibrating metal tongues, as well as for those instruments in which sounds are produced by pipes, reeds, or strings, or other sounding devices, the controlling-valves, pallets, or hammers or equivalents of which are arranged to be operated by the passage of a pin or projection for moving them or for combinations of these.

The accompanying drawings illustrate the improved pin-wheel mounted in a musical box with vibrating metal tongues, Figure 1 being a front elevation of the mechanism, partly in section; Fig. 2, a plan thereof; Fig. 3, a section on line C D, Fig. 2; Fig. 4, a similar section illustrating the pin-wheel as applied to the operating of two separate sets of sound-producers. Figs. 5 to 8 are detail views of parts, Fig. 5 being an elevation, and Fig. 6 a section, of a disk for holding the pins; Fig. 7, a spring for protruding the pins; Fig. 8, one of said pins on the pin-wheel. Fig. 9 is a side elevation, partly in section; and Fig. 10 is a cross-section illustrating a modified construction. Fig. 11 is a cross-section illustrating another slightly-modified construction.

The improved pin-wheel consists, essentially, of a number of parallel disks, each with an independent rotary movement and having equally spaced around its circumference spring-protruded pins or projections to be used in connection with a tangentially-movable slotted music-sheet or surface, so that as the latter passes across the spring-protruded pin or pins pressed down by the solid portion of the music-sheet is in due course protruded into the approaching slot therein, so that

henceforth the respective disk is rotated by the music-sheet for a distance sufficient to cause another or others of the system of pins thereon to vibrate the respective sounding tongue or tongues which the system is arranged to operate.

This invention may be carried out as follows: The disks  $n$ , forming the pin-wheel  $n'$ , are arranged to rotate on the tube  $k$  independently one from the other, said tube being placed over the rotating shaft  $a$ . In order that during the rotation of the shaft  $a$  the tube  $k$  is not rotated—that is, carried along in the same direction by the friction caused by the surface of the tube  $k$  being in contact with that of the shaft  $a$ —a stop-lever  $g$  is arranged on the tube  $k$  in firm connection therewith. Said lever, as shown by Figs. 3 and 4, rests upon the base-plate  $p$  of the work, and thus prevents the tube  $k$  from rotating. The disks  $n$  are of equal diameter and similar perforation and their several thicknesses equal to the distance from center to center of the steel tongues of the comb  $h$ , from which the sounds are obtained.

On one side, as shown by Figs. 5 and 6, the disks  $n$  are centrally recessed at  $n^2$  to receive a circularly-bent spring  $r$ , Fig. 7, in the recess of each disk  $n$ . Besides, as shown in Fig. 5, the disks  $n$  are provided on the said side at equal distances with a number of radial slots  $n^3$ , extending from the periphery to the said central recess. In each of said slots a pin  $s$ , Fig. 8, with a bent end, is placed in such a manner that the bent ends of all the pins  $s$  of each disk  $n$  are located in the central recess of the same and are pressed by the spring  $r$  against the edge of said recess. The pins  $s$  are all of the same length, and the recesses of the disks  $n$  are also of equal diameter, so that the pins  $s$  project at equal height from the circumference of the disks  $n$ . The disks  $n$  are placed close to one another upon the tube  $k$ , and a plain closing disk is placed against the disk  $n$  placed last over the tube  $k$ , so that the notches and the recess of each disk  $n$  are covered by a neighboring disk, and the pins  $s$  and the spring  $r$  are retained in their places.

The notes of the music-sheet  $m$  are formed by perforating or recessing, and therefore the music-sheets are without any elevations.

The modification shown more particularly in Fig. 10 differs, in that the central recess  $n^2$  of each disk is made deep enough only to receive tails of the pins  $s$ . A groove is made around a part of the circumference of the tube  $k$ , and springs are fixed at one end in said groove to press outward the pin or pins of each disk at the place where they engage with the music-sheet. In Fig. 11 a similar construction is shown; but the spring  $r$  is here a double spring, one part acting to protrude the pins at the place of their engagement with the music-sheet and the other acting upon the pins at the place where they are required to be protruded to engage with the comb.

The musical box provided with this improvement operates as follows: The shaft  $a$ , passing through the pin-wheel  $n'$ , is operated in the usual manner by the spring-work  $f$  and wheels  $b$  and  $c$ ; likewise the wind-regulator by the shaft  $a$ , wheel  $o$ , and usual train of wheels. On the shaft  $a$  are two wheels  $d$ , which gear with the music-sheet  $m$  and carry the same along over the cylinder  $n'$ . During the sliding of the music-sheet  $m$  over the cylinder  $n'$  all the pins  $s$ , which are in contact with the music-sheet  $m$ , are slightly pressed toward the interior of the pin-wheel  $n'$ , as long as no note—that is, no hole of the music-sheet  $m$ —has arrived over any of them, (see Fig. 4;) but as soon as a note arrives above one of the pins  $s$  (see Fig. 3) the respective pin  $s$  jumps into the hole of the music-sheet  $m$  in consequence of the spring  $r$  acting upon said pin  $s$ , and the latter is carried along by the music-sheet  $m$ , so that at the same time the disk  $n$ , holding the pin  $s$ , rotates on the tube  $k$ , and the pin  $s$  is carried along until it is withdrawn again from the note-hole by the rotation of the disk. During this rotation of the disk  $n$  a second pin  $s$  of the same disk passes at the same time a tongue of the steel comb  $h$ , and causes a sound thereby. If several pins  $s$  of different disks jump simultaneously into different note-holes, several disks  $n$  are rotated by the same on the tube  $k$ , and consequently several sounds are caused simultaneously by the tongues of the steel comb  $h$ . Thus with a suitable arrangement of the note-holes on the music-sheet  $m$  any piece of music may be played on this musical box.

In order to produce as many sounds as possible by a pin-cylinder thus constructed, one may bring two or more steel combs into con-

tact with the pin-wheel  $n'$ , as seen by Fig. 4. In a similar manner as for musical boxes thus described this new device may be used also for musical boxes or works in which the sounds are obtained direct from the strings or plates, &c., or by means of wind from tongues and pipes, the pins being caused on the rotation of the disks  $n$ , moved by the music-sheet, to set in motion in a suitable manner the operating mechanism for producing the sound from the respective strings or plates, &c., or the wind-valves leading to the tongues or pipes.

I claim in a mechanical musical instrument—

1. The combination, substantially as and for the purpose set forth, with a series of sound-producers and a movable slotted music-surface, of a pin-wheel consisting of a series of independently-revoluble disks with spring-protruded equidistant projections on their circumferences.

2. The combination, substantially as and for the purpose set forth, with a series of sound-producers and a movable slotted music-surface, of a pin-wheel consisting of a series of independently-revoluble disks, a circular central recess in the one face of each disk, a series of equidistant slots in the periphery of each disk, movable pins  $s$  in said slots, and a spring  $r$  in the central recess of each disk.

3. The combination, with two or more series of sound-producers and a movable slotted music-surface, of a pin-wheel consisting of a series of independently-revoluble disks with spring-protruded equidistant projections on their circumferences, adapted to be revolved by said music sheet, and thus operate respectively sound-producers, substantially as set forth.

4. The combination of one or more series of sound-producers, a movable slotted music-sheet, a central shaft  $a$ , having wheels  $d$  for moving said music-sheet, a stationary tube  $k$  on said shaft, a series of independent rotary disks  $n$  on said tube, with equidistant spring-protruded projections on their peripheries, adapted to operate in connection with the music-sheet and sound-producers, substantially as set forth.

In witness whereof I have signed this specification in presence of two witnesses.

ERNST SCHILLING.

Witnesses:

JULIUS MARQUEE,  
CARL BORNGRAEBER.