

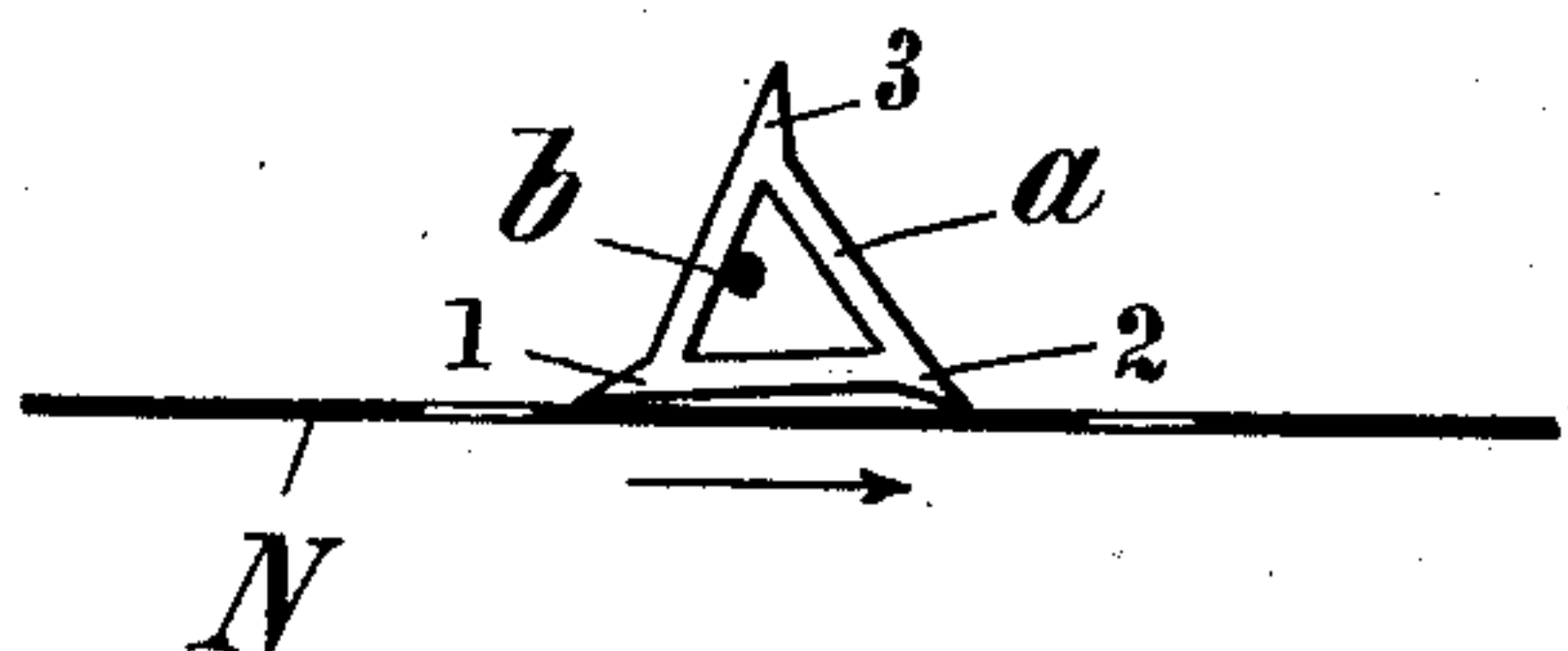
(No Model.)

H. F. HAMBRUCH.  
MECHANICAL MUSICAL INSTRUMENT.

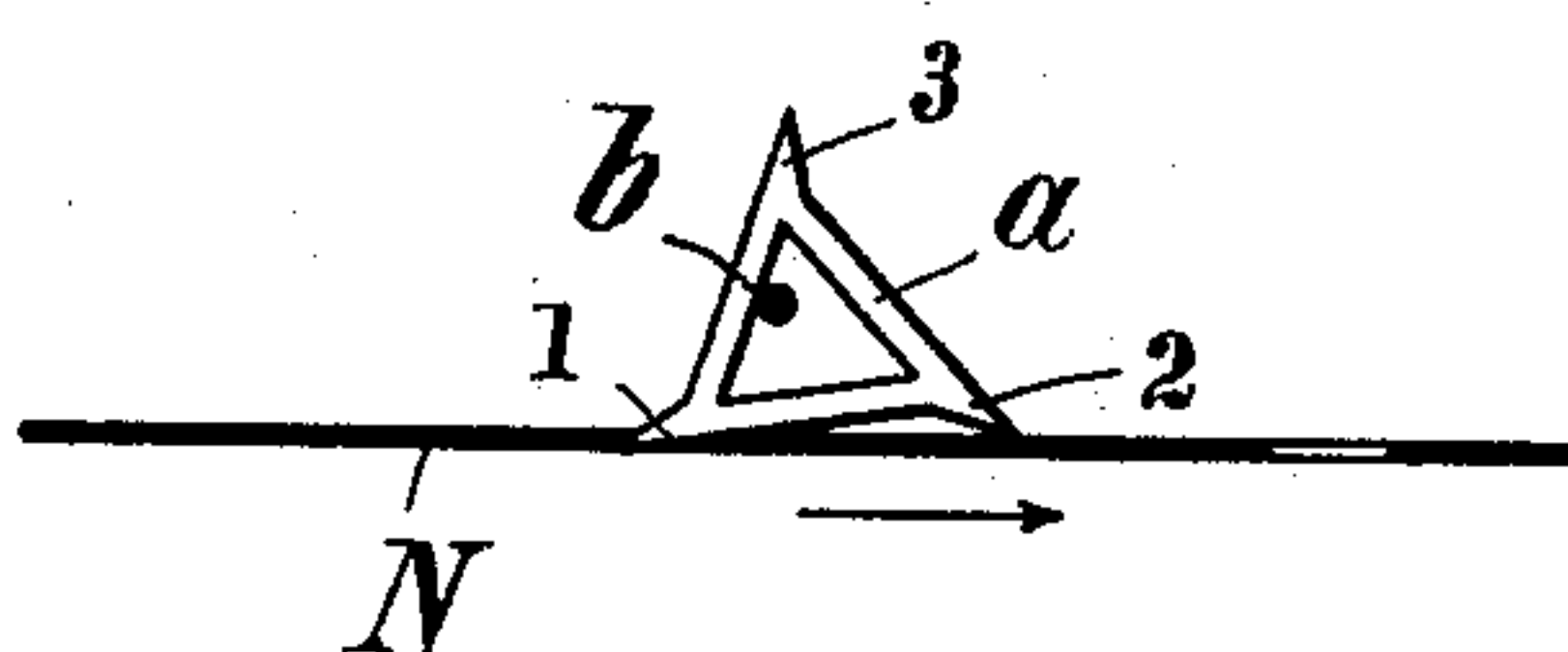
No. 555,159.

Patented Feb. 25, 1896.

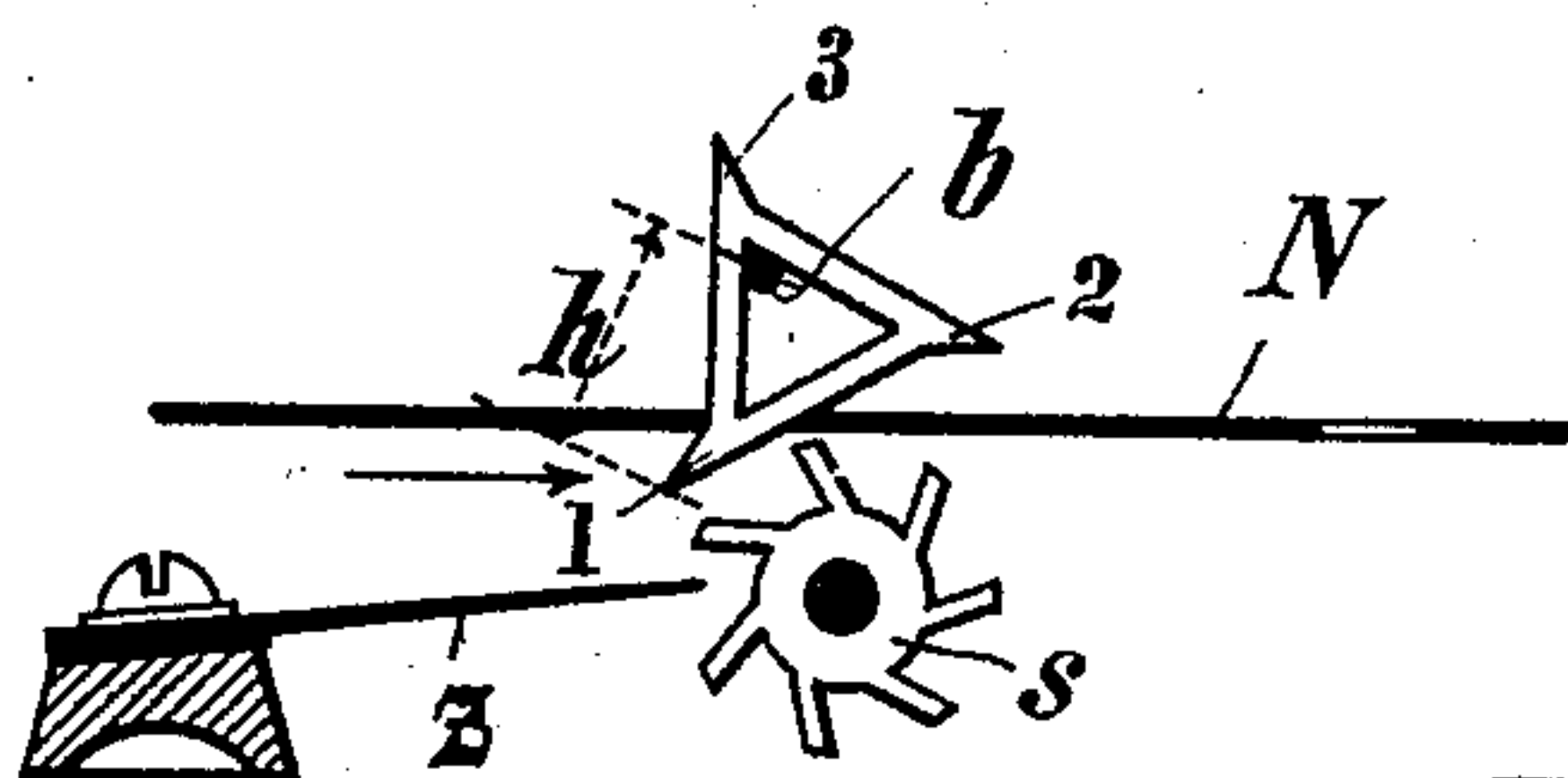
*Fig. 1.*



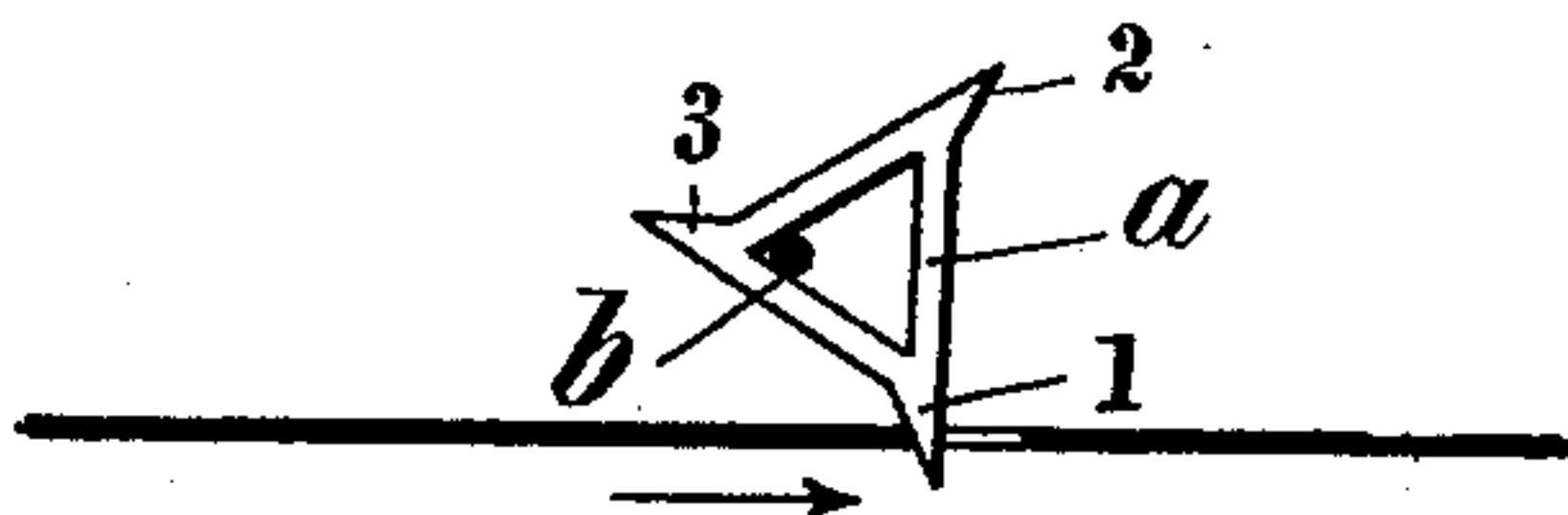
*Fig. 2.*



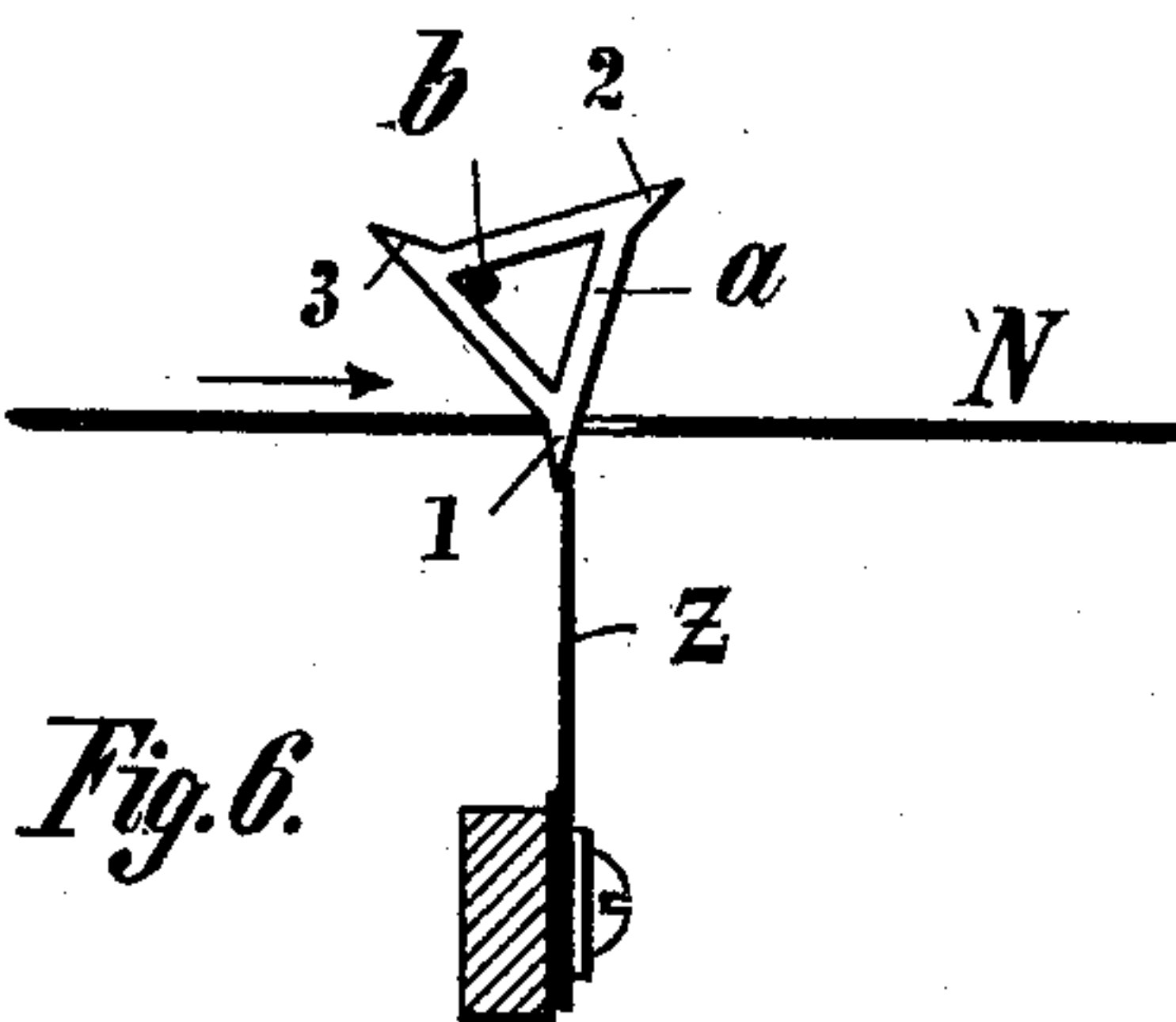
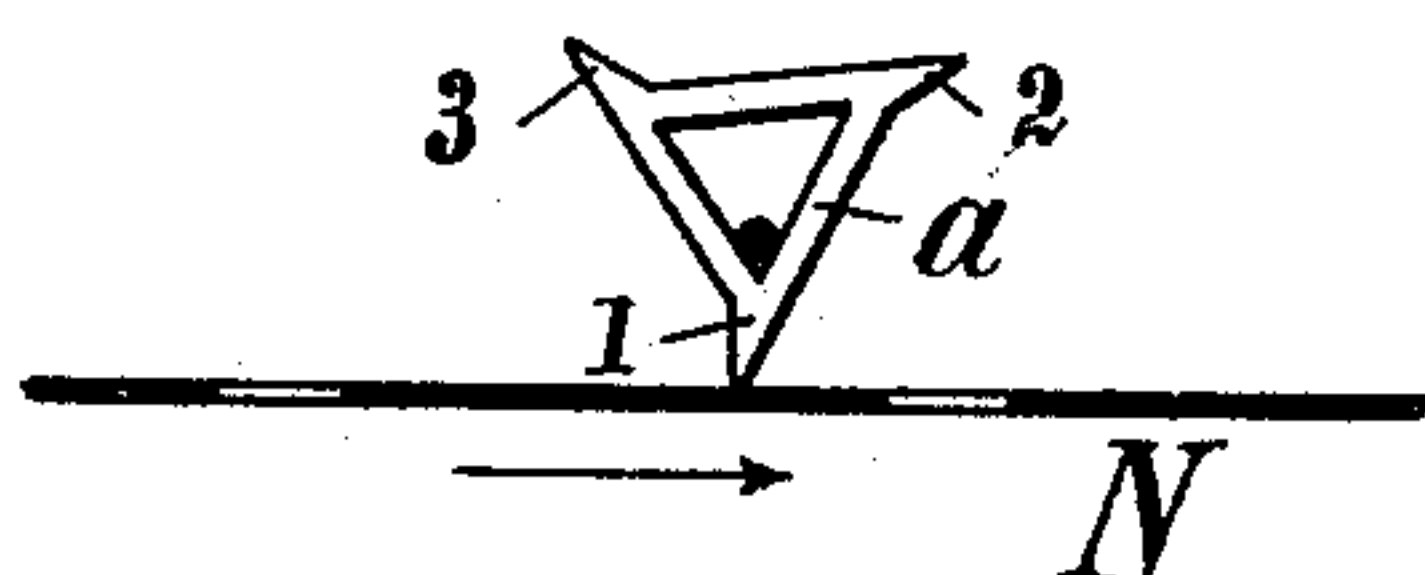
*Fig. 3.*



*Fig. 4.*



*Fig. 5.*



*Fig. 6.*

Witnesses.

B. S. Ober.

Henry Orth

Inventor

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by *Henry Orth*

# UNITED STATES PATENT OFFICE.

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## MECHANICAL MUSICAL INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 555,159, dated February 25, 1896.

Application filed October 29, 1895. Serial No. 567,292. (No model.)

*To all whom it may concern:*

Be it known that I, HEINRICH FRIEDRICH HAMBRUCH, a subject of the German Emperor, and a resident of Hamburg, in the German Empire, have invented certain new and useful Improvements in Mechanical Musical Instruments, of which the following is a specification.

My invention relates to that class of musical instruments in which tunes are played mechanically by means of metal tongues, and in which the said metal tongues are made to sound in order to produce such tunes by means of changeable perforated note-sheets, and a sort of intervening wheels adapted to drop with their teeth into the perforations of the note-sheet and to turn on the progress of the latter suitable star or striking wheels operating the said tongues, or to strike or touch the tongues directly without the aid of such striking-wheels; and my invention consists in making the central openings or slots by which the said intervening wheels are suspended by their pivot angular in form or shape, and in arranging the teeth or arms of the intervening wheels adapted to drop into the perforations of the note-sheet in such a manner that the inclined faces of such teeth or arms are arranged to the note-sheet in opposite direction of its feeding motion.

The objects of my said improvements are, first, to provide means by which the intervening wheels, in spite of their enlarged angular aperture, when caught by the note-sheet are prevented from being moved out of their proper positions or displaced in upward direction; second, to afford a reliable dropping of the teeth of the intervening wheels into the respective perforations of the note-sheet, and a sufficient rotation of the striking-wheels or a reliable striking of the metal tongues, respectively; third, to enable the intervening wheels, in case they should have failed for any reason to drop into the note-sheet, to rotate above the said note-sheet on their common pivot, avoiding thereby jamming and clinching of the whole apparatus. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figures 1 to 5 are diagrams showing the co-operation of the note-sheet and the intervening wheel. Fig. 6 is a similar view showing a modification in which the tongue is directly operated by its respective intervening wheel.

Similar letters and numerals refer to similar parts throughout the several views.

In the drawings, the intervening wheels *a* have been made tripartite and are provided, according to this form, with a triangular central opening to ride on the pivot or suspension rod *b*, each intervening wheel *a* being consequently furnished with three teeth or arms 1 2 3 projecting from the corners of the triangle formed by the intervening wheel, and arranged in such a manner that the inclined faces or sides of the said teeth or arms 1 2 3 are adapted to turn to the note-sheet *N* in opposite direction of its feeding motion.

When the body of the note-sheet *N* is going along beneath the intervening wheel *a* the latter is in the position shown in Fig. 1—that is to say, the wheel *a* rests with its arms 1 and 2 upon the note-sheet, while the left part or side of the triangular opening of the intervening wheel is resting against the fixed axle or pivot *b*. As soon as the tooth or arm 1 is caught by a perforation of the note-sheet—that is to say, as soon as the tooth 1 drops into a perforation, Fig. 2—the note-sheet *N*, by turning the intervening wheel on the pivot *b* in direction of the arrow, slides successively onto the said arm 1 until it finally sits at rest in the corner formed by and between the said arm 1 and the adjoining side of the intervening wheel *a*, Fig. 3. By this engagement of the note-sheet and the intervening wheel the latter receives an absolutely reliable guiding, so that when caught by the note-sheet the intervening wheel is prevented, due to the arrangement and position of its arm 1, from being displaced in upward direction. On the contrary, as the side of the intervening wheel which bears against the pivot *b* is nearly in a vertical position, the said intervening wheel slides or slips fully down, so that it is hanging with its upper inner corner on the pivot *b*, Fig. 3, receiving thereby for the further rota-



tion a reliable and indisplaceable bearing. In this position the arm 1 extends far enough through the perforation of the note-sheet for securing a sufficient rotation of the striking-wheel *s* and reliable striking or touching of the tongue *z*. It is therefore obvious that an arm of the intervening wheel may hit upon the end face or point of an arm or tooth of the striking-wheel; but should this occur for any other reasons, or should the dropping arm of the intervening wheel hit against the edge of a perforation of the note-sheet or upon the latter itself, yet a jamming or locking of the instrument cannot take place, as the intervening wheel in this case is capable of giving way—that is to say, of being turned above the note-sheet—in consequence of its triangular central opening or slot, under this circumstance the pivot-rod *b* being in the lower corner of the triangular opening, as shown in Fig. 5.

On further forward motion of the note-sheet, after the tongue *z* has been struck, the body of the note-sheet is going to raise the intervening wheel out of the respective perforation of the note-sheet, in the manner shown by Fig. 4, whereupon the intervening wheel will noiselessly slide down its pivot *b* and occupy a similar position, as shown in Fig. 1, but resting now upon the note-sheet with its teeth or arms 3 and 1, and so on.

From Fig. 3 it is obvious that in the present form of the intervening wheel the leverage, (marked *h*,) which is available for operating the striking-wheel *s*, is greater than it would be when the intervening wheel is mounted on its pivot with a central circular slot or bore. Due to this greater leverage it is possible to make the intervening wheel proportionately very small, so that the perforations in the note-sheet may follow one another close together.

The merits or advantages of the improved intervening wheels over similar already-known devices consist in and are based upon the fact that in consequence of the peculiar form and suspension of the intervening wheels a reliable dropping of the latter into the perforations of the note-sheet is secured, that the said intervening wheels are reliably guided and adapted to effect a sufficient rotation of the striking-wheels, that the intervening wheels are prevented from being jammed, and that the said intervening wheels may be made extremely small in order to enable the use of note-sheets having perforations following one another close together.

In some cases I dispense entirely with the striking-wheel and arrange the tongue *z* in such a manner as to be acted upon directly by the intervening wheel *a*, Fig. 6.

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

1. In a musical instrument such as described, the combination with the perforated

note-sheet and a reed, of an intervening wheel provided with an angular aperture and with teeth lying substantially in the plane of the apices of the angles of said aperture and adapted to drop into the perforations of said sheet, and a supporting rod extending through the aperture of the wheel, for the purpose set forth.

2. In a musical instrument such as described the combination with the perforated note-sheet and a reed, of an intervening wheel provided with an angular aperture and with teeth lying substantially in the plane of the apices of the angles of said aperture and adapted to drop into the perforations of said sheet, said teeth having one of their faces inclined in a direction opposite to the direction of motion of such sheet, and a supporting-rod extending through the aperture of the wheel for the purpose set forth.

3. In a musical instrument such as described, the combination with the perforated note-sheet, a reed and a toothed striker-wheel for said reed, of an intervening wheel provided with an angular aperture and with teeth lying substantially in the plane of the apices of the angles of said aperture and adapted to drop into the perforations of said sheet within reach of the teeth on the striker-wheel, and a supporting-rod for the intervening wheel extending through the aperture thereof, for the purpose set forth.

4. In a musical instrument such as described, the combination with the perforated note-sheet, a reed, and a toothed striker-wheel for said reed, of an intervening wheel provided with an angular aperture and with teeth lying substantially in the plane of the apices of the angles of said aperture, said teeth having one of their faces inclined in a direction opposite to the direction of motion of the note-sheet, and adapted to drop into the perforations of said sheet within reach of the teeth on the striker-wheel, and a supporting-rod for the intervening wheel extending through the aperture thereof, for the purpose set forth.

5. In mechanical musical instruments with metal tongues and perforated note-sheet an intervening wheel provided with a triangular central aperture and suitable teeth or arms projecting from the corners of the said intervening wheel in opposite direction to the feeding motion of the note-sheet, said intervening wheel being mounted to turn on a suitable pivot and adapted to drop into the perforations of the note-sheet, in combination with a striking-wheel, substantially as and for the purpose specified.

6. In mechanical musical instruments the combination of a metal tongue, a perforated note-sheet and an intervening wheel provided with a triangular central aperture and suitable teeth or arms projecting from the corners of the said intervening wheel in opposite direction to the feeding motion of the note-sheet,

said intervening wheel being mounted to turn  
on a suitable pivot and adapted to drop into  
the perforations of the note-sheet and to act  
upon the said tongue, substantially as and  
5 for the purpose specified.

In testimony that I claim the foregoing as  
my invention I have signed my name, in pres-

ence of two witnesses, this 10th day of Octo-  
ber, 1895.

HEINRICH FRIEDRICH HAMBRUCH.

Witnesses:

ALEXANDER SPECHS,  
E. H. L. MUMMENHOFF.