

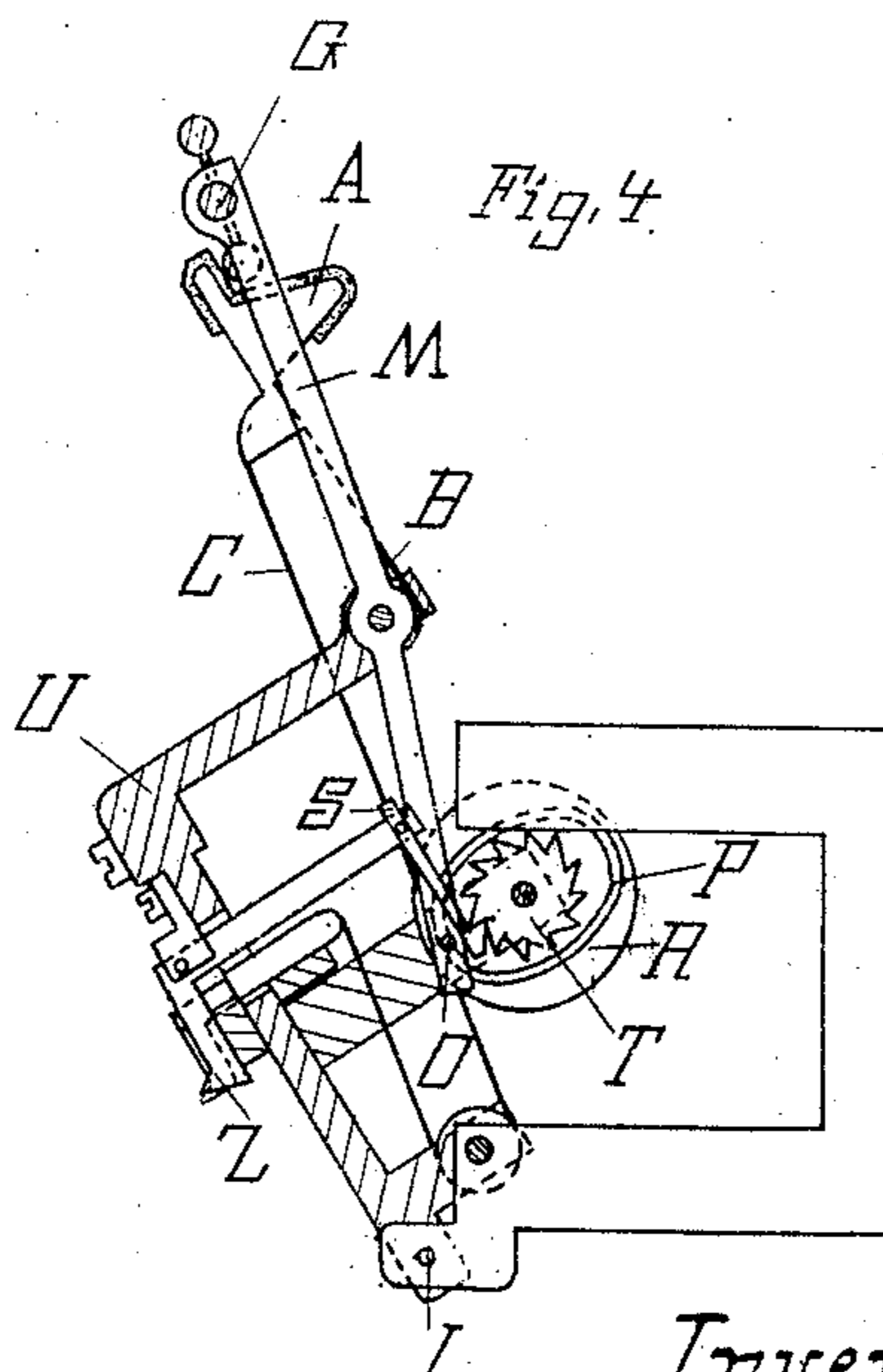
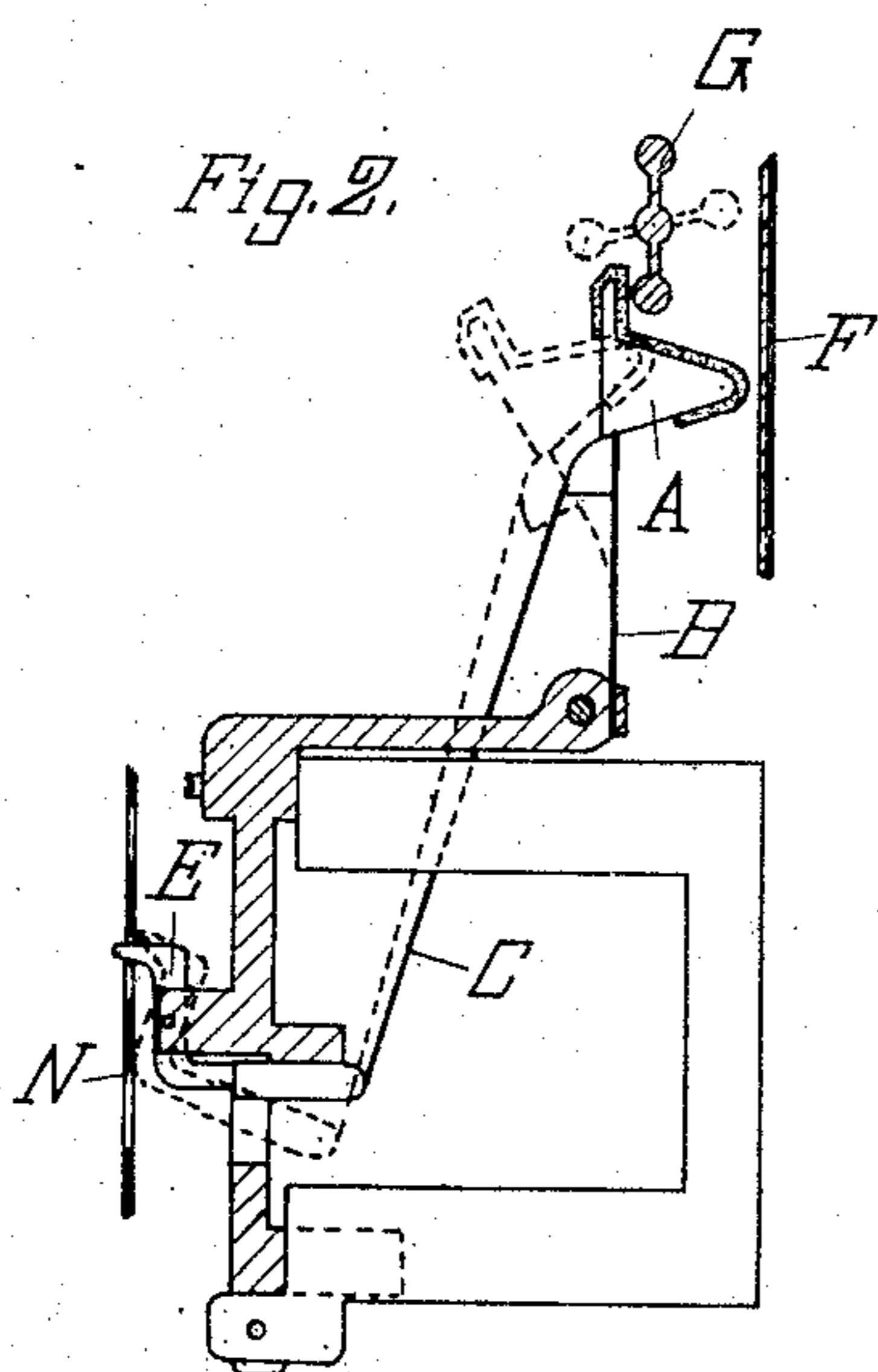
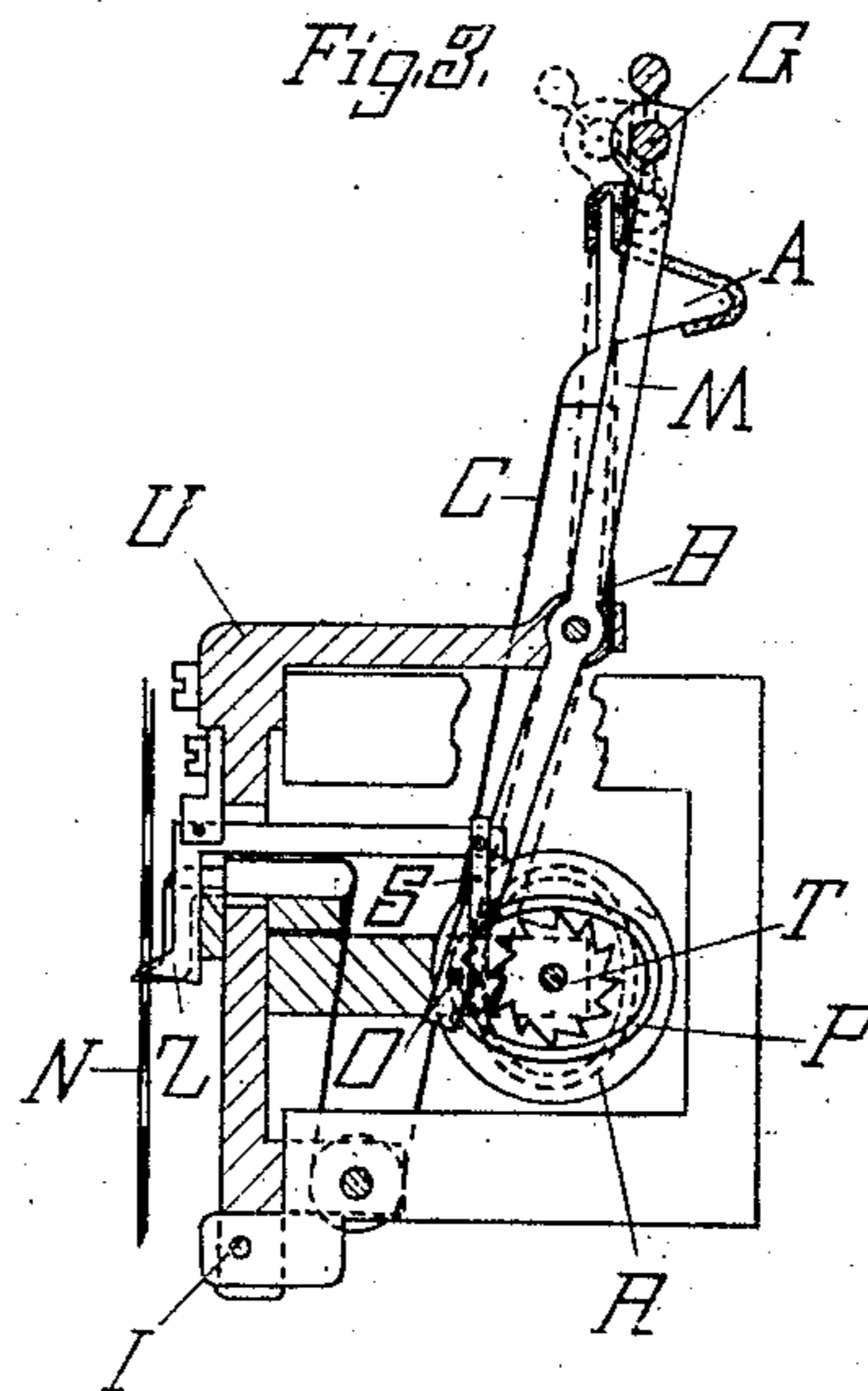
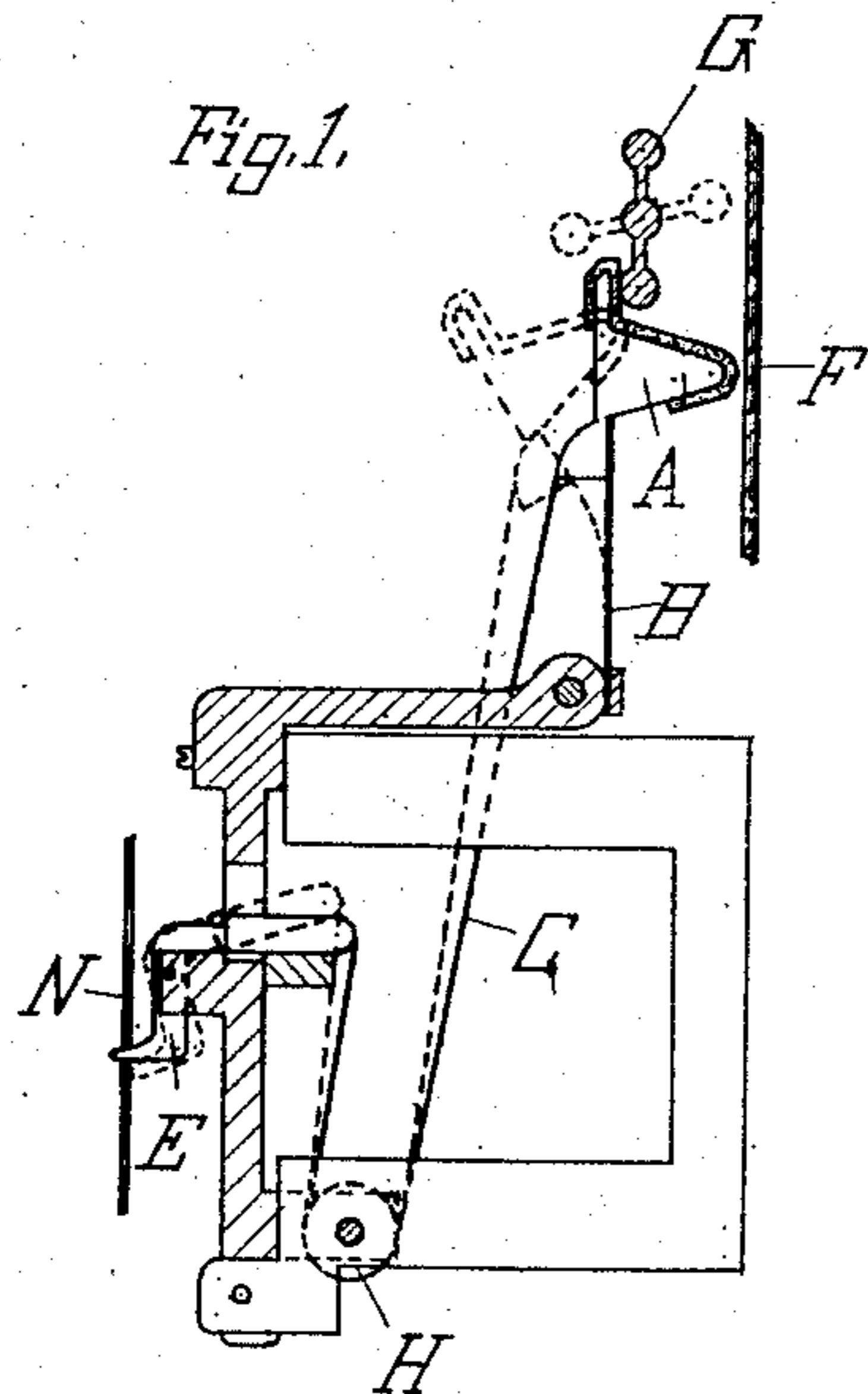
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PATENTED DEC. 31, 1907.

P. LOCHMANN.

MECHANICAL STRINGED INSTRUMENT WITH SPRING HAMMER.

APPLICATION FILED OCT. 2, 1906.



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PAUL LOCHMANN, OF ZEULENRODA, GERMANY.

MECHANICAL STRINGED INSTRUMENT WITH SPRING-HAMMERS.

No. 875,193.

Specification of Letters Patent.

Patented Dec. 31, 1907.

Application filed October 2, 1906. Serial No. 337,115.

To all whom it may concern:

Be it known that I, PAUL LOCHMANN, a subject of the Emperor of Germany, residing at Zeulenroda, Thüringen, German Empire, have invented new and useful Improvements in Mechanical Stringed Instruments with Spring-Hammers, of which the following is a specification.

According to this invention the hammers mounted on spring arms are to be arranged on a common base plate and connected by flexible drawing or pulling means with the note-sheet engaging levers so that the movement of the note-sheet engaging levers is communicated to the hammers. On laying or putting a note sheet into place the depression of the levers by means of the drawing connections lifts the hammers from the strings. As the levers enter holes in the note sheet the tensioned spring-hammers are suddenly freed and give a springing stroke on the strings. By inserting a rotary tappet shaft which imparts vibratory motion to the freed spring supported hammers, tremolo action can be produced.

This invention is set forth in the following specification and claim and illustrated in the annexed drawing in which:

Figure 1 shows a device embodying this invention the flexible drawing device or string being led over a guide roll. Fig. 2 shows the connection or string led directly to the hammer. Fig. 3 shows a device in which the tappet shaft can be set or adjusted relatively to the spring supported hammers. Fig. 4 shows the frame supporting the hammer mechanism as being opened.

The hammer heads A are secured to a spring arm B and by means of a drawing medium C connected to the note-sheet engaging lever E so that on depressing the note-sheet engaging lever by a superposed note sheet the several hammers are retracted out of reach of the strings F as also of a tappet shaft G which can be applied if necessary.

The connection between the hammer and the note-sheet engaging lever E can be of various kinds. In the arrangement shown in Fig. 1 the flexible drawing medium C is fastened to the hammer head A, and carried over the roller or cylinder H and secured to its other end to the note-sheet engaging lever E.

In the construction shown in Fig. 2 there

are no intermediate members. The drawing member C is secured at one end to the hammer head A and at the other end to the note-sheet engaging lever E. Any suitable material such as a tape or cord of hemp or of steel or of any other material or a wire or the like can be used. As the note-sheet engaging lever E enters an opening in the note sheet N the spring arm B is released and snaps or strikes the hammer to contact with the string F. As it only gives a single impact a tone effect is produced such as that by the hammer of ordinary key instruments.

Prolonged tones can be produced as follows. If for instance a rotary tappet shaft G is journaled in reach of the hammer heads then the rotation of the tappet shaft causing the tappets to successively engage and release the hammer heads will cause the hammers to produce the required tremolo action. Consequently with the above described arrangement there can be produced either a single stroke or a plurality of strokes now called a tremolo according as the hammer hits but once, or is exposed to the action of the rotary tappet shaft which produces vibratory motion of the hammers. The use of the flexible drawing medium has the advantage of working noiselessly and also of not hindering the hammers in their vibration.

As shown in the construction Fig. 3 the position of the tappet shaft G is not fixed, but such shaft can be set so that it can be placed nearer to or further from the hammers A. The production of tones can thereby be regulated, that it is to say the sound of the tones can be made louder or can be diminished. The adjustment of the tappet shaft G is effected by means of a separate note-sheet engaging lever Z which can be set according to specially arranged perforations in the note plate N. The movement of the note sheet engaging or expression lever Z can be communicated to the tappet shaft G by various means. According to the construction shown one or more two armed levers M can be employed. This lever M is hinged or swinging. If such a lever arm is mounted on each side of the instrument these lever arms in connection with the tappet shaft G carried thereby from an adjustable frame. The free ends of the lever arms (or of one of them) engage an eccentric or curve disk R. In the example shown the

stud O of the lever arm engages the path P of the cam disk which path is shown of elliptical form. On the same shaft with the cam disk R is secured a ratchet wheel T, the teeth of which are engaged by the hooked end of a spring arm S which is linked or pivoted to the play lever Z.

If a loud tone is to be produced the entering end of the note-sheet engaging lever Z must enter one of the holes of the note plate N and as the note plate moves along the hook S of the note sheet engaging lever Z actuates the ratchet T and the curve disk R. On a quarter turn of the disk R the stud O has reached the deepest point of the curve way P and the lever arm M is set to vary the position of tappet shaft G relatively to the striking point of the hammer A. By varying the point of engagement of the thumb shaft relatively to the hammer such hammer A is caused to make a heavier stroke, and consequently to produce a louder tone.

The two intermediate positions between the extreme position of the curve disk R can be taken as the normal position of the lever arm M. By the same or similar means the extreme positions of the curve disk can be utilized for diminuendo or crescendo.

In order to enable repairs to be readily made on the mechanical string instrument, and the strings to be readily stretched or tuned the frame to which the hammer-mechanism is applied should be so mounted that it can be swung back or out of the way.

The hammers A as well as their springs B and the note-sheet engaging levers E are applied to a frame U. This frame should be so journaled on the axle or pivot I that the frame and the hammer mechanism can be swung to the position shown in dotted lines Fig. 4. The axle or point of rotation I can of course be applied or journaled just as well at the upper as the lower end of the instrument, in case the hammers are to be directed downward. It is immaterial what means are employed for swinging the frame U up or out of place. The frame can be swung out by hand and held in desired posi-

tion by suitable stop or stops. Other known means can also be used for this purpose. 50

I claim:

1. A mechanical stringed instrument comprising a spring-supported hammer, an adjustable frame with tappet shaft, a cam disk for setting the adjustable frame, a ratchet and pawl for setting the disk, note-sheet-engaging levers, one of said levers being made to actuate the ratchet and pawl and the other having a flexible connection with the hammer. 55 60

2. In a stringed instrument the combination with spring supported hammers, note sheet engaging levers and flexible connections to the spring supported hammers from the note-sheet engaging levers, of a rotary tappet shaft for imparting rapidly recurring vibrations to the hammers and adjustable bearing members for the tappet shaft. 65

3. In a stringed instrument the combination with spring supported hammers, note-sheet engaging levers and flexible connections to the spring supported hammers from the note sheet engaging levers, of a rotary tappet shaft for imparting rapidly recurring vibrations to the hammers, an adjustable bearing for the tappet shaft and means actuated by a note sheet for setting or shifting the bearing. 70 75

4. In a stringed instrument the combination with spring supported hammers and note-sheet engaging levers with a flexible connection to the spring supported hammers from the note-sheet engaging levers of a rotary tappet shaft for vibrating the hammers and a frame to which the hammers are pivoted, said frame being hinged so as to allow said frame with the hammers to be swung away from the strings. 80 85

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses. 90

PAUL LOCHMANN.

Witnesses:

GUSTAV MÜLLER,
CHARLES NEUER.