

E. P. NEEDHAM.
Mechanical Musical Instrument.

No. 221,343.

Patented Nov. 4, 1879.

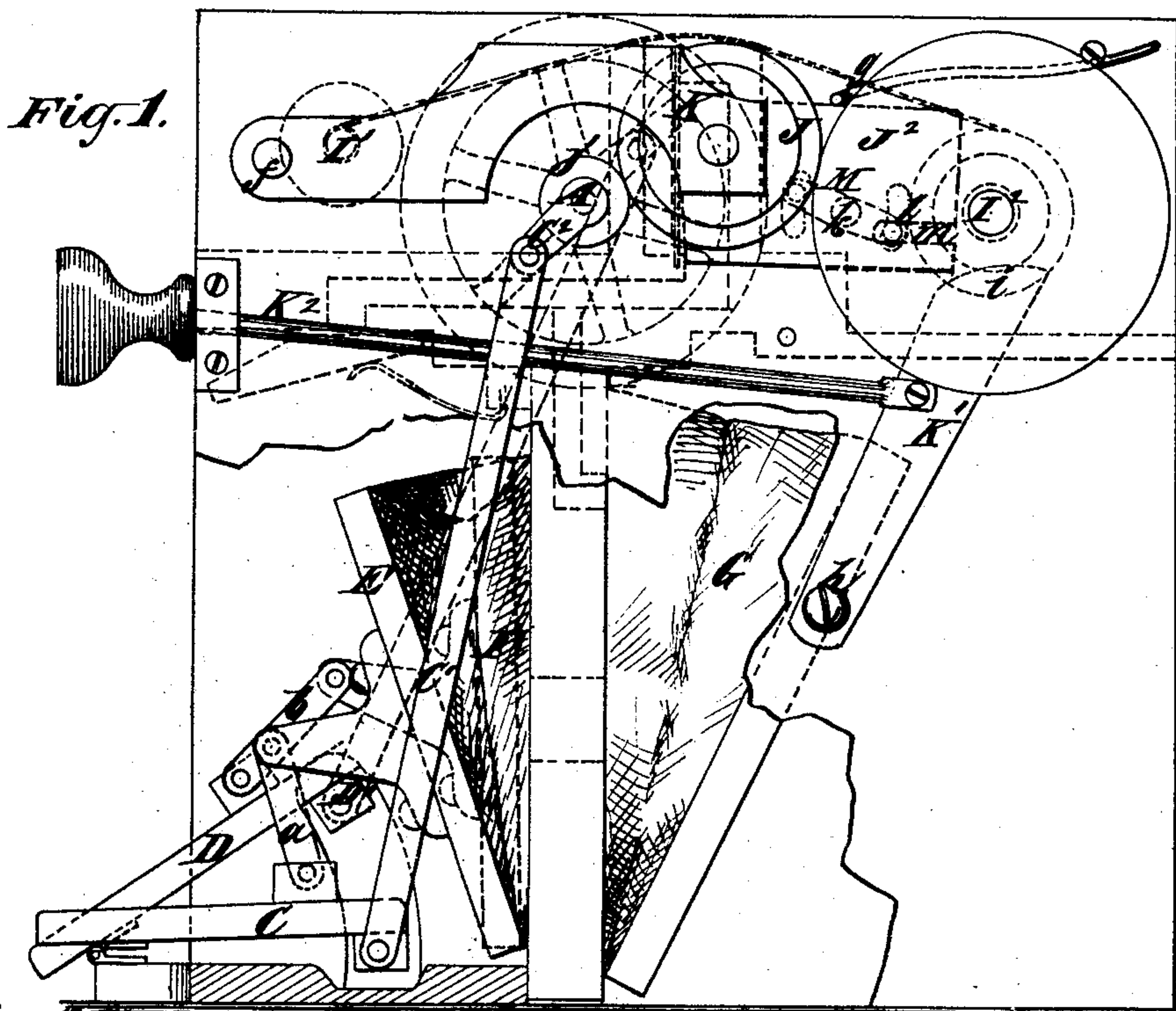


Fig. 4.

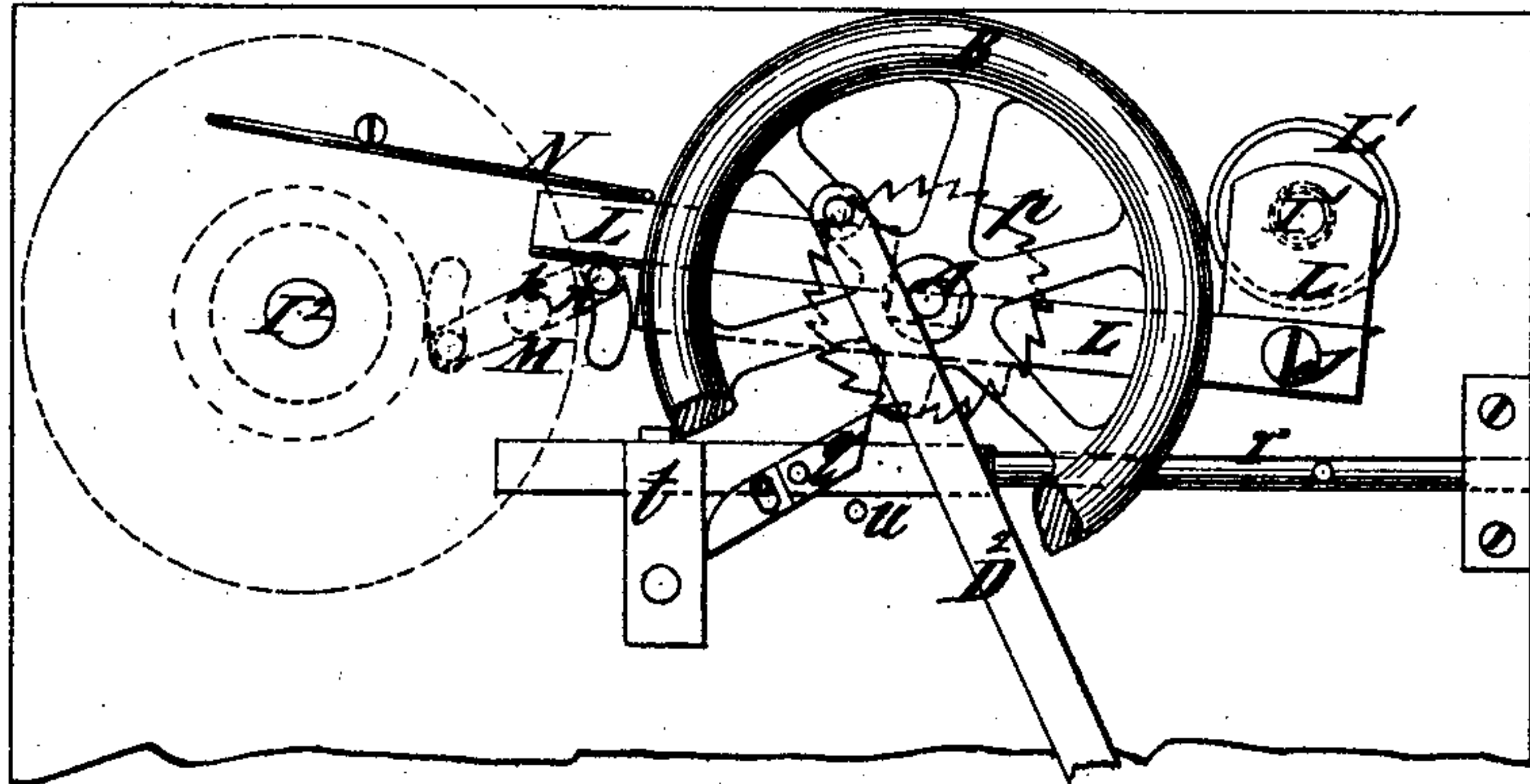
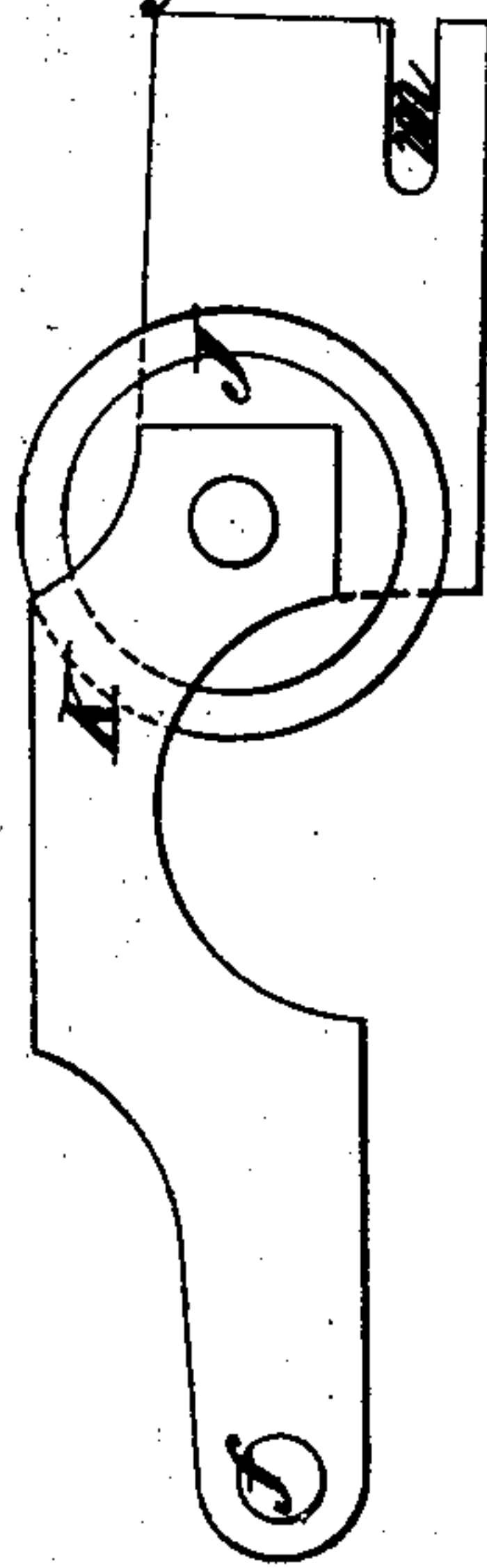
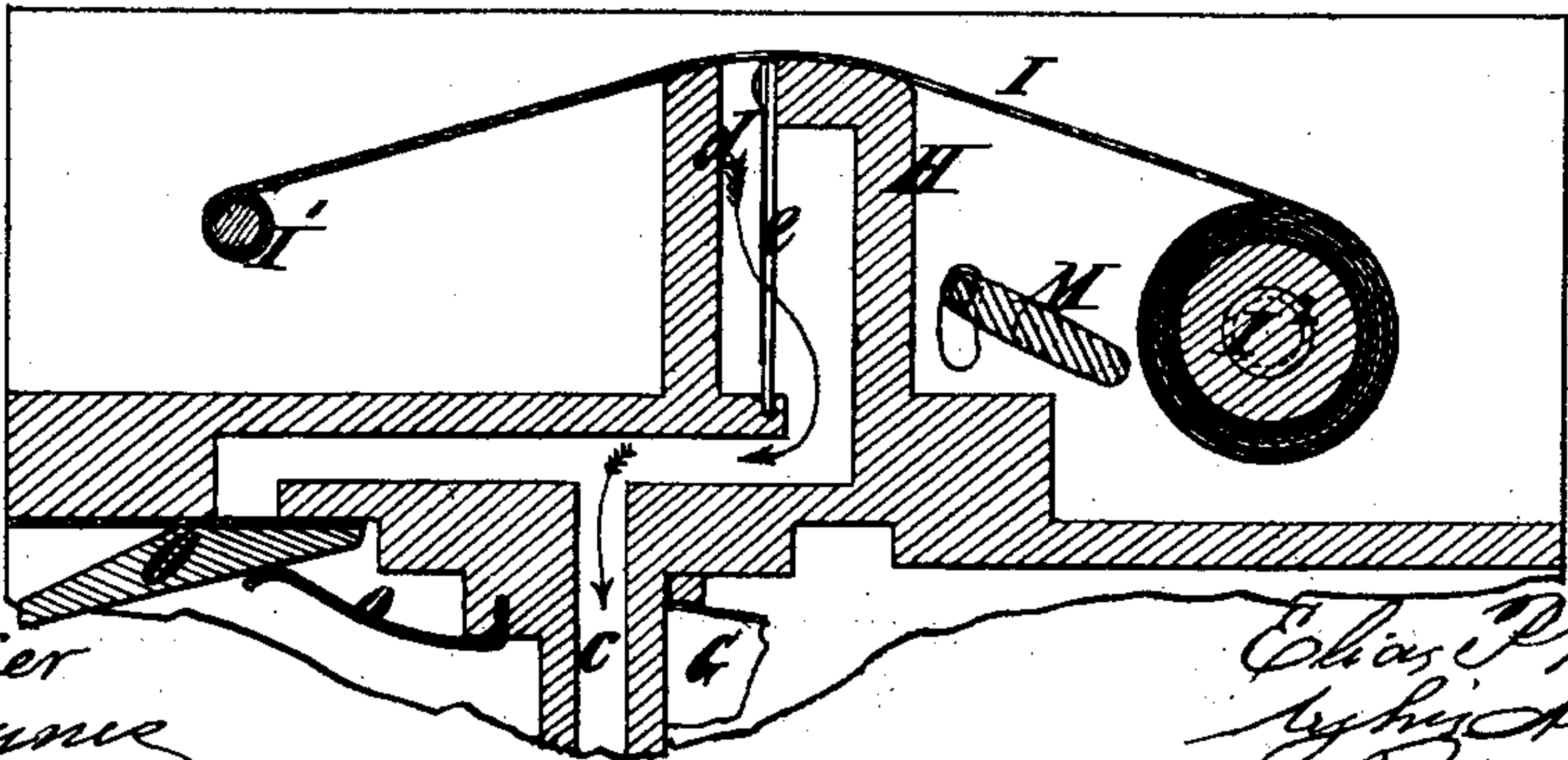


Fig. 2.

Fig. 3.



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IMPROVEMENT IN MECHANICAL MUSICAL INSTRUMENTS.

Specification forming part of Letters Patent No. **221,343**, dated November 4, 1879; application filed July 31, 1879.

To all whom it may concern:

Be it known that I, ELIAS P. NEEDHAM, of the city of New York, in the county and State of New York, 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 mechanical organs and other mechanical musical instruments in which the playing is automatically effected by the passage of a strip or sheet of perforated paper or other equivalent music-sheet through the instrument.

In instruments of this kind the perforated paper or music-sheet is usually placed in the instrument wound upon a roller, which may be called the "music-roller," and is passed therefrom through the instrument, after which it is rolled upon another roller, called the "take-up roller." The perforated paper or music-sheet may pass over an action-board to control the admission of air to operate pipes or reeds, or may be used to operate any mechanical devices, such as hammers, bells, &c., by which musical sounds are produced.

One of my improvements consists in the combination, in a mechanical musical instrument, with a main driving-shaft, of a fly-wheel mounted thereon, a treadle for imparting motion to said shaft, and a take-up roller independent of and separate from the driving-shaft, having motion imparted to it from said main driving-shaft through intermediate mechanism, thereby effecting the movement of the paper without the use of separate feed-rollers.

Another of my improvements consists in the combination, in a mechanical musical instrument, with a main driving-shaft, of a fly-wheel mounted thereon, a treadle for imparting motion to said shaft, a music-roller, a take-up roller, a friction wheel or pulley, whereby motion is imparted from said driving-shaft to said take-up roller, a separate and independent friction wheel or pulley, whereby motion is imparted to the music-roller, and means for bringing one of said friction wheels or pulleys into operation and one out of operation, so as to effect the driving of either of said rollers.

Other improvements consist in details and combinations of parts hereinafter described.

In the accompanying drawings, Figure 1 represents a side elevation of an instrument embodying my improvements, a portion of the side being broken away to better illustrate my invention. Fig. 2 represents a side view of a portion of the opposite side of the instrument. Fig. 3 represents a vertical section of the upper portion of the same, and Fig. 4 a detail view of certain parts thereof.

Similar letters of reference designate corresponding parts in all the figures.

A designates the main driving-shaft of the instrument, extending from side to side thereof, and having a fly-wheel, B, mounted upon it. Motion is imparted to said driving-shaft by means of treadles C D, which are represented as acting, through connecting-rods C' D', upon the crank C² and fly-wheel B on the main shaft A. Although the connecting-rod D' is here shown as secured to the fly-wheel, an independent crank similar to C² might be used.

E F designate a pair of bellows, by which the wind-chest G is exhausted of air, and which are operated through links *a* and *b* from the treadles C D. The wind-chest G is shown as communicating, by means of ducts *c*, with an action-board, H, in which are reed-tubes *d* and reeds *e*. Pipes might be substituted for the reeds, if desirable, with good results.

I designates a perforated paper strip or music-sheet, which is rolled upon the music-roller I' preparatory to playing, and passes therefrom over the action-board H to the take-up roller I², upon which it is rolled and by which it is drawn forward over the action-board. The said take-up roller is preferably of considerably larger diameter than the music-roller, as in such case the increase of its diameter as the music-sheet is wound upon it is less, and the said sheet is not subjected to undue strain.

Motion is imparted to the said take-up roller I² from the main driving-shaft A by means of an intermediate wheel or pulley, J, which is in frictional contact with a pulley, J', upon the driving-shaft A, and transmits its motion to the take-up roller I² through a friction-pulley, J², mounted on the shaft of said roller. The pulley J is mounted in a bearing-block, K, (see Fig. 4,) pivoted at *f* to the side of the instru-

ment, and represented as forced down by a spring, *g*, to hold the pulley *J* in frictional contact with the pulleys *J'* and *J*².

K' designates a lever, pivoted to the side of the instrument at *h*, and having a cam-face, *i*, which, by pulling the handle of the rod *K*², may be brought in contact with the pivoted block *K*, for the purpose of raising the pulley *J* out of contact with the pulleys *J'* and *J*².

In lieu of the frictional gearing for driving the take-up roller *I*², a belt might be employed with equally good results, in which case the pulley *J* would serve simply as a tightening-pulley.

When the driving of the take-up roller is effected by friction, as in the present instance, one or more of the friction-pulleys may have a rubber band upon them for increasing their effectiveness.

For the purpose of rewinding the music-sheet upon the music-roller *I'*, I have shown said roller as mounted at one end in a bell-crank lever or support, *L*, pivoted to the side of the instrument at *j*, and adapted to be oscillated to bring a pulley, *I'*, mounted upon the said music-roller, in contact with a wheel or pulley upon the main driving-shaft, which, in this instance, is the fly-wheel *B*. When it is desired to rewind the music-sheet upon the music-roller *I'*, it is necessary to disengage the take-up roller *I*² from the main driving-shaft *A*, and, preferably, the engagement of the music-roller with and the disengagement of the take-up roller from said driving mechanism are effected simultaneously. The means here shown for accomplishing this consist of a piece or bar, *M*, extending transversely across the instrument parallel with the shaft *A*, and pivoted in the sides at *k*, so as to be free to swing or oscillate upon said pivot. At one end the piece *M* is provided near one edge with a pin, *l*, which engages with a slot, *m*, in the hinged bearing-block *K*, in such manner that the raising of said block oscillates the said bar or piece *M* and depresses a pin, *n*, secured in its opposite end. When the said pin is depressed the end of the hinged bell-crank support *L* is released, whereupon the spring *N* depresses the said support and forces the pulley *I'*, mounted upon the music-roller *I'*, against the rim of the fly-wheel *B* with such force that the said music-roller *I'* is rotated thereby and the music-sheet rewound upon it. The spring *g* should be of greater strength than the spring *N*, so that when the instrument is playing the bearing-block *K* is forced down, and, through the oscillation of the bar or piece *M*, the end of the hinged bell-crank support *L* is raised and the rewinding mechanism rendered inoperative.

It is obvious that any suitable means might be substituted for the oscillating piece *M*—such, for instance, as a lever acted upon at one end by the hinged bearing-block *K*, and acting at the other end upon bell-crank-lever support *L*.

In order to prevent the reeds from sounding as the music-sheet is rewound, I have represented a valve, *O*, which may be opened by the hand when the music-sheet is being rewound, and which is represented as closed by a spring, *o*.

In order to provide a means for starting the instrument in case the main shaft should become stuck on the center, I have represented a ratchet-wheel, *p*, as mounted on the shaft *A*, and a pawl, *q*, pivoted to a draw-bar, *r*, adapted to be moved longitudinally by the handle *s*.

In order to effect the automatic working of the pawl, I have represented a block, *t*, against which the curved cam-like end of the pawl *q* strikes as the draw-bar is pushed in, thereby moving said pawl to a position to operate on the teeth of the ratchet-wheel. As the draw-bar is pulled out the pawl strikes a stationary pin, *u*, and is by it disengaged from the teeth of the ratchet-wheel.

It is obvious that the details of my instrument might be altered, if desirable, to suit different situations without altering the character of the instrument.

With a heavy fly-wheel it may be only necessary to have one connecting-rod and crank for imparting motion to the shaft *A*, and the mechanism connecting the driving-shaft with the music-roller and take-up roller might be modified, if desirable.

As by my invention I am enabled to effect the engagement of the music-roller with and the disengagement of the take-up roller from the driving-shaft without stopping the same or changing the direction of its motion, a piece of music may be played, rewound, and played again, or any part thereof repeated, without varying the rotation of the driving-shaft.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a mechanical musical instrument, the combination, with a main driving-shaft, of a fly-wheel mounted thereon, a treadle for imparting motion to said driving-shaft, and a take-up roller independent of and separate from the driving-shaft, having motion imparted to it from said driving-shaft through independent mechanism, substantially as specified.

2. In a mechanical musical instrument, the combination, with a main driving-shaft, of a fly-wheel mounted thereon, a treadle for imparting motion to said shaft, a music-roller, a take-up roller, a friction wheel or pulley, whereby motion is imparted from said driving-shaft to said take-up roller, a separate and independent friction wheel or pulley, whereby motion is imparted to the music-roller, and means for bringing one of said friction wheels or pulleys into operation and one out of operation, so as to effect the driving of either of said rollers, substantially as specified.

3. In a mechanical musical instrument, the combination, with a main driving-shaft, of a

fly-wheel mounted thereon, a treadle for imparting motion to said driving-shaft, a take-up roller, wheels or pulleys mounted on said driving-shaft and the shaft of said take-up roller, and an intermediate wheel or pulley adapted to be brought into frictional contact with said pulleys for transmitting motion from the driving-shaft to the take-up roller, substantially as specified.

4. The combination, with the main driving-shaft A and the take-up roller I², of the wheels or pulleys J' J², the wheel or pulley J, mounted in the pivoted bearing-block K, the lever K', and rod K², substantially as specified.

5. The combination, with the driving-shaft A, music-roller I', and take-up roller I², of the pivoted bearing-block K, the oscillating

piece M, and the bell-crank-lever support I, with its wheel or pulley L', substantially as specified.

6. The combination, with the main driving-shaft A and fly-wheel B, of the bell-crank-lever support L, wheel or pulley L', oscillating piece or bar M, and spring N, substantially as specified.

7. In a mechanical musical instrument, the combination, with the main driving-shaft A, of the ratchet-wheel *p*, pawl *q*, having a cam-shaped face at one end, draw-bar *r*, block *t*, and pin *u*, substantially as specified.

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