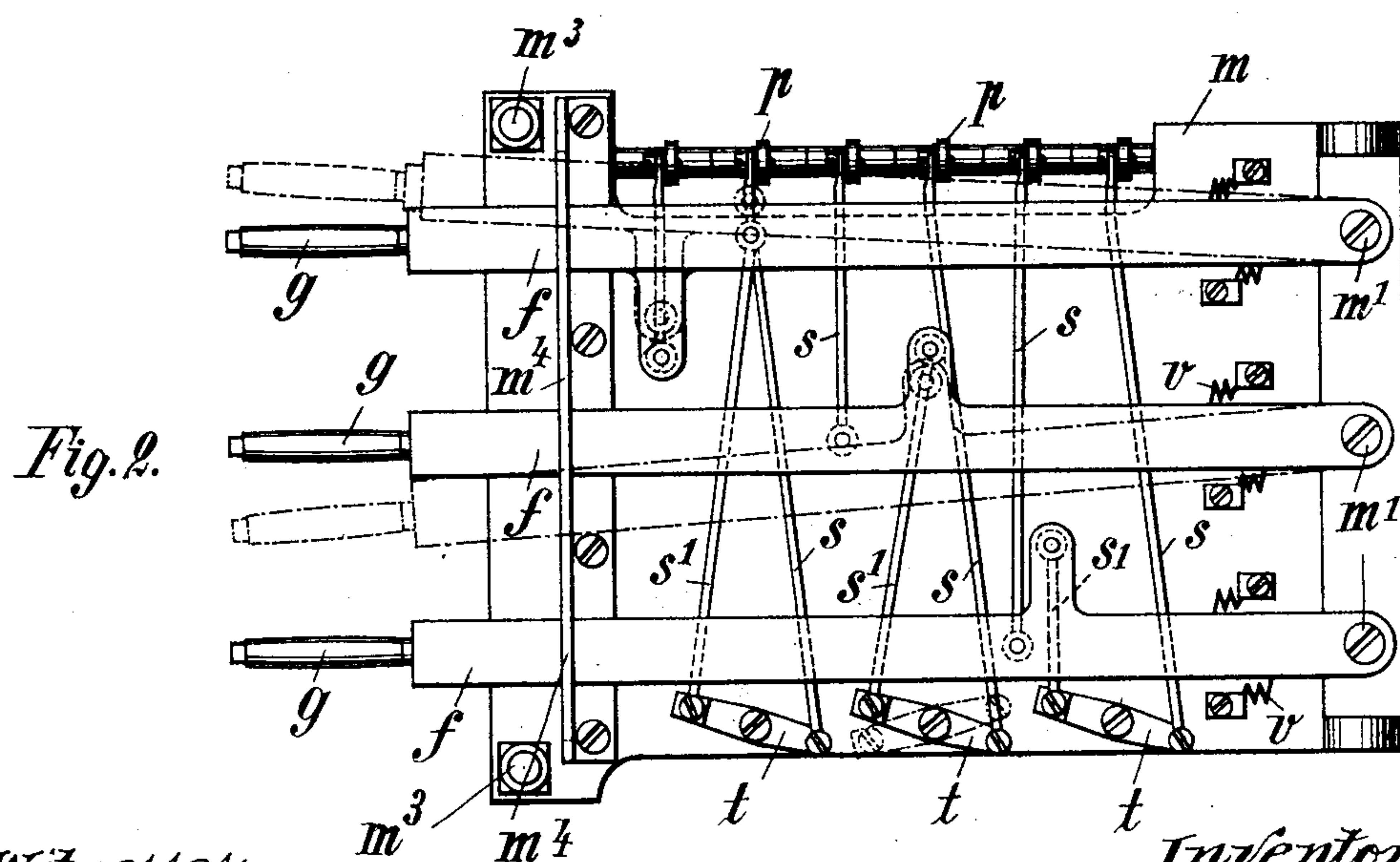
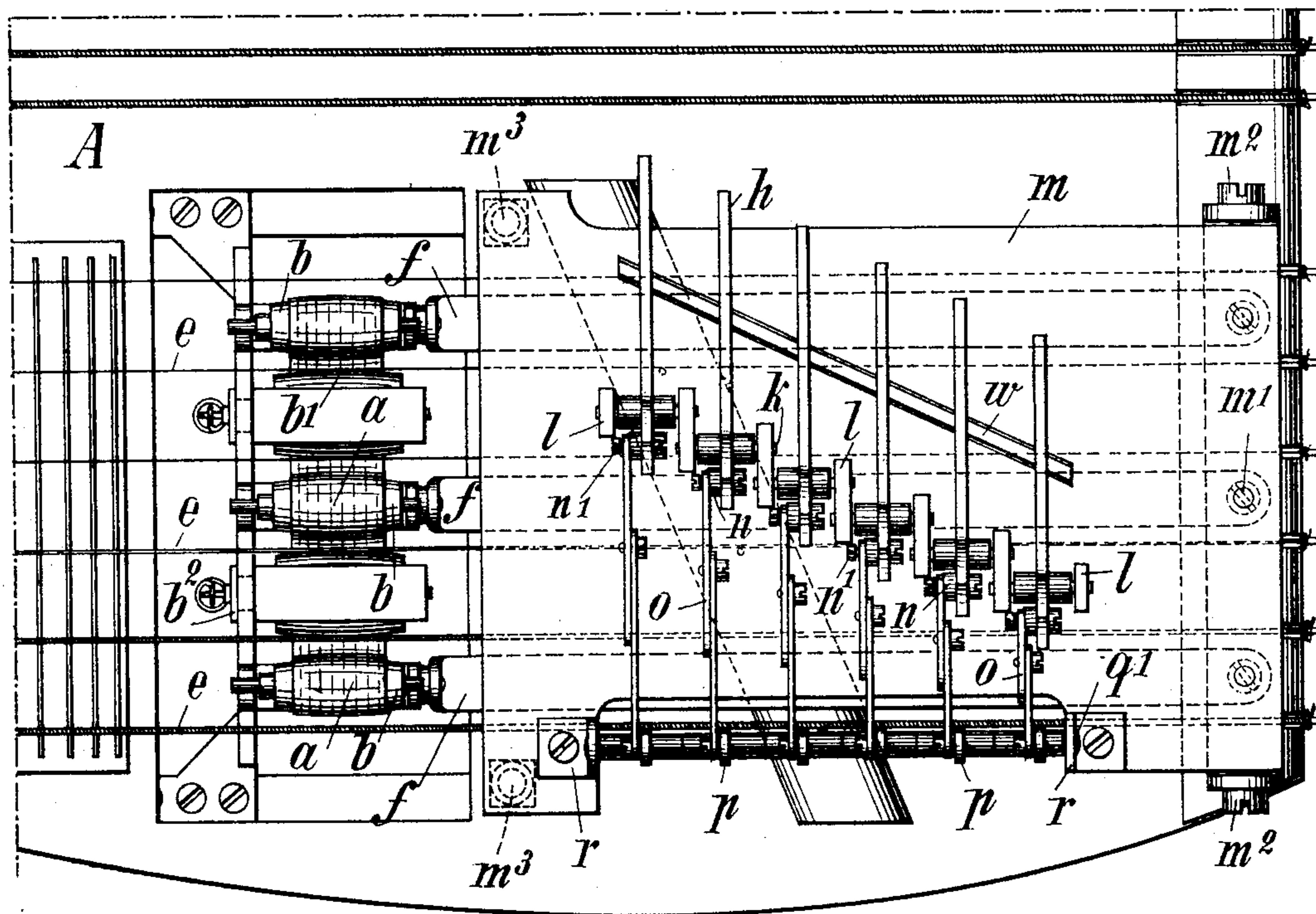


3 Sheets—Sheet 1.

No. 536,886.

Patented Apr. 2, 1895.

Fig. 1.



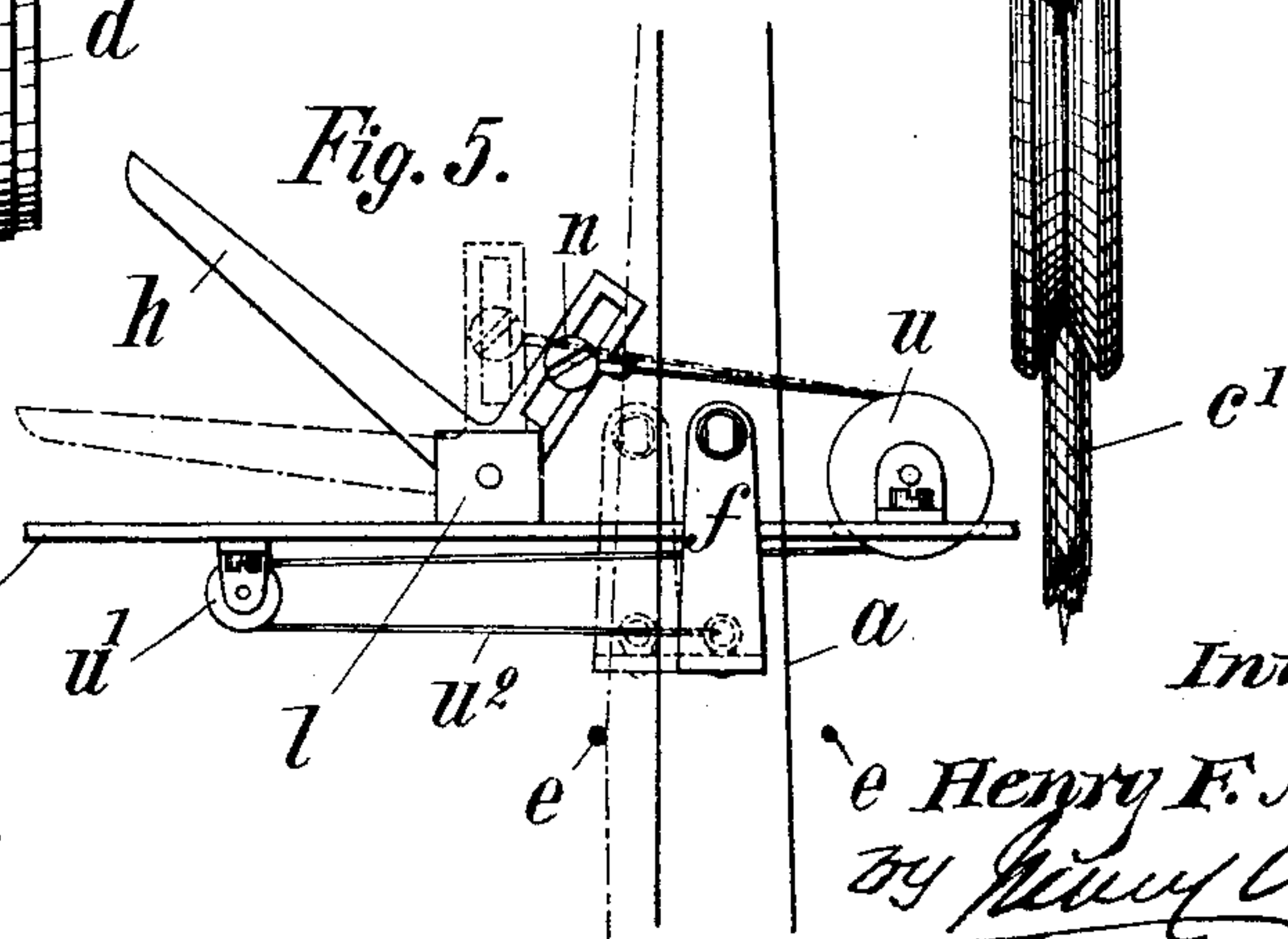
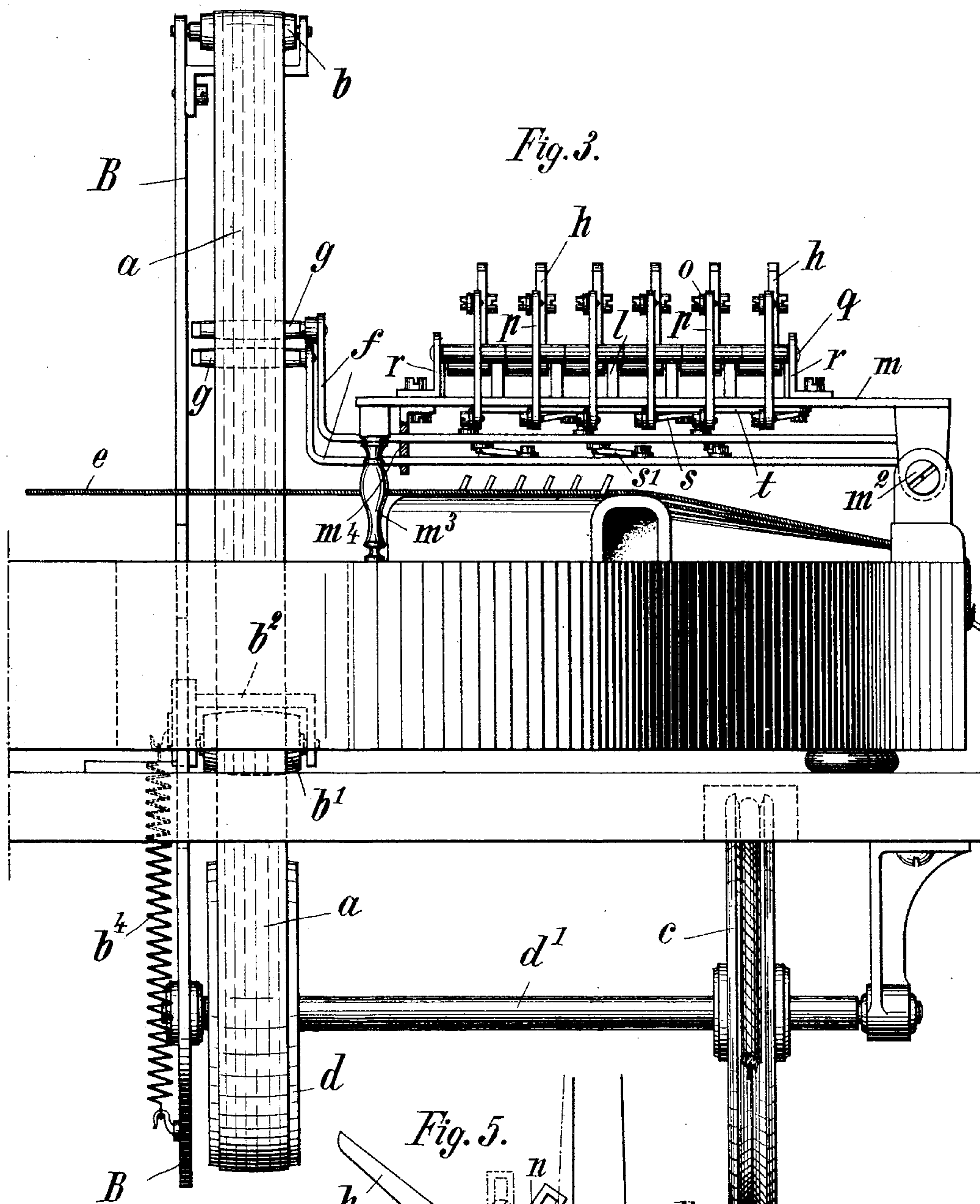
Witnesses;
B. S. Ober,
Henry M. J.

Inventor:
Henry F. Müller.
by Henry D. Th Atty.

H. F. MÜLLER.
PIANO VIOLIN.

No. 536,886.

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B. S. Ober.

Henry Müller

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Henry F. Müller.

by Henry C. B. Atty

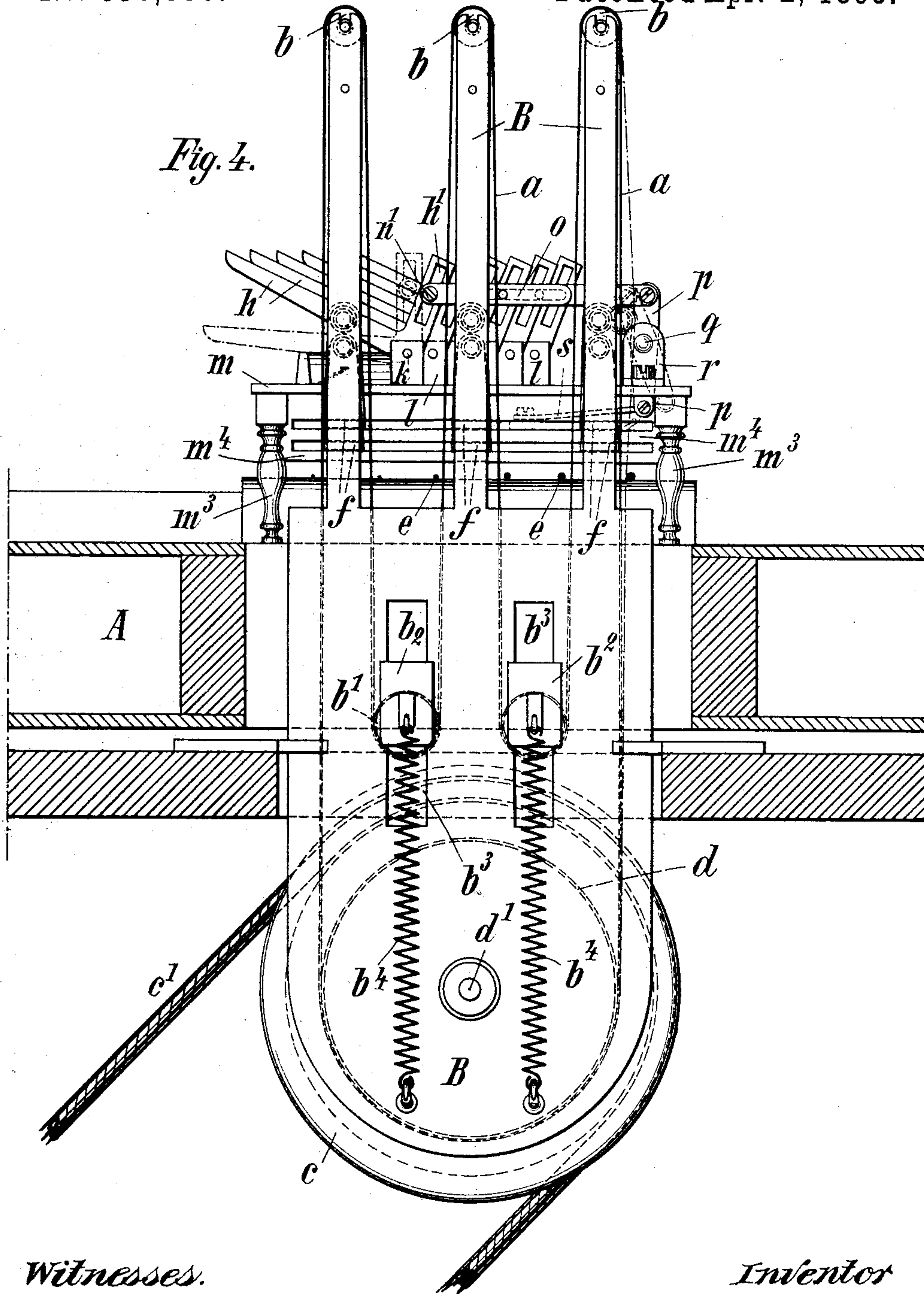
(No Model.)

3 Sheets—Sheet 3.

H. F. MÜLLER.
PIANO VIOLIN.

No. 536,886.

Patented Apr. 2, 1895.



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UNITED STATES PATENT OFFICE.

HENRY F. MÜLLER, OF HAMBURG, GERMANY, ASSIGNOR TO CARL FRIEDRICH AUGUST MEYER, OF ST. LOUIS, MISSOURI.

PIANO-VIOLIN.

SPECIFICATION forming part of Letters Patent No. 536,886, dated April 2, 1895.

Application filed September 8, 1894. Serial No. 522,443. (No model.) Patented in Germany May 5, 1892, No. 72,889; in France November 11, 1892, No. 225,771, and in Austria-Hungary May 18, 1894, No. 113 and No. 17,710.

To all whom it may concern:

Be it known that I, HENRY F. MÜLLER, a subject of the Emperor of Germany, and a resident of Hamburg, in the German Empire, have invented certain new and useful Improvements in Musical Stringed Instruments, (for which I have obtained patents in Germany, No. 72,889, dated May 5, 1892; in France, No. 225,771, dated November 11, 1892, and in Austria-Hungary, No. 113 and No. 17,710, dated May 18, 1894;) and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

My invention has relation to that class of stringed instruments in which the sounds are produced by the friction resulting from the pressure upon the strings of a mechanically moved endless band bow, such pressure being controlled by suitable key levers, as will now be fully described, reference being had to the accompanying drawings, in which—

Figure 1 is a plan view of a musical instrument embodying my invention. Fig. 2 is an under side view of the mechanism controlling the pressure levers and controlled by the key levers. Fig. 3 is a side elevation, and Fig. 4 is a vertical cross sectional view of the instrument, and Fig. 5 is a detail view illustrating a modification in the means for controlling the operation of the band bow.

In the above drawings A indicates the finger board which is cut away at its lower end to admit of the passage of the endless band bow *a*, arranged to travel in a zigzag path over suitable pulleys *b b'* and is set in motion by a drum *d* keyed to a spindle *d'*. Rotation may be imparted to the spindle by any suitable means, as by a treadle, a suitable grooved wheel *c*, and rope or cord *c'* being provided. In order to maintain the band bow *a* at a uniform tension, the lower guide rollers *b'* are journaled in bearings *b²*, adapted to slide in slots *b³* in the framing B, said bearings being connected with the framing by suitable springs *b⁴* that tend to draw the bearings

downwardly and thus maintain the band bow *a* at normally uniform tension.

In order to bring the band bow *a* into contact with the strings *e* on the finger board, I provide a series of levers or oscillating pressure bars *f* fulcrumed on pins or pivots *m'* secured to a plate *m* that carries the key levers *h*, said pressure bars being guided in suitable slots formed in a transverse bar *m⁴* that is conveniently secured to the under side of the aforesaid plate *m*. The free end of the pressure bars *f* is Z-shaped, forming a finger that carries a roller *g* and projects into the path of the endless band bow *a*.

The key levers *h* are bell crank levers fulcrumed at *k* in suitable uprights *l* secured to plate *m*. The short arm of the key levers is slotted longitudinally, and in the slot *h'* thereof is adjustably secured a slide block *n*, connected by bolt *n'* with one end of an extensible bar *o*, whose other end is connected with one of the arms of a centrally pivoted rock lever *p*, the other arm of which is connected with a pressure bar, as hereinafter described.

By means of the described connection of key lever and centrally pivoted rock lever, the amplitude of the movements of said parts may be varied or regulated as desired, or required.

The bars *o* as shown are constructed of two parts adjustable longitudinally on each other by means of a set screw, and the centrally pivoted rock levers *p* to which said bars are connected are fulcrumed on a common spindle *q* supported from suitable standards *r*, secured to the plate *m*.

I have shown an instrument provided with six melody strings *e*, and in accordance therewith I provide six pressure bars *f*, and these I arrange in pairs, one of a pair above the other on their respective fulcrum pins *m'*, and provide means whereby the pressure bars of a pair may be oscillated in opposite directions from a normal position of rest and brought into contact with oppositely moving portions of the endless band bow *a* to press said portions against the strings on the outer side thereof. To this end one half of the pressure bars *f* are directly connected with a corre-

sponding number of centrally pivoted rock levers p by means of connecting rods s while the remaining pressure bars f are connected with their respective centrally pivoted rock levers through the medium of intermediate two-armed levers t and connecting rods s and s' , Fig. 2, suitable springs v being provided to return the pressure bars into their normal position of rest when moved out of it by depressing a key lever h .

The downward movement of the finger arm of the key levers h is limited by a bridge or stop w , Fig. 1, secured to the finger board m , which latter may be pivotally connected with the frame B as by pivot screws m^2 whereby said board m , supported at its free end on posts m^3 , may be lifted and tilted over, thus affording ready access to the mechanism on the under side thereof.

In lieu of the described connections $o p s$, and $o p, t, s s'$, between the key levers h and pressure bars f , the said key levers may be connected with their respective pressure bars by means of wires, cords, or belts u^2 , Fig. 5, passing over suitable guide pulleys u and u' , one end of each wire, cord, or belt being secured to the adjustable block n of a key lever and the other to a pressure bar.

The described invention may be applied to almost all stringed instruments in which a bow is used for the production of sound, and it is also applicable to such stringed instruments as the zither, in which the treble strings are usually actuated by a plectrum attached to the thumb, while the bass strings are actuated by the other fingers of the right hand. In the latter case the key levers of the action are preferably arranged with their front edge on a line oblique to the strings, Fig. 1, while in other cases, where the bass strings need not be struck by the fingers of the right hand and the sounds of the treble strings on the finger board regulated by the left hand fingers, the front end of the key board may be parallel with the strings of the instrument.

Although I have described a particular construction of finger board action, and a modification of the same, I wish it to be clearly understood that I do not limit the scope of my invention thereto.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

1. In a musical instrument such as described, the combination with the violin strings and an endless band bow adapted to travel in a zigzag path in proximity to said strings, of a key lever, a pressure bar adapted to move in a plane at right angles to the plane

of motion of the bow and to press the same against an adjacent string, and means for varying the amplitude of the movements of the pressure bar, for the purpose set forth.

2. In a musical instrument such as described, the combination with a movable endless band bow, and a violin string on each outer side thereof, of two pressure bars having fingers in proximity to the inner sides of said band bow, two key levers, and connections between the latter and the pressure bars adapted to move said bars in opposite directions when said key levers are depressed, for the purpose set forth.

3. In a musical instrument such as described, the combination with a movable endless band bow and a violin string on each outer side thereof, of two pressure bars having fingers in proximity to the inner sides of said band bow, said pressure bars arranged one above the other on a common fulcrum, two key levers, and connections between the latter and the pressure bars adapted to move said bars in opposite directions when said key levers are depressed.

4. In a musical instrument such as described, the combination with a movable endless band bow, a violin string on each outer side thereof, and two pressure bars f arranged one above the other on a common fulcrum and carrying rollers g proximate to the inner sides of said bow, a key lever, a centrally pivoted rock lever p connected with said key lever, and with one of the pressure bars, a second key lever, a second centrally pivoted rock lever p connected thereto, and an intermediate two-armed lever t , and connections $s s'$ connecting the said two armed lever with the other pressure bar, said devices arranged to move the pressure bars in opposite directions when the key levers are depressed, for the purpose set forth.

5. In a musical instrument such as described, the combination with a key lever having a longitudinal slot in one of its arms, a block adjustable along said slot, and a pressure bar as f , of a centrally pivoted rock lever, a connection between said pressure bar and rock lever, and an extensible connection connecting the aforesaid block with the rock lever, for the purpose set forth.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 25th day of August, 1894.

HENRY F. MÜLLER.

Witnesses:

ALEXANDER SPECHT,
HARRY F. W. GRETHE.