No. 750,946. PATENTED FEB. 2, 1904.

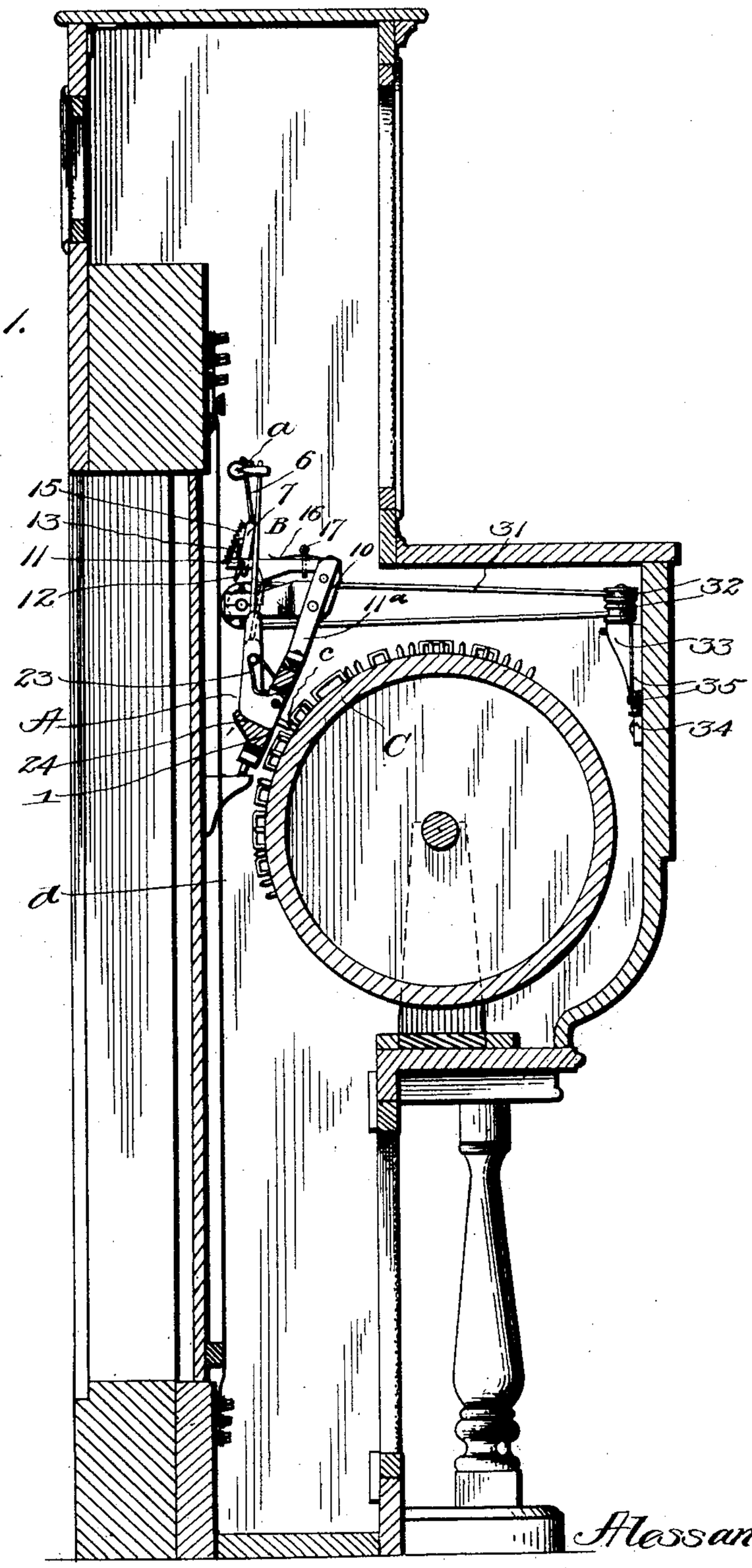
A. CAPRA.

TREMOLO ACTION FOR MECHANICAL PIANOS.

APPLICATION FILED SEPT. 8, 1903.

NO MODEL. 3 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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NO MODEL. 3 SHEETS—SHEET 2.

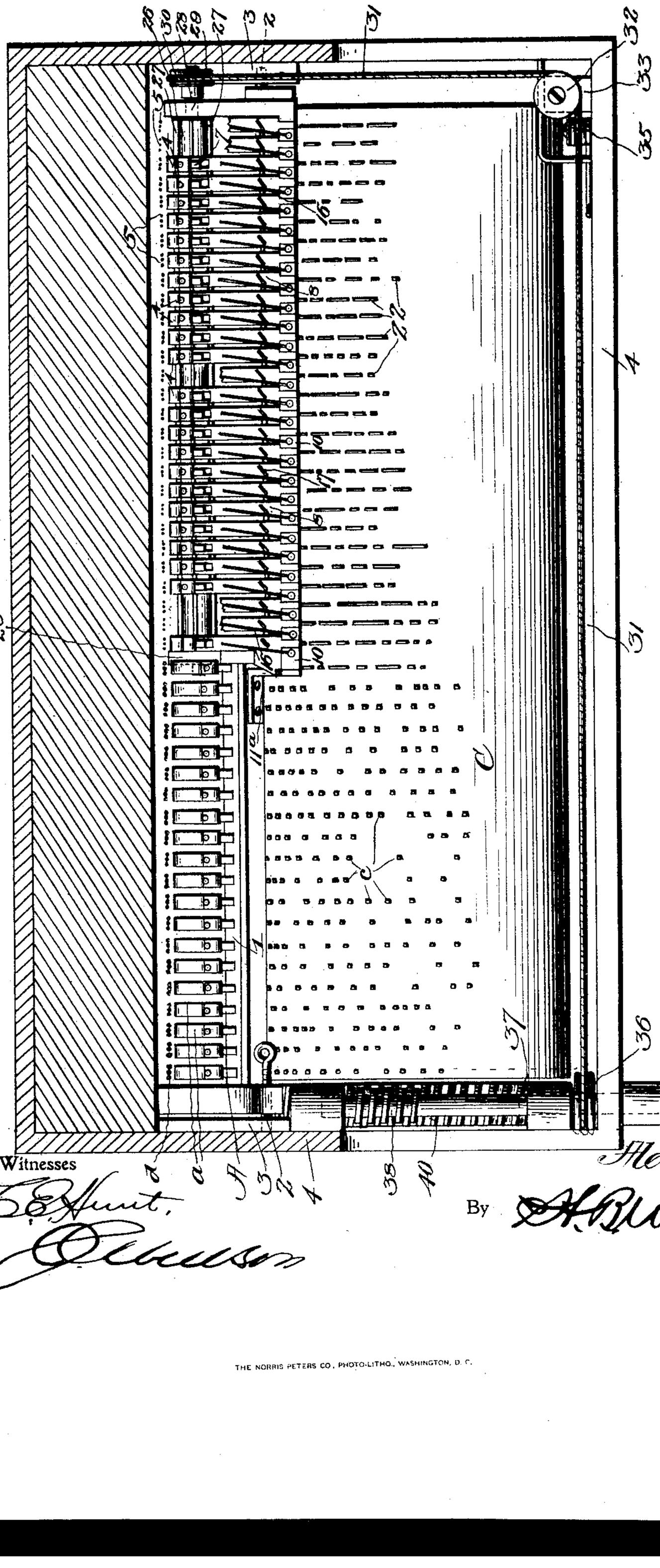

Fig. 2.

Witnesses

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APPLICATION FILED SEPT. 8, 1903.

NO MODEL. 3 SHEETS—SHEET 3.

Fig. 3.

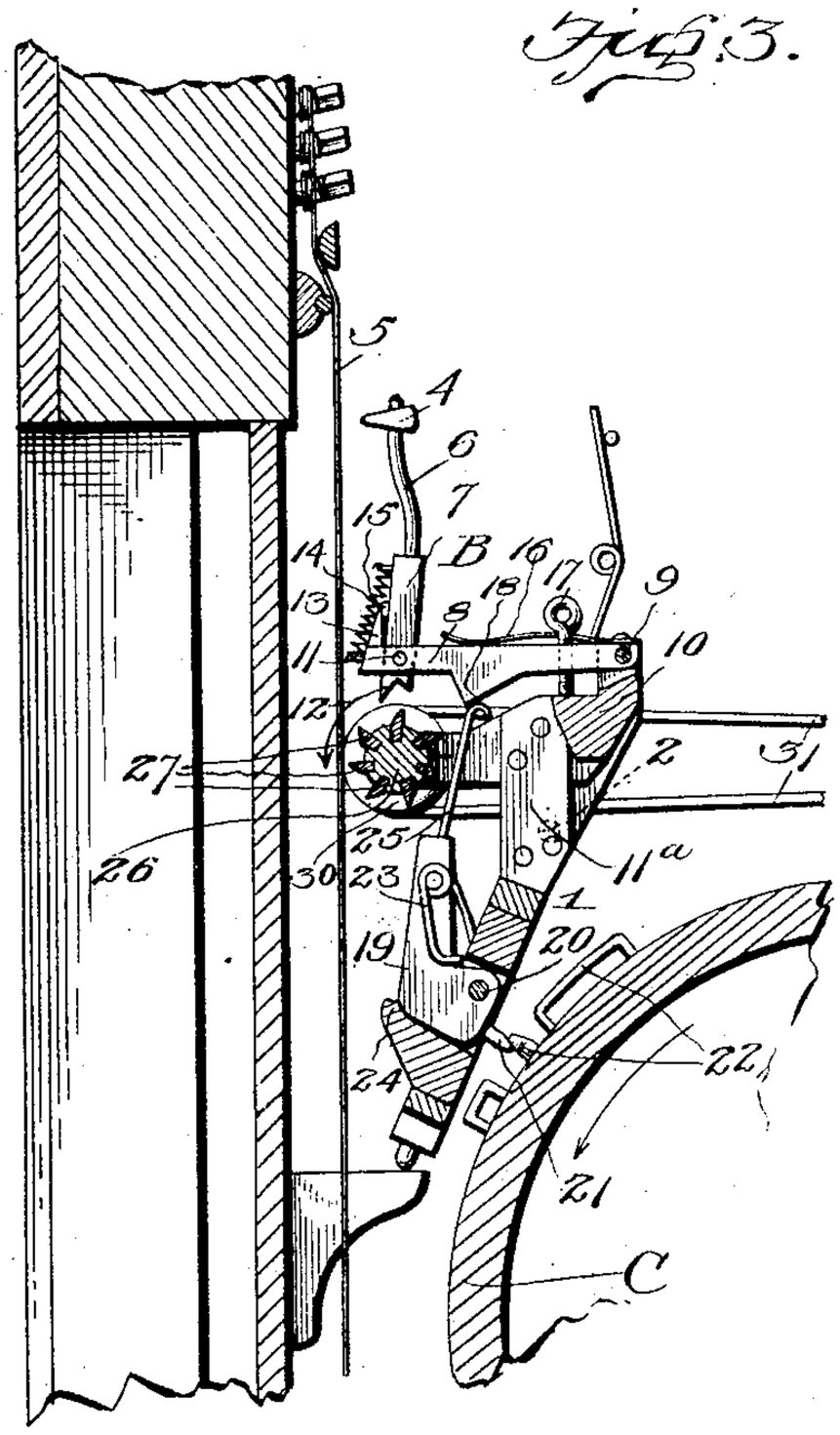


Fig. 4.

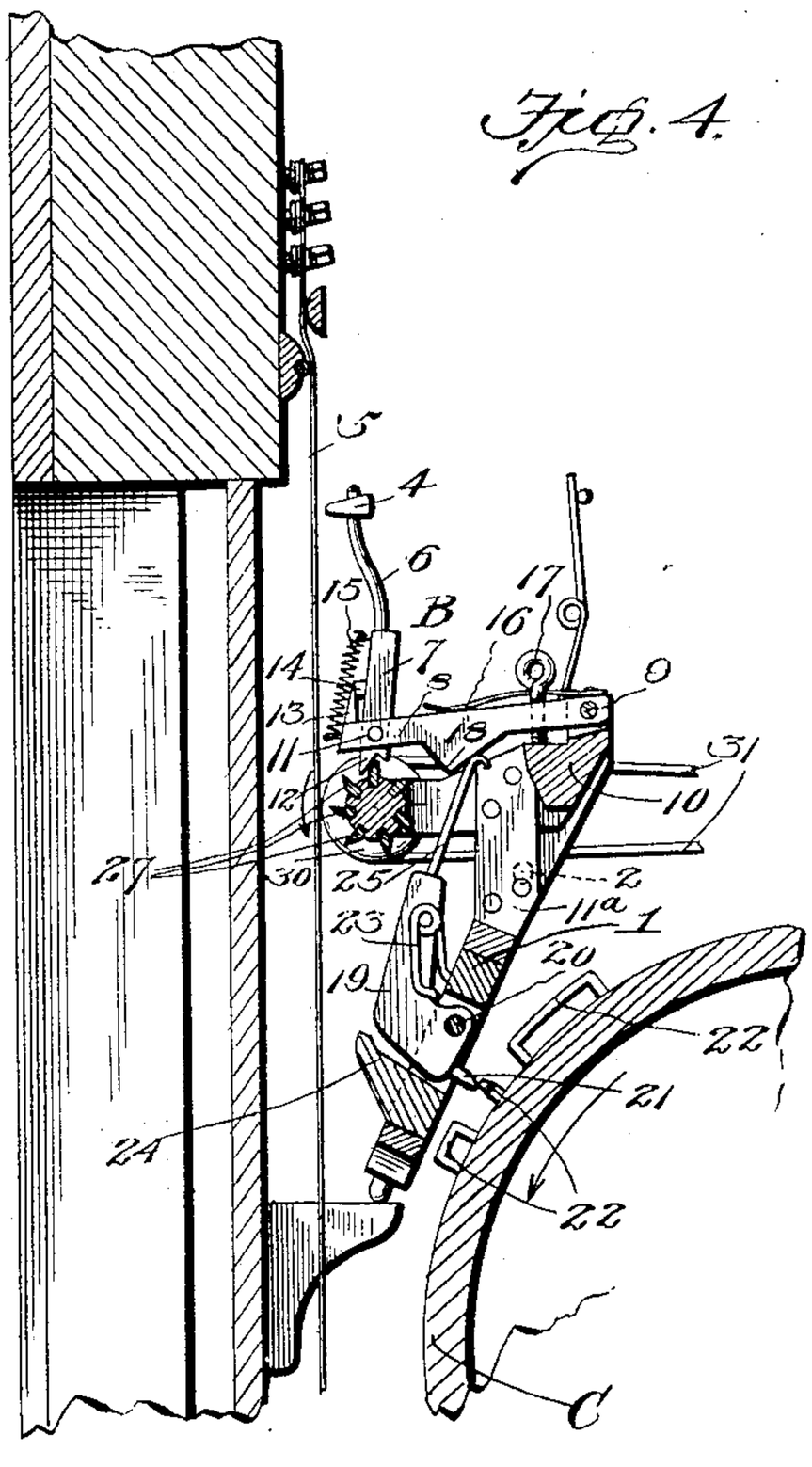
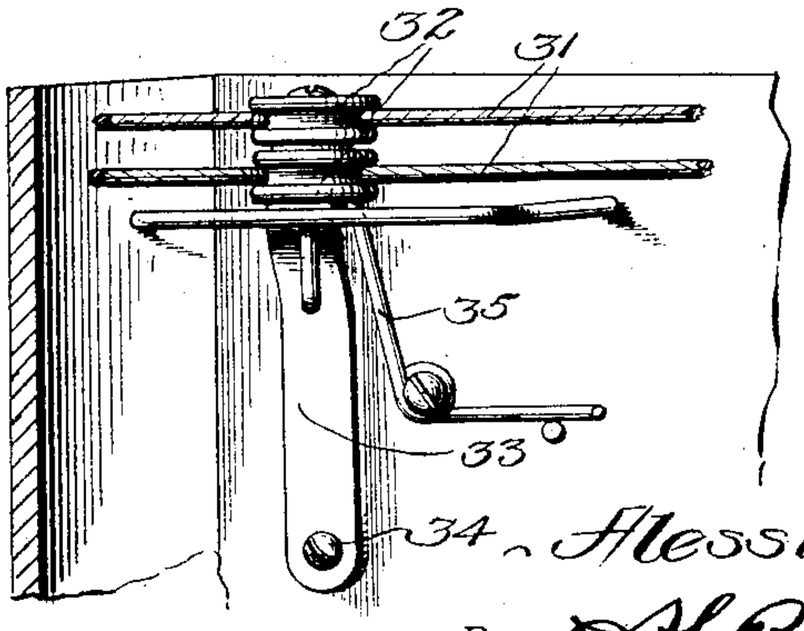


Fig. 5.



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No. 750,946. Patented February 2, 1904.

UNITED STATES PATENT OFFICE.

ALESSANDRO CAPRA, OF PHILADELPHIA, PENNSYLVANIA.

TREMOLO-ACTION FOR MECHANICAL PIANOS.

SPECIFICATION forming part of Letters Patent No. 750,946, dated February 2, 1904.

Application filed September 8, 1903. Serial No. 172,318. (No model.)

To all whom it may concern:

Be it known that I, ALESSANDRO CAPRA, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Tremolo-Actions for Mechanical Pianos; and I do 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.

My invention is an improved tremolo-action for mechanical pianos and similar musical instruments adapted for playing the air in imitation of a stringed instrument, such as a mandolin, while the accompaniment is played by the usual hammers of the instrument and their operated mechanisms.

The object of my invention is to combine with a hammer-operating instrument a vibrator, a hammer, a movable carrier therefor, and means operated by the hammer-operating element and coacting with the hammer-carrier to engage the latter with the vibrator for operation thereby.

A further object of my invention is to combine with the key-pin cylinder which operates the usual mechanical-piano action a vibrator which is driven simultaneously with the cylinder and a tremolo-action distinct from the first-named action, the hammers of which are normally disengaged from the vibrator and are provided with means actuated by key-tappets on the cylinder for putting the tremolo-hammers into engagement with the vibrator, whereby they are caused to repeatedly and rapidly strike the strings, the key-tappets by their length and rotation of the cylinder determining the duration of the coaction of the vibrator and the several hammers of the tremolo-action.

My invention consists in the construction, combination, and arrangement of devices hereinafter described, and pointed out in the claims.

A further object of my invention is to combine with a mechanical-piano action a tremolo-action distinct therefrom operated simultaneously therewith.

A further object of my invention is to provide an instrument of the class described with an action for playing the accompaniment and a distinct tremolo-action for playing the air.

In the accompanying drawings, Figure 1 is a vertical transverse sectional view of a mechanical piano embodying my improvements. Fig. 2 is a horizontal sectional view of the same, showing the usual mechanical-piano action and my improved tremolo-action in connection therewith. Fig. 3 is a detail vertical sectional view showing the tremolo-action with one of its hammers in its normal position out of engagement with the vibrator. Fig. 4 is a similar view of the same, showing the hammer in engagement with the vibrator for operation thereby. Fig. 5 is a detail view of means for maintaining the tension of the endless cord which operates the vibrator-roller.

In the embodiment of my invention here shown the action A is of a form usual in mechanical pianos, the hammers *a* being operated by the key-pins *c* of the cylinder C. The action A is arranged for playing the accompaniment. The strings on which the hammers of the action A operate are indicated at *d*. The hammers of the action A are pivoted to a hammer-bar 1, which is pivotally mounted at its ends, as at 2, in bearings 3 at the ends of the inclosing case 4. This hammer-bar 1 may be turned on its pivots, by the means usually employed for this purpose and which forms no part of my present improvements, to put the action into or out of operative relation to the key-pins *c* of the cylinder. The bar 1 also carries my improved tremolo-action, which is indicated at B. The tremolo-action is arranged for playing the air and is distinct from the action A, which is arranged for playing the accompaniment. The cylinder C, which operates the action A, also controls the operation of the action B, which plays the accompaniment. The hammers 4 of the tremolo-action are adapted each to repeatedly and rapidly strike one of the strings 5 to produce a sound in imitation of that of a stringed instrument, such as a mandolin. Each hammer 4 has a resilient arm 6, which in practice is usually made of steel wire, and a pivoted arm 7, which forms a continuation thereof and is

carried by a carrier or arm 8. The latter is pivoted at its outer end, as at 9, to a bar 10, which is connected to the bar 1 by supporting elements 11[a] and is hence movable with said bar, and the arm 7 of the hammer is pivoted near its lower end, as at 11, to the carrier, at a point near the inner end of the latter, the extreme lower end of the said arm 7 projecting below the carrier 8 and forming a tappet 12. At the inner end of the carrier and extending from the upper side thereof is a stop 13, which is here shown as provided on the side opposed to the arm 7 with a stop-pad 14, made of felt or other suitable material. A spring 15, which is here shown as a coiled retractile spring, connects each hammer-arm 7 to its carrier-arm 8 and normally engages the arm 7 with the stop-pad. The bar 10 is provided with springs 16, which bear downwardly on the carriers or carrier-arms 8, one of the said springs 16 being employed in connection with each of the carriers. Each of the carriers is provided with an adjusting-screw 17, here shown as a screw-eye, to bear on the bar 10 and to adapt the carriers for the required vertical adjustment. In the form of my invention here shown each carrier is provided on its under side with a wedge-shaped cam 18. Combined with each carrier 8 is a finger 19, which is carried by the bar 1 and pivoted thereto, as at 20. Each finger 19 has a tappet 21, adapted to be engaged and operated by appropriately-disposed tremolo key-tappets 22, which in practice are similar to those shown and described in Letters Patent of the United States No. 675,149, granted to me May 28, 1901, and which are of appropriate length, determining the duration of the coaction of the several hammers of the tremolo-action and the vibrator, hereinafter described, which operates the said hammers. A spring 23 is provided for each finger 19 to move it in one direction into engagement with a stop-flange 24, with which the bar 1 is provided. Each finger has an upwardly-extending rod 25, the upper end of which forms a tappet that bears under the cam 18 of one of the carriers, and the action of the springs 23 is such as to keep the fingers normally in the position shown in Fig. 3 and to cause their tappets 25 to coact with the cams 18 of the carriers to raise the free inner ends of the latter, and hence maintain the hammers in an elevated position.

The vibrator 26, which is shown as a revoluble roller provided with longitudinally-disposed radial tappets 27, extends entirely across the tremolo-action under the free ends of the carriers 8 and is journaled, as at 28, in bearings 29, with which the bar 10 is provided at its ends. This vibrator is operated by the means hereinafter described. At one end of the vibrating roller is a pulley 30, which is engaged by an endless cord 31. The latter also engages direction-sheaves 32, which are carried by an arm 33, disposed in the front side of the case and pivoted at its lower end, as at 34, and pressed in one direction by a spring 35. The said endless cord also engages a power-pulley 36, which is carried by the crank-shaft 37, which has the usual worm 38, that engages the worm-gear 40 at one end of the cylinder C, and it will be understood that when the cylinder is rotated by the revolution of the shaft 37 and the coaction of the worm and worm-gear the endless cord, driven by the pulley 36 by its frictional engagement with the pulley 30 of the vibrator-roller, causes the latter to rotate simultaneously with the cylinder. The pivoted spring-pressed arm 33, which carries the direction-sheaves 32, operates to keep the endless cord at the requisite tension to insure rotation of the vibrator-roller with the cylinder.

In their normal position (shown in Fig. 3) the hammers of the tremolo-action are elevated to such an extent that their tappets 12 clear the tappets of the vibrator-roller 26. When, however, the tappet 21 of one of the fingers 19 is engaged by one of the key-tappets 22 of the cylinder, the movement of the said key-tappet, caused by the rotation of the cylinder in the direction indicated by the arrow in Figs. 3 and 4, causes said finger to be turned on its pivot 20 against the tension of its spring 23 and the finger-tappet 25 to move outwardly under the wedge-shaped cam 18 of the coacting carrier 8 and so that the free end of the carrier is lowered sufficiently to cause the tappet 12 of its hammer-arm 7 to become engaged with the tappets 27 successively of the rotating vibrator-roller, the latter coacting with the spring 15 to vibrate the hammer, so that the latter is caused to repeatedly strike upon the string 5, with which it coacts and produces sound which closely imitates that of a mandolin. The length of the period of time during which the hammer thus repeatedly strikes its string depends upon the length of the coacting key-tappet 22.

It will be understood that when the bar 1 is turned on its pivots by the means usually employed for this purpose to disconnect the action A from the cylinder the tremolo-action B is also disconnected from the cylinder, the movement of the bar 1 carrying the fingers 19 such a distance as to cause their tappets 21 to clear the key-tappets 22 of the cylinder.

From the foregoing description, taken in connection with the accompanying drawings, the construction and operation of the invention will be readily understood without requiring a more extended explanation.

I do not desire to limit myself to the precise construction and combination of devices herein shown and described, as it is evident that modifications may be made therein without departing from the spirit of my invention and within the scope of the appended claims.

Having thus fully described my invention,

what I claim as new, and desire to secure by Letters Patent, is—

1. In an instrument of the class described, the combination of a cylinder, a driven pulley, means to simultaneously rotate them, an action, means to move the same into and out of engagement with the cylinder, a revoluble vibrator movable with the action and having a pulley, an endless cord connecting said pulley directly with the driven pulley to rotate said vibrator, and a spring-pressed movable element engaging the cord and maintaining the tension thereof in all positions of the movable vibrator.

2. In an instrument of the class described, the combination of a cylinder, a driven pulley, means to simultaneously rotate them, an action, means to move the same into and out of engagement with the cylinder, a revoluble vibrator movable with the action and having a pulley, an endless cord connecting said pulley directly with a driven pulley to rotate said vibrator, and a pivoted element having a spring to move it in one direction and provided with direction-sheaves engaging said endless cord and maintaining the tension thereof in all positions of the movable vibrator.

3. In an instrument of the class described, in combination with an action series, and a separate action series whose several members each comprise a movable carrier, a hammer pivoted thereto and having a tappet, and a pivoted finger to coact with the carrier to determine the position of the latter and the hammer, a vibrator, and a revoluble cylinder having separate means to actuate the members of the first-mentioned action series and the fingers of the several members of the last-named action series to control their relation to the vibrator.

4. In combination with a vibrator and means to impart motion thereto, a supporting element, a stop, a finger pivoted to said supporting element, a spring to normally engage the finger with the stop, a movable carrier carried by the supporting element and operated by the finger, and a hammer, pivoted to the carrier and brought by the movement thereof into and out of action with the vibrator.

5. The combination of a pivoted supporting-bar, a carrier pivoted thereto and having a cam on its under side, a hammer pivoted to the carrier and having a tappet at its lower end, a stop on the carrier, a spring acting on the hammer to normally engage it with the stop, a pivoted spring-pressed finger bearing under the cam of the carrier and normally supporting the latter and the hammer in a raised position, means to actuate the finger to raise and lower the carrier, and a vibrator coacting with the tappet of the hammer to operate the latter when the carrier and hammer are lowered.

6. The combination of a supporting-bar, a carrier pivoted thereto and having a cam on its under side and a stop on its upper side, a spring-pressed hammer pivoted to the carrier and having a tappet at its lower end, a pivoted spring-pressed finger bearing under the cam of the carrier, a stop to normally maintain the finger in position to raise the carrier and the hammer, means to actuate the finger to raise and lower the carrier, and a vibrator coacting with the tappet of the hammer to operate the latter when the carrier and hammer are lowered.

7. In an instrument of the class described, the combination of a laterally-movable hammer-bar, an action carried by the said bar, a tremolo-action distinct from the first-named action, and a revoluble vibrator to actuate the tremolo-action also carried by and movable with the hammer-bar, movable fingers carried by the hammer-bar, to control the members of the tremolo-action, means to operate the action and the said fingers, and means to actuate the vibrator.

8. In an instrument of the class described, the combination of a revoluble key-pin cylinder having relatively fixed bearings, a hammer-bar movable toward and from said cylinder, an action carried by the said bar, a tremolo-action distinct from the first-named action, and a revoluble vibrator to actuate the tremolo-action, also carried by and movable with the hammer-bar, movable fingers carried by said bar to control the members of the tremolo-action and put into and out of operation with the cylinder by the movement of the hammer-bar, and means, including a yieldable element, to actuate the vibrator and keep the same in engagement irrespective of the movement thereof by the movable hammer-bar.

9. In an instrument of the class described, the combination of a revoluble key-pin cylinder having relatively fixed bearings, a hammer-bar movable toward and from the cylinder, an action and a tremolo-action separate from the first-named action, carried by the hammer-bar, the former operated and the latter controlled by the cylinder, a revoluble vibrator carried by and movable with the hammer-bar, said vibrator operating the tremolo-action, a driving element for the cylinder and vibrator, and a yieldable connection between the said element and the vibrator to actuate the latter and keep the same in engagement irrespective of its movement with the hammer-bar.

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

A. CAPRA.

Witnesses:
BENJ. G. COWL,
E. F. CAVERLY.