

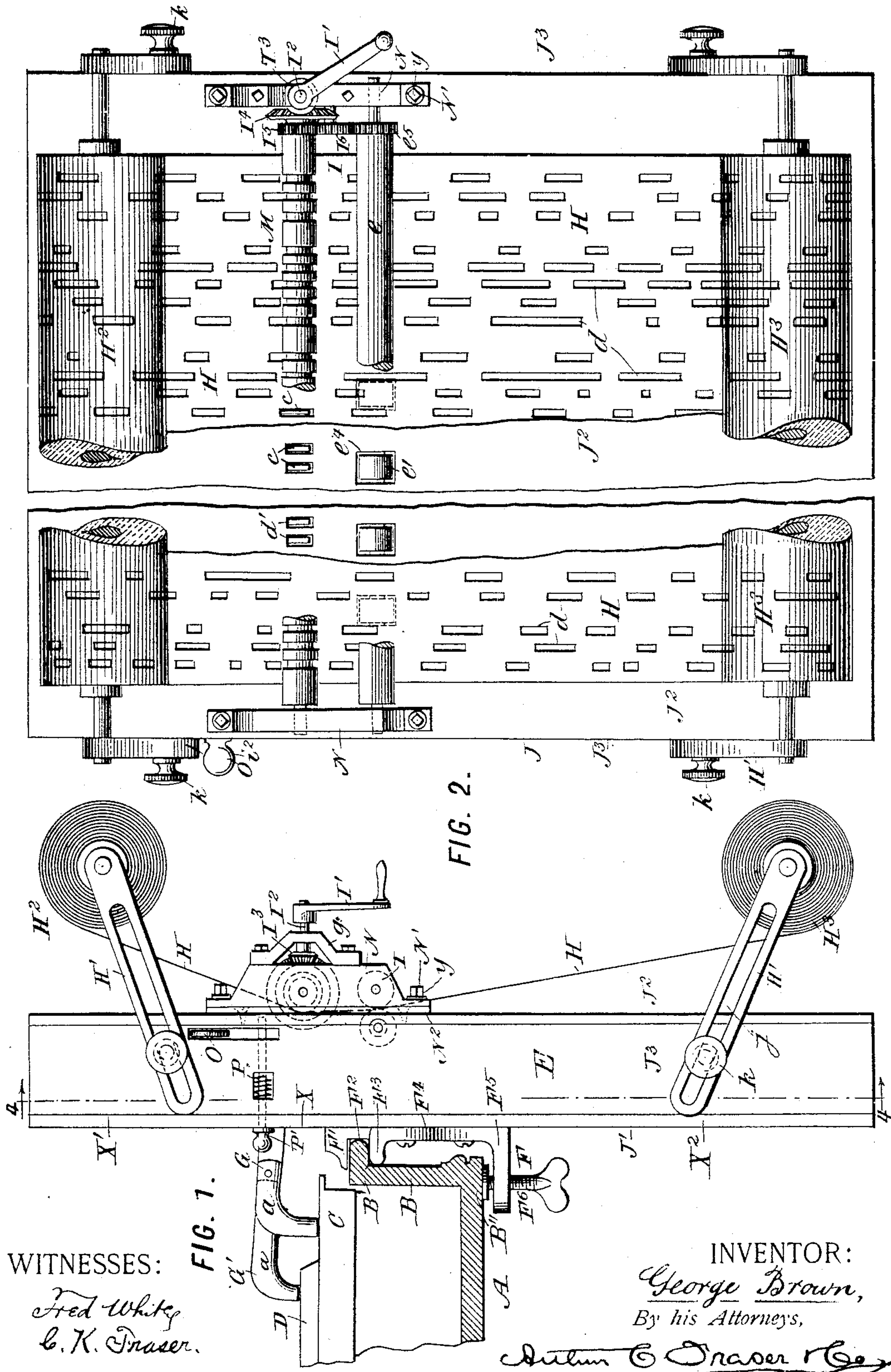
(No Model.)

2 Sheets—Sheet 1.

G. BROWN.
ATTACHMENT FOR MUSICAL INSTRUMENTS.

No. 514,259.

Patented Feb. 6, 1894.



WITNESSES:

Fred Whitey
C. K. Fraser.

INVENTOR:

George Brown,
By his Attorneys,

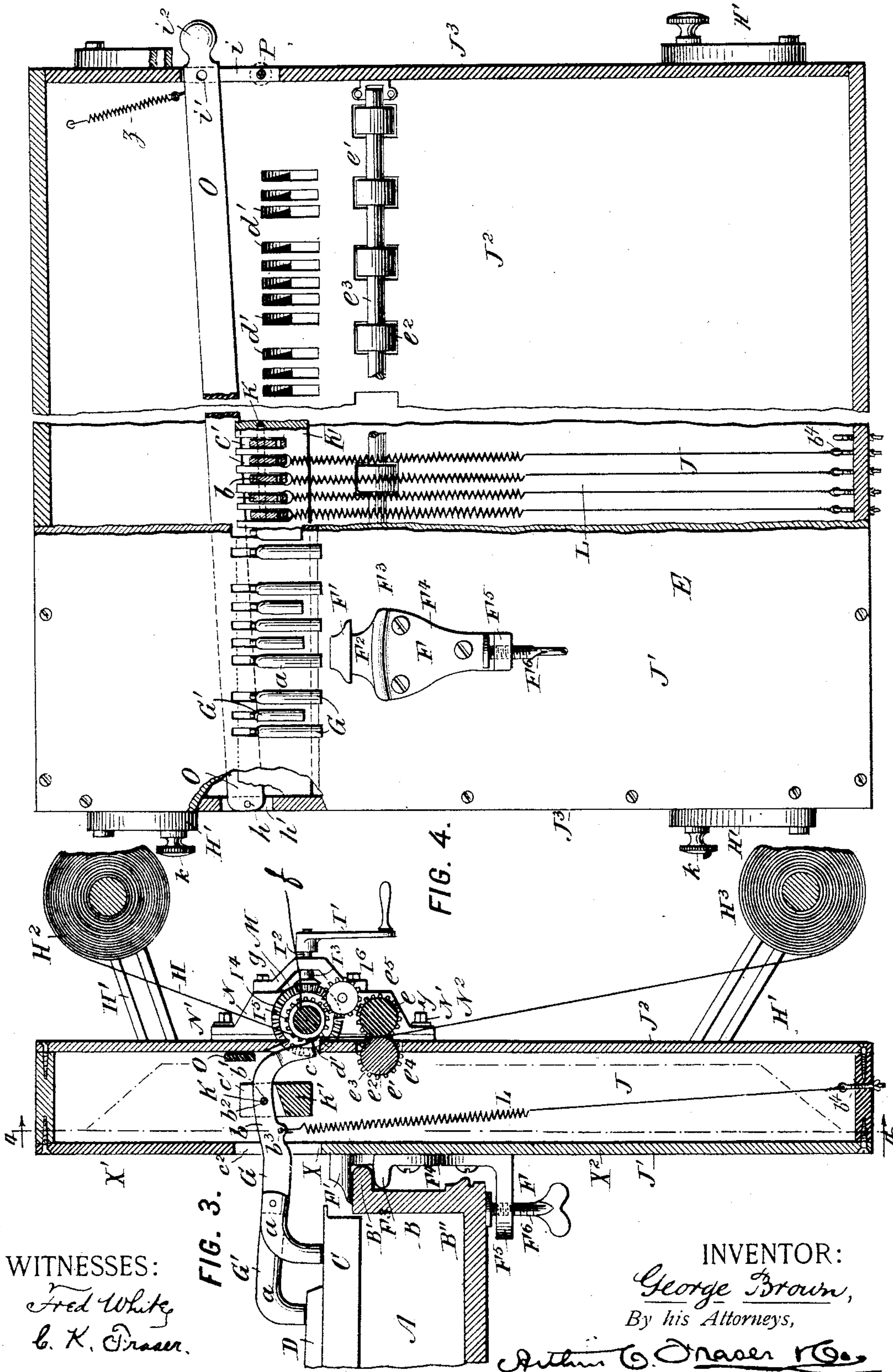
Arthur C. Fraser & Co.

G. BROWN.

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UNITED STATES PATENT OFFICE.

GEORGE BROWN, OF LONG ISLAND CITY, NEW YORK.

ATTACHMENT FOR MUSICAL INSTRUMENTS.

SPECIFICATION forming part of Letters Patent No. 514,259, dated February 6, 1894.

Application filed September 27, 1893. Serial No. 486,611. (No model.)

To all whom it may concern:

Be it known that I, GEORGE BROWN, a subject of the King of Portugal, but having declared my intention of becoming a citizen of the United States, residing in Long Island City, in the county of Queens and State of New York, have invented certain new and useful Improvements in Attachments for Musical Instruments, of which the following is a specification.

This invention relates to such musical instruments as pianos and organs, and is designed to provide an improved attachment which may be either permanently or removably applied to such instruments, and by means of which the instruments can be played automatically.

Automatic pianos have heretofore been in use in which mechanism operating the keys has been actuated by a moving sheet or plate constructed to permit operation of such mechanism in accordance with the music to be rendered by the instrument. My invention relates in its general character to such devices.

This invention aims to provide a simple, cheap and effective attachment for pianos and other instruments by which such instruments can be operated automatically or mechanically. To this end in carrying out my invention, I provide certain features of improvement in the construction and operation of the attachment which will be hereinafter fully set forth.

In the accompanying drawings, which illustrate the preferred adaptation of my invention, Figure 1 is a side elevation of my improved attachment showing the key-board of a piano to which it is attached in section. Fig. 2 is a fragmentary front elevation of the attachment, the parts being broken out centrally to shorten the view. Fig. 3 is a vertical mid-section of the apparatus; and Fig. 4 is a fragmentary rear elevation thereof partly in section on the line 4—4 in Figs. 1 and 3, and broken out intermediately of its length to shorten the view.

Referring to the drawings, let A indicate a piano case, B the front board of the key-box thereof, C the white keys or full-tone keys of the piano, D the black keys or half-tone keys thereof, E my improved attachment as a whole, F the clamp thereof for connecting the at-

tachment to the piano, G the white-key hammers thereof, G' the half-tone hammers thereof, H the music sheet, perforated according to the music to be rendered and controlling the operation of the hammer mechanism of the attachment, H' H' the brackets carrying the rollers on which sheet H is carried, I the driving mechanism for operating sheet H, and I' the crank or other suitable motor for driving the mechanism I.

The piano A may be of any usual construction. As usual, the front board B of its key-box has a molding B' projecting at top, and beneath this a flat bottom B''. The keys C and D are of the usual construction and arrangement, serving as usual when depressed to operate the hammers for producing the desired sounds.

According to the preferred form of my invention the attachment E is a separate structure capable of attachment to or removal from the instrument which it operates. In the construction shown it consists of a rectangular vertical frame or box J, having flat rear wall J', similar front wall J², and flat vertical end walls J³. The height and length of the box will depend upon the instrument to which it is to be applied. Preferably the box J is provided at rear with one or more metallic clamps F, which are rigidly fixed to the back board J', and are according to my invention constructed with a narrow flat rearwardly projecting top flange F', felted on its under face, and adapted to rest upon the top face of the molding B' of the piano case. Beneath this flange is a recess F² receiving said molding. Beneath this recess is a rearwardly projecting flange F³, preferably convex on its upper face, and of greater width than the flange F', which flange F³ freely embraces the under face of the molding B'. Beneath the flange F³ the clamp extends downwardly in a substantially flat and gradually tapering portion F⁴, and terminates in a rearwardly projecting screwthreaded lug F⁵, which passes under the bottom face B'' of the piano case, and is traversed by a clamping screw F⁶, which when screwed tight engages the bottom face of the case and thereby clamps the case tightly between the flange F' and the lug F⁵, and secures the attachment firmly to the piano.

The attachment preferably carries the key

movers, the music roll, the driving mechanism, and the motor. Any of these parts may be of any suitable known construction, but I prefer to employ the constructions shown, in which the key movers are vertically-acting pivoted hammers G and G', one for each key of the piano, the music roll is the usual sheet perforated according to the piece to be played, the driving mechanism consists of gears and rollers I, and the motor consists of a crank I' to be operated by the hand of the user, by electricity or any other means. The hammers G and G' are identical in all respects, except that those for the full-tone keys C are shorter and of greater downward projection than those for the half-tone keys D, the difference corresponding with the usual difference in location of the respective keys. Preferably the hammers are each constructed with a felted enlarged striker *a*, of wood or other material at their rear ends, a thin sheet metal or other suitable body portion *b*, and a widened metallic or other pointer *c* at their front ends. In this construction the various hammers are all fulcrumed on a single axis K consisting of a single wire arranged within the box J, and traversing a corresponding perforation through a vertical kerf or notched bar K' fixed to the respective end walls J³ of the box. The thin bodies *b* of the hammers each have a pivotal perforation *b'* coinciding with the longitudinal perforation *b*² through the bar K', and the wire K traverses all these perforations. The notches *c'* traverse vertically substantially half through the bar K', and are each of sufficient width to receive and firmly embrace while movably engaging, the body *b* of the hammer entering the notch. The rear board J' has a vertical slot *c*² for each of the hammers, and the rear end of the body portion *b* of each hammer projects through this slot. This slot *c*² is but little larger than the width of the body *b*. The rear wall J' is divided at the lower ends of the slots *c*², on the line X into top and bottom parts X' and X², the slots being in the upper part X', so that in applying or removing the rear wall the slots can be passed over the ends of the hammers G. At rear of their fulcrums the hammers have eyes *b*³, and for each of the hammers I provide a spring or other actuating device L. In the construction shown, a spiral spring is employed for each hammer, which spring on its upper end engages the eye *b*³ of its hammer, and at its lower end, is fastened to an adjustable eye *b*⁴ which screws into the bottom wall of the box J, and which can be adjusted to give the requisite tension to its spring by being screwed toward or from said wall. The springs L tend to draw the hammers toward the case of the piano, and when the hammer is released its spring quickly depresses it with sufficient force to cause it to strike the requisite blow upon the corresponding piano key.

Normally all the hammers are retained in the raised or inactive position against the

tension of their respective springs by reason of the engagement of the music sheet H with their front extremities or pointer ends *c*. When, however, one of these ends is opposite a perforation or depression, such as the perforations *d* in the music sheet, this perforation permits such pointer to move forwardly into it, whereupon the tension of the spring of the corresponding hammer is free to act to depress the hammer, and consequently the piano key, and strike the desired note. The depression of the hammer will be maintained by the spring until the hammer is again restored to the inactive position, which will be done when the end of the perforation or depression in the music sheet has been reached, and the solid body of the sheet has by passing across the pointer end *c* of the hammer caused the latter to tilt back to the normal position. The music sheet H is given a regular progressive movement across the pointer ends of the hammers, and thus by graduating the length and location of the respective perforations, the sequence of striking the respective keys, and the proper relative duration of the depressions thereof for maintaining the notes during the period of time desired, is obtained as usual.

According to my invention the music sheet H traverses preferably at the front side of the box J and across the outer front face thereof, and the pointer ends *c* of the hammers project through slots *d'* in the front wall J², and have inclined front faces bearing against the rear side of the sheet H substantially flush with the front face of the wall J². The sheet H is drawn across these points preferably from top to bottom, being brought from a roll H² at top to a roll H³ at bottom. Preferably the sheet is driven by the driving mechanism I, which in the construction shown consists of a cylindrical outer roller *e* of uniform diameter traversing the front face of the wall J², a corresponding roller *e'* arranged within the box J and having enlargements *e*² and intermediate reduced portions *e*³, its enlarged portions passing through slots *e*⁴ in the front wall J² and approaching so close to the periphery of the roller *e* that when the sheet H is passed the two, it will be frictionally engaged by both, and thereby be compelled to advance with the rotation of the rollers. The rollers *e* and *e'* are geared together by spur-gears *e*⁵ on each, and hence rotate at the same surface speed. These rollers may be driven by any suitable motor, that shown consisting of the crank I' which drives horizontal shaft I² carrying bevel-pinion I³ meshing with bevel-gear I⁴ which carries a spur-gear I⁵ meshing with an idler I⁶ which meshes with and drives the spur-gear *e*⁵ and roller *e*.

My invention provides improved means for reinforcing the music sheet at the point where it is acted on by the pointer ends of the hammers. Preferably at this point I provide a reinforce roller M which has annular grooves *f* opposite each pointer end *c*, and of slightly

greater width than the pointer ends, and of a depth sufficient to permit the maximum outer movement of each pointer end when such end passes outwardly through one of the perforations d of the music sheet. Between these grooves, the portions f' of the roller M are smooth and cylindrical, and of the same diameter as the roller e , and these portions engage and rest against the outer face of the sheet H between the pointers, reinforcing it, and preferably assisting to frictionally drive the sheet. To the latter end the roller M is driven by the driving gear actuating the rollers e and e' . Preferably it is fixed to the bevel-gear I⁴. Thus when any hammer end c enters an aperture d , the end moves through the aperture and into the groove f of the roller M, where it rests until the solid portion of the sheet strikes it and restores it to the normal position.

Preferably the rollers e and M and their respective gears, are carried in brackets N, which brackets are removably connected by T-screws N' at top and bottom to plates N² fixed to the front of wall J². Thus by unscrewing the screws N' with a key fitting their square heads y , the rollers e and M with their gears can be removed from the face of the box J, whereupon a new sheet H can be substituted for that previously used, and then said rollers again applied in position. Preferably one of the brackets N carries an auxiliary bracket g in which is mounted a crank-shaft I².

To facilitate the application or removal of the music sheet H, I provide means for deflecting all the hammers upwardly so that their pointer ends c will be drawn within their apertures d' , whereby they will not catch upon or interfere with the manipulation of the sheet. Preferably this is accomplished by a shifting bar O, arranged upon the rear side of the front wall J², traversing the latter longitudinally above the pointer ends c of the several hammers, and pivoted at its one end to a pin h fixed in a recess h' in one of the end walls J³ of the box J, and extending at its other end outwardly through a slot i in the opposite end wall J³ of the box, where the bar is constructed with a pin-hole i' and a handle i^2 . By pushing the bar downwardly it is lowered until its lower edge engages and tilts all the hammers sufficiently to draw their pointer ends c within their slots d' . A catch P is provided in the wall J³, and when the bar O is in the downward position, this catch enters its hole i' and prevents its raising. When the catch is released a spring z draws the bar upward out of engagement with the hammers. The catch P is manipulated against a spring by its handle P' at rear.

Another feature of my invention consists in constructing the brackets H' with slots j , and providing set-screws k on the end faces J³ of the box, which screws take through the slots and clamp the brackets against the flat faces of the ends. Thus by loosening the screws

either bracket may be adjusted outwardly or inwardly, or tilted upwardly or downwardly until the desired position is reached, and then set by tightening the screws.

In operation, the music is placed in position, the driving mechanism is clamped against the front side of the music sheet, the attachment is clamped to the piano, and by rotating the crank I' the music sheet is caused to feed across the pointer ends of the hammers, and as it releases the respective hammers, the latter through the tension of their springs act to depress the keys and play the piano or other instrument to which the apparatus is attached.

It will be seen that my invention provides an improved attachment for musical instruments which is simple, cheap and effective in construction, and convenient of operation, and it will be understood that the invention is not limited to the precise details of construction, arrangement or combination set forth and shown as its preferred form, as these may be modified as circumstances or the judgment of those skilled in the art may dictate, without departing from the essential features of the invention.

What I claim is, in attachments for musical instruments, the following-defined novel features and combinations, substantially as hereinbefore set forth, namely:

1. In an attachment for musical instruments, a vertical frame J having a vertical front wall J² constructed with hammer-slots d' and roller holes e^4 , and adapted to be carried by a musical instrument, hammers G for actuating the keys of the latter fulcrumed within said frame and projecting at their front ends through said hammer-slots, a music sheet for controlling the operation of said hammers carried by said frame and moving over the outer face of said front wall and engaging the ends of said hammers opposite said holes d' , a grooved reinforce roller M engaging said sheet opposite said holes d' , driving mechanism for moving said sheet consisting of rollers e and e' engaging the opposite sides thereof, said roller e mounted at and engaging the outer side of said sheet, and said roller e' mounted within said frame J and having enlarged portions e^2 passing through said holes e^4 and engaging the inner side of said sheet, interengaging gears between said rollers M e and e' driving them at like surface speed, and means for driving said gears, substantially as and for the purposes set forth.

2. In an attachment for musical instruments, a vertical frame J, adapted to be connected to a musical instrument, and having a front wall J² constructed with hammer-holes d' , a rear wall J' constructed with hammer slots c^2 and an inner hammer bar K', hammers G carried by said frame for actuating the keys of said instrument, consisting of rigid levers pivoted each on said bar K', projecting through said holes d' at front and through said slots c^2 at rear of said frame,

separate spiral springs L connected each to one of said hammers for actuating it, a driven music sheet traveling across the ends of said hammers for controlling their operations, and
 5 a reinforce roller M engaging said sheet opposite its point of contact with said hammers and reinforcing it against the tension thereof, substantially as set forth.

3. In an attachment for musical instruments, a vertical frame J, adapted to be connected to a musical instrument, and having a front wall J² constructed with hammer holes d', a rear wall J' constructed with hammer slots c² and an inner hammer bar K', hammers G carried by said frame for actuating the keys of said instrument, consisting of rigid levers pivoted each on said bar K', projecting through said holes d' at front and through said slots c² at rear of said frame, separate spiral springs L connected each to one of said hammers for actuating it, each of said hammers having an inclined outer end, a driven music sheet traveling across the ends of said hammers for controlling their operation, and a throw-off device engaging said hammers consisting of a flat bar O, hinged at one end within said frame, lying against the front wall thereof above the inclined outer ends of said hammers, and when moved downward engaging and tilting the latter to an inactive position, and when moved upward freeing the hammers and permitting their normal operation, substantially as and for the purposes set forth.

35 4. In an attachment for musical instruments, a vertical frame J having a front wall J², and a rear wall J', the latter consisting of a slotted top board X' and a bottom board X², a clamp F fixed on the board X² and adapted
 40 to be attached at its rear to a musical instrument, hammers G carried by said frame projecting at rear through the slots of said board

X' and engaging the keys of said instrument for operating said keys, said front wall having apertures d', and said hammers having
 45 pointer ends c projecting through said apertures d', a notched bar K' within said frame to which bar said hammers are fulcrumed, means for tilting said hammers to throw their pointer ends outwardly, and means at the exterior of said front wall engaging and moving across the pointer ends of said hammers for controlling the operation thereof, whereby by removing said board X' access can be
 50 had to the interior of said frame without detaching it from the musical instrument, substantially as and for the purposes set forth.

5. In an attachment for musical instruments, a frame J, hammers G carried thereby and having pointer ends projecting at front of said frame, means for actuating said hammers, a sheet H moving down the outer face of said frame for controlling the operation of said hammers, a reinforce roller M engaging the outer side of said sheet opposite said
 60 pointer ends and reinforcing it against the action thereof, driving mechanism for operating said sheet consisting of a roller e' engaging the inner side thereof, a roller e engaging the outer side thereof, interengaging gears between said rollers e and M for driving them together, brackets N removably mounted on the front of said frame and carrying said rollers e and M and their gears, and a crank I' for driving said rollers, substantially as and
 70 for the purposes set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

GEORGE BROWN.

Witnesses:

GEORGE H. FRASER,
 THOMAS F. WALLACE.