A. D. PALMER.

ATTACHMENT FOR PIANOS AND THE LIKE.

APPLICATION FILED MAY 14, 1909.

956,502.

Patented Apr. 26, 1910.

2 SHEETS—SHEET 1.

Fig. 1.

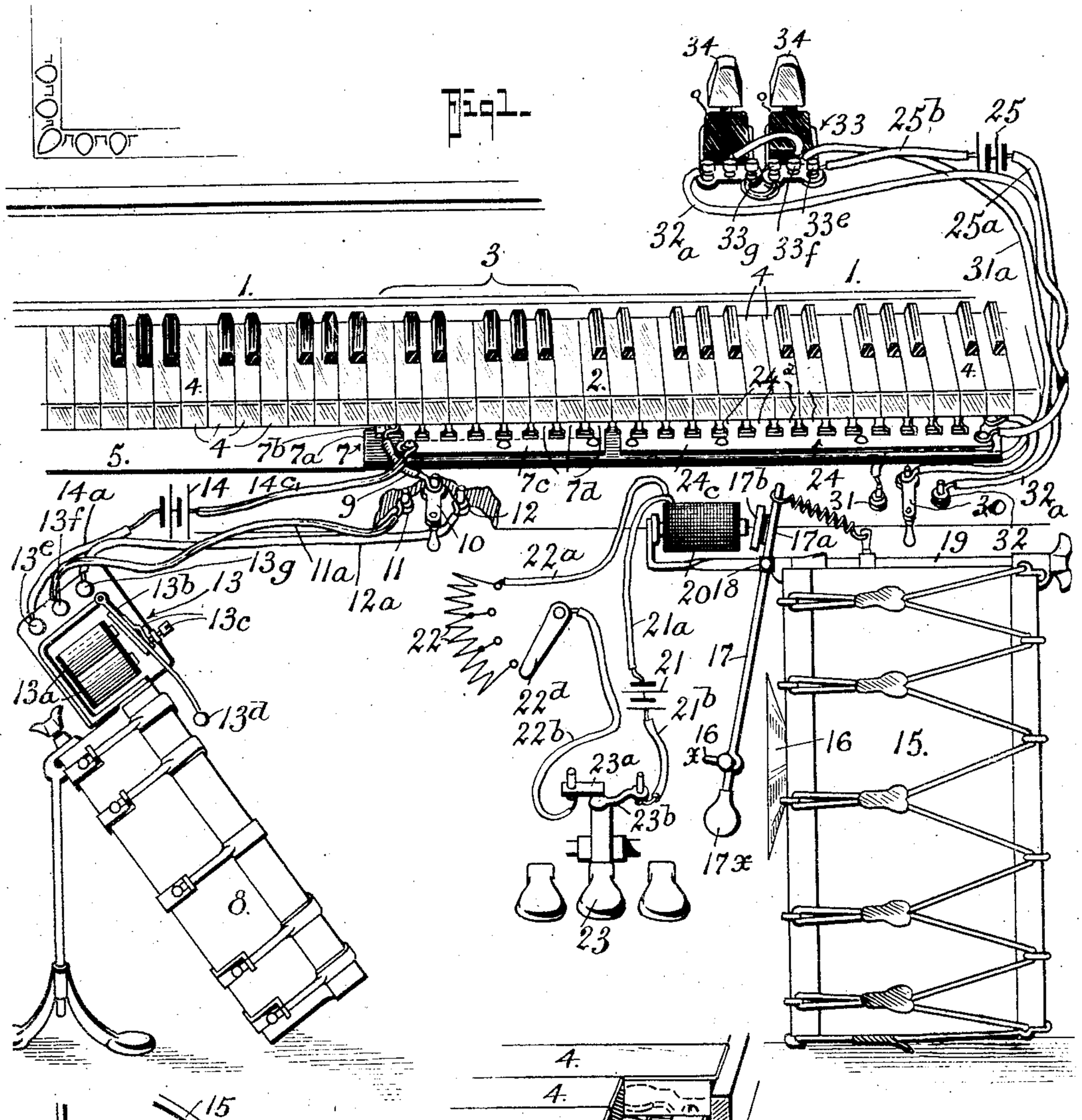

Fig. 7.

Fig. 2.

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2 SHEETS—SHEET 2.

Fig. 3.

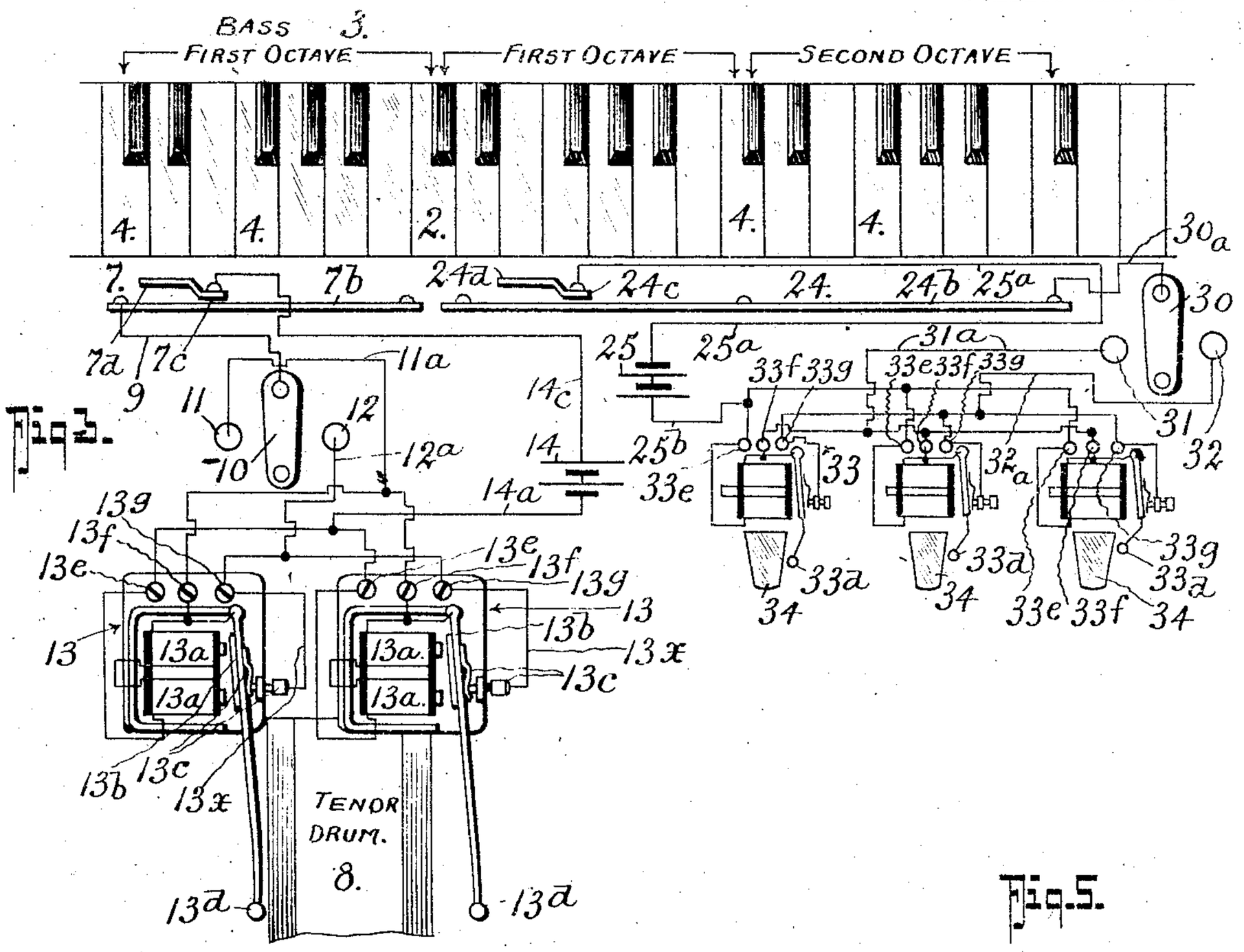


Fig. 5.

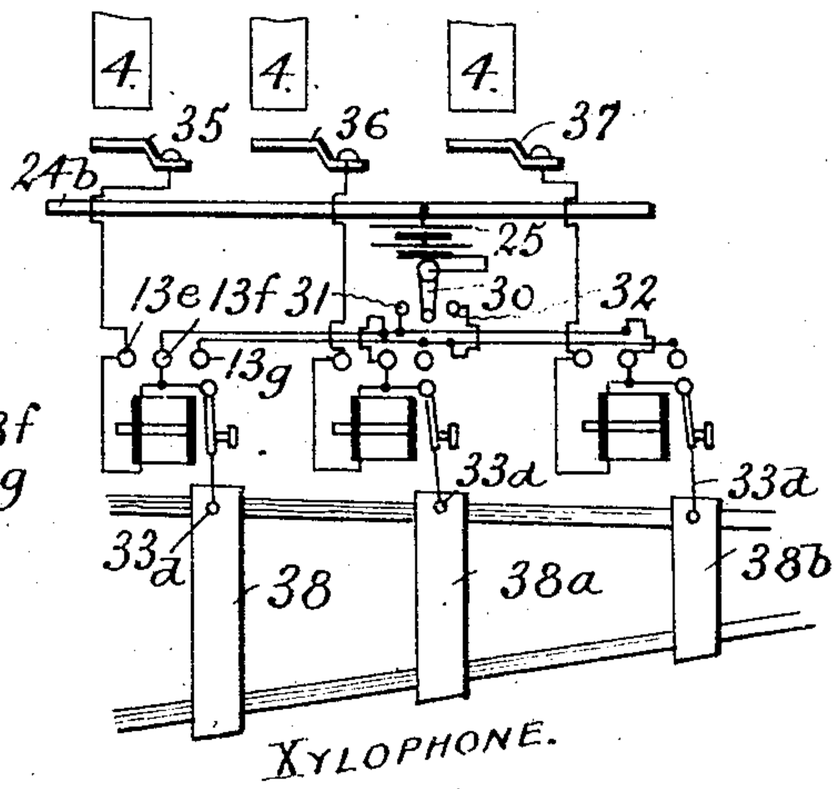


Fig. 4.

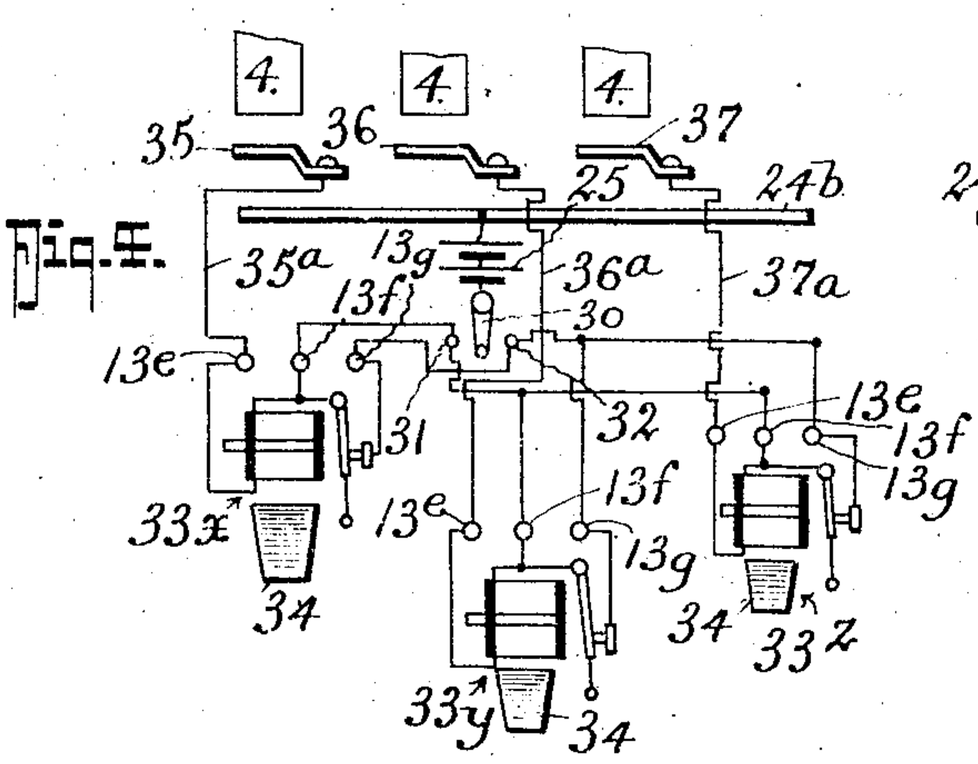
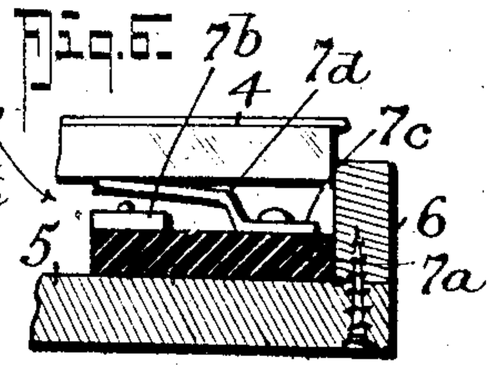


Fig. 6.



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ATTACHMENT FOR PIANOS AND THE LIKE.

956,502. Specification of Letters Patent. **Patented Apr. 26, 1910.**

Application filed May 14, 1909. Serial No. 495,914.

To all whom it may concern:

Be it known that I, ALBERT D. PALMER, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Attachments for Pianos and the Like, of which the following is a specification.

My invention has for its object to provide an attachment for pianos, piano players, organs and like instruments having key-boards, whereby drums, orchestra bells, xylophones and other instruments may be electrically operated and controlled from a key-board in such manner that either a single tap may be given to such instruments at the will of the operator or a series of successive taps relatively close together may be imparted to such instruments if desired.

Another object of my invention is to provide electrically operated means controlled by the pedal of the piano or other like instrument for actuating a bass drum.

It is the object of my invention to provide an attachment of the foregoing character that may be applied to any standard make of piano or other instrument having a similar key-board without in any way damaging or requiring a re-building of the instrument.

In its more detail nature the invention also comprises those novel details of construction, combination and arrangement of parts, all of which will be first described, then be specifically pointed out in the appended claims, and illustrated in the accompanying drawings, in which:—

Figure 1, is a diagrammatic perspective view of a piano key-board and pedals showing the application of my invention. Fig. 2, is a sectional perspective view of a portion of a key-board showing the circuit closing contact strip inserted beneath the keys. Fig. 3, is a further diagrammatic view illustrating the application of my invention, showing the action of the tenor drum operating means and the orchestra bell operating means. Fig. 4, is a diagrammatic view of a modification of my invention. Fig. 5, is a similar view of a further modification thereof. Fig. 6, is a detail sectional view showing the manner of inserting the contact strip beneath the keys of the key-board. Fig. 7, is a detail view of a part of the invention.

Referring now to the accompanying drawings, in which like letters and numerals of reference indicate like parts in all of the figures, 1 represents the ordinary key-board.

2 represents the middle "C" of the piano, and 3 indicates the first bass octave below middle "C."

In piano key-boards of the ordinary type the keys 4 are spaced from the base board 5, the spaces being closed at the front of the keys by a strip 6 which is secured to the base 5 in any desired manner. In applying my invention to piano key-boards and the like, I remove the strip 6 and insert the contact maker 7 beneath the keys 4 and then replace the strip 6, it being understood, of course, that suitable passages are left for the wires to pass from the key-board to the outside of the piano in the usual manner to permit of the proper electrical wiring of the parts. The contact maker 7 comprises a base plate 7^a of insulating material and a continuous contact strip 7^b which is secured thereto, while a second contact strip 7^c having contact fingers 7^d to rest beneath the respective keys 4 is provided to coöperate with the strip 7^b whereby when a key 4 is depressed electrical connection will be made between the strips 7^b and 7^c. The tenor drum 8, is, in practice preferably actuated when any key in octave 3, being the first octave below middle "C," is depressed to close the circuits between the strips 7^b and 7^c respectively. From the strip 7^b an electrical connection 9 is made with the shifting arm 10 of a two-point switch, the switch arm 10 having contact points 11—12.

13 designates an electro-magnetic make-and-break vibrating device of the general type of the ordinary vibrating electric bell, which device includes the magnets 13^a, the pivoted armature 13^b, the make and break contacts 13^c and the hammer 13^d, which serves in lieu of the ordinary drum stick.

In carrying out my invention the magnets 13^a have their terminals connected to binding posts 13^e and 13^f respectively, while the armature 13^b is also electrically connected with the binding post 13^f and the stationary contact 13^c of the make and break contact is connected with a third binding post 13^g. The binding post 13^e is electrically connected through a wire 14^a to a source of electric energy 14, which is in turn connected through a wire 14^c with the contact strip 7^c. One of the switch points (say the point 11)

is electrically connected through a wire 11^a with the middle binding post 13^f of the drum actuating mechanism 13, while the other contact 12 is connected through a wire 12^a with the binding post 13^g.

In the practical application of my invention for the operation of a tenor drum, two sets of mechanisms 13 are provided and connected together, as shown in Fig. 3, of the drawings, so as to be simultaneously operated. When the switch lever 10 is in contact with the switch point 11 and the operator depresses any key 4 in the octave 3 beneath which the contact maker 7 is located, the circuit will be closed, current flowing from the battery through the wire 14^c across contact strip 7^c to strip 7^b via the depressed contact finger 7^d beneath the key and from the strip 7^b the current flows through switch lever 10 and contact point 11 to binding post 13^f, passing directly through the magnets 13^a to binding post 13^e. From binding post 13^e the current returns via wire 14^a to battery 14, thus completing the circuit.

During the depression of a key in the octave 3 while the switch lever 10 is on contact point 11, a single tap will be imparted to the drum, by reason of the energizing of the magnets 13^a at each depression of a key 4. Now should the operator desire to impart a "roll" to the drum, it is only necessary for him to shift the switch lever 10 from contact point 11 onto contact point 12. Upon depressing any key in the octave 3 the circuit will be closed between contact plates 7^c and 7^b thus permitting current to flow from battery 14 via wire 14^c to contact 7^c and across the depressed strip 7^c to contact strip 7^b from which current flows to the switch lever 10 and from thence through contact 12 and wire 12^a to binding post 13^g. From binding post 13^g current flows through wire 13^x to the fixed contact 13^c of the make and break contact, across the make and break contact to the armature 13^b from which current flows through the magnets 13^a to binding post 13^d and to battery 14 via wire 14^a. This sets up a vibration of the clapper 13^d owing to the rapid energizing and deënergizing of the magnets 13^a as the clapper 13^d vibrates and makes and breaks the circuit at the make and break contacts 13^c. Thus whenever a key in octave 3 is depressed the clapper 13^d will be rapidly set into vibration and will continue to vibrate so long as a key is depressed in octave 3. By shifting the switch 10 to an intermediate position between contacts 11 and 12, no action of the tenor drum will take place while playing in octave 3.

The bass drum 15 and cymbal 16 are actuated by a magnetically actuated drum stick 17 that is pivoted at 18 to a bracket 19 that is secured to the drum, the drum stick 17 having an extension 17^a carrying an armature 17^b to coöperate with the magnet 20, which magnet 20 is electrically connected to a battery 21 by a wire 21^a, and is also connected to a rheostat 22 by a wire 22^a, the rheostat lever arm 22^d being connected by a wire 22^b with a contact 23^a that coöperates with a second contact 23^b to close the circuit from the battery 21 through the magnet 20 and rheostat 22, the battery 21 being connected with contact 23^a by a wire 21^b. The contacts 23^a and 23^b are brought into engagement with one another through the action of the center or "practice" pedal 23 of a piano, or in any other desired manner so that the operator upon depressing the pedal 23 will close the contacts 23^a and 23^b respectively and energize the magnet 20 which draws over armature 17^b causing drum stick 17 with its hammer 17^x to strike the head of the drum 15 and at the same time by adjusting the cymbal clapper 16^x the cymbal 16 may be struck. The taps may be imparted to the drum 15 at will by simply depressing pedal 23.

24 designates a second contact maker strip of similar construction to the contact maker strip 7 and consists of a fixed contact strip 24^b corresponding to the contact strip 7^b, shown in Fig. 2, of the drawings and a finger contact strip 24^c corresponding to the contact strip 7^c of the contact maker 7, the strip 24^c having fingers 24^d corresponding to those 7^d of the contact maker 7. The contact maker 24 is preferably the length of two octaves and is placed, in practice, beneath the first and second octaves above middle "C" including middle "C" as the first key of the first octave and this contact maker controls the action of the orchestra bells or other similar instruments. A second switch 30 of like construction to the switch 10 is provided, the switch 30 having a pair of contacts 31 and 32. The switch arm 30 is connected with the strip 24^b by a wire 30^a, while the strip 24^c connects through a wire 25^a with a source of energy 25 which is in turn connected through a wire 25^b to the contact 33^e of the bell ringing mechanism 33 which is of precisely the same construction as the mechanism 13, hereinbefore described, and which is wired in the same manner, the operating mechanism 33, however, being so designed that the hammer or clapper 33^d will strike the bell 34. Each bell mechanism 33 is provided with the binding posts 33^e, 33^f and 33^g, that 33^e being connected through the wire 25^b with the source of electric energy 25, while the contact 33^f is connected through a wire 31^a with the contact 31 of the switch 30, the other contact 32 of the switch 30 being connected through a wire 32^a to the binding post 13^x. Any number of bells 34 may be connected together, as shown in Fig. 3, of the drawings, so as to be simultaneously operated

upon the depression of any key in the two octaves under which the contact maker 24 is located.

Instead of operating the bells simultaneously I may provide a series of different toned bells corresponding to the notes of the octave, one for each key 4, as shown in Fig. 4, of the drawings, and in that event in lieu of the single contact strip 24^c I provide separate contact fingers 35—36—37, each of which is connected through a wire 35^a—36^a—37^a respectively with the binding post 13^e of its respective operating mechanism 33^x—33^y—33^z, etc., as shown in Fig. 4, of the drawings. Upon depression of any of the keys, say, the key over contact 35 the mechanism 33^x will be set into operation effecting a vibrating action on the bell 34 or a tapping action thereon, depending upon the position of the switch arm 30, as will be well understood by reference to Fig. 4, of the drawings. Fig. 5 illustrates essentially the same wiring and operating mechanisms as is shown in the form disclosed in Fig. 4, of the drawings, with the exception that in the form shown in Fig. 5, the bells 34 are omitted and the various keys 38, 38^a, 38^b of a xylophone or any other instrument of like character are acted upon by the hammers or clappers 33^d.

In practice the switches 10 and 30 will be located beneath the key-board 5 so that they may be set by the knee of the operator when playing the piano.

The gist of my invention resides in providing electrical means whereby drums and other instruments may be operated from the key-board of an ordinary piano, and whereby said instruments may have a vibrating stroke imparted thereto or a tap stroke, as the operator may desire.

While I have disclosed a bass drum 15 and means for operating the same from the pedal 23 of a piano, I make no claim in this application thereto, as the subject-matter of this portion of my invention is reserved for a divisional application.

It is, of course, obvious that numerous changes in the details of construction and arrangement of parts may be made without departing from the spirit of the invention or the scope of the appended claims.

What I claim is:

1. In combination with the keyboard of a musical instrument; a contact-maker engageable by predetermined ones of the keys of said keyboard and having a plurality of contact portions to be operated upon depression of at least one of said keys, a sounding body, a plurality of electromagnetic devices for operatively engaging said sounding body, a source of electric energy and a single controlling means electrically connected to all of said electromagnetic devices and to said contact maker which when in one operative position determines that said electromagnetic devices shall each impart a single tap to said sounding body upon depression of any one of said keys and which when in another operative position determines that said electromagnetic devices shall each impart a series or rapid succession of taps to said sounding body upon depression of any one of said keys.

2. The combination with a keyboard of a musical instrument, a circuit closer inserted beneath the keys of said keyboard and operable by the depression of at least one of said keys, an electromagnetic tapping device, a musical sound producing body to be tapped by said tapping device, electrical connections between said tapping device and said circuit closer, said electrical connections including a source of electric energy, and a single means which when in one operative position will determine that said tapping device shall impart a single tap to said musical sounding body when a key on the keyboard is depressed to close said circuit closer and which when under another operative position will determine that said tapping device shall impart a rapid succession of taps to said musical sounding body when a key on the keyboard is depressed to close said circuit closer.

3. The combination of a key-board, a plurality of independently-operating circuit-closing contact-members beneath the keys of said key-board, a plurality of electro-magnetic tapping devices, electrical circuits connecting the tapping devices with said contact members, and a single means interposed in said circuits which when in one operative position determines that said electro-magnetic tapping devices shall each impart a single tap upon closing the circuit at the respective contact members and which when in another operative position determines that said electro-magnetic devices shall each impart a rapid succession of taps upon closing the circuits at the respective contact members.

4. The combination of a key-board, a plurality of independently operating circuit-closing contact members beneath the keys of said key-board, a plurality of electromagnetic tapping devices, electrical circuit connections between said tapping devices and corresponding ones of said contact members in virtue of which each contact member controls the operation of a distinct one of said electromagnetic tapping devices, and a single circuit switch interposed in said electrical circuit connections which when in one operative position determines that each of said electromagnetic devices shall impart a single tap upon closing the circuit through their respective contact members and which when in another operative position determines that each of said electromagnetic devices shall impart a rapid succession of taps

upon closing said circuit at the respective contact members.

5. In a device of the character stated, a keyboard, a plurality of circuit closers one for each key, a plurality of electromagnetically actuated hammers, a plurality of musical sound producing bodies one for engagement by each hammer, a source of electric energy, electrical circuit connections between said circuit closers, said source of electric energy and said hammers, and a single switching means coöperating with the aforesaid parts to simultaneously control all of the circuit connections between said circuit closers and their respective electromagnetically actuated hammers to determine that said hammers shall impart a single tap upon closing the respective circuit closer when said switching means is in one operative position, and to determine that said hammers shall impart a succession of taps upon closing their respective circuit closers when said switching means is in another operative position, substantially as shown and described.

6. A means for operating sound producing bodies that comprises in combination with the keyboard of a musical instrument, a plurality of circuit closers each operated by a different key on said keyboard, a plurality of electromagnetically actuated hammers, a single source of electric energy, electrical circuit connections between said source of energy, said circuit closers and said hammers, and a single circuit switching means coöperating with the aforesaid parts which when in one position will determine that a single tap shall be given by a hammer upon depression of its respective key, and the closing of its respective circuit closer, and which when in another operative position will determine that a succession of taps shall be imparted by said hammer upon depression of its respective key and the closing of its respective circuit closer.

7. In combination with a keyboard having a plurality of independently movable keys, a plurality of circuit closing members beneath said keys one for each key, a plurality of musical sound producing bodies, and a tapping device for each body, said tapping device comprising an electromagnet, an armature therefor, a hammer carried by said armature and a make and break circuit closer controlled by the movements of said armature, electrical connections between the magnets of said tapping devices and the respective circuit closing members, a source of electric energy, electrical connections between said source of electric energy and said circuit closing members, a single circuit controlling switch common to all of said tapping devices, electrical connections between the magnets of all of said tapping devices and said switch and separate electrical connections between the make and break circuit closers of all of said tapping devices and said switch, electrical connections between the make and break circuit closers of said tapping devices and their respective magnets, all being so arranged that when said switch is in one position all of said tapping devices will impart single taps when their respective circuit closing members are operated by the respective keys and that when said switch is in another position all of said tapping devices will be set into vibration upon closing their respective circuit closing members.

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