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SPINET PIANO ACTION

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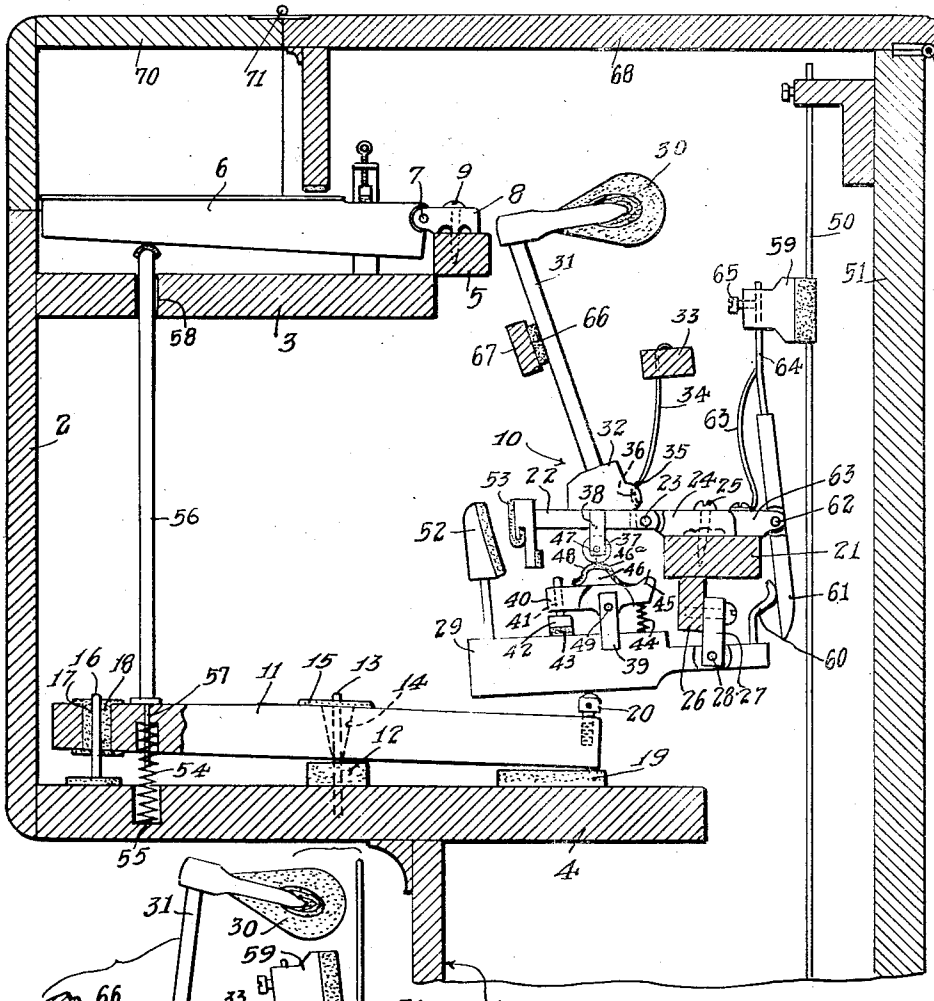


Fig. 1

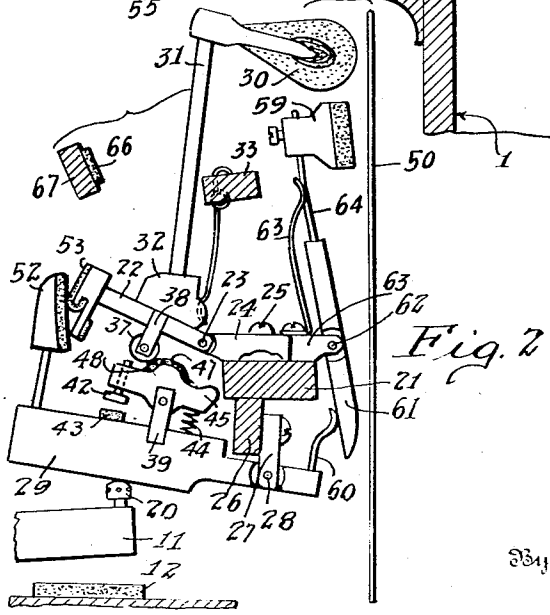


Fig. 2

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SPINET PIANO ACTION

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4 Claims. (Cl. 84—240)

This invention relates to a spinet piano action. This type of piano is not well adapted for employment with ordinary piano actions, because it requires the action to be located at or below the level of the keyboard. Ordinary upright piano actions require a considerable space in a front and rear direction, and this necessitates a casing or piano box of very considerable horizontal depth.

In my prior application entitled "Mechanical action for musical instruments," filed March 21, 1938, Serial No. 197,061, I disclosed a piano action of simple construction, greatly reducing the number of parts that it is necessary to employ. The mechanical action disclosed in my prior application is not immediately adaptable to an upright mechanical action.

An object of the present invention is to provide a mechanical action embodying the features of simplicity and few parts, and particularly adapted for employment in a spinet type piano.

A further object of the invention is to provide a mechanical piano action of very simple construction, involving few parts, and which can be readily assembled into a relatively small space at or below the level of the keyboard. This enables the horizontal depth of the spinet to be greatly reduced. Also to provide a construction in which the resistance of the keys when struck by the fingers, will closely simulate those in a piano of horizontal or grand type.

A further object of the invention is to provide a construction which will adapt the mechanical action disclosed in the said prior application, to an upright type of design, and to provide a construction which will enable the hammer head to rebound and be held a short distance from the string if the key struck is held depressed, and at the same time, to construct the parts in such a way that as soon as the key is released the parts of the mechanical action will place themselves in a relation to permit a second depression of the key to drive the hammer against the string to produce a repeat note. This enables repeat notes to be struck in rapid succession.

Further objects of the invention will appear hereinafter.

The invention consists in the novel parts and combination of parts to be described hereinafter, all of which contribute to produce an efficient spinet piano action.

A preferred embodiment of the invention is described in the following specification, while the broad scope of the invention is pointed out in the appended claims.

In the drawing:

Figure 1 is a vertical section taken in a front and rear plane through the upper portion of a piano casing or box of spinet type, the lower portion of the casing being broken away. This view shows the parts of the action in a position of rest.

Figure 2 is a fragmentary view showing some of the parts illustrated in Figure 2, but in the relation which they assume when the key is struck and held down.

Referring more particularly to the parts 1 indicates the casing or box of a spinet type piano including a front board 2 which, in the present instance, is substantially upright or vertical, and also including the keyboard 3, which is substantially horizontal and extends back from the front board in the usual manner. Below the keyboard I provide a base board 4, which is also substantially horizontal, and located at the level of the lower edge of the front board. Above the keyboard a key rail 5 is provided carrying a plurality of keys such as the key 6, and each of these keys is supported on a suitable pivot to rock in a vertical plane; in the present instance, each key is supported on a pivot pin 7 carried on an adjustable block 8 that is clamped in position by means of a clamping screw 9 passing down into the rail 5.

Supported on the base board 4 I provide means for imparting movement from the key 6 to the piano action, which is indicated generally by the reference numeral 10. In order to accomplish this, I prefer to provide a sub-key 11. At an intermediate point on its length this sub-key is supported to rock on a fulcrum 12, which fulcrum may be in the form of a rail or pad 12 of relatively soft material, such as rubber or felt. The sub-key is held in alignment preferably by means of a vertical pin 13 that extends up through a slot 14 in the sub-key. This slot tapers in width in a front and rear direction so that the slot at its lower end fits fairly closely to the diameter of the pin 13. The upper end of the slot 14 may be closed by a small cover pad 15 that is slotted to permit the upper end of the pin 13 to move to and fro, and this pad will exclude a considerable amount of dust from entering the slot. I provide another aligning pin 16 near the front end of the sub-key, which pin projects up from the upper face of the base board 4 and extends through a guide slot 17, and it may have a pad lining 18 if desired. The rear end of the sub-key normally rests on a soft pad or rail 19, and this end of the sub-key im-

parts movement to the piano action 10 preferably through the agency of a capstan screw 20, which is adjustably mounted in the upper face of the sub-key.

Toward the rear of the casing 1 and somewhat below the mid position between the keyboard 3 and the base board 4, I provide a hammer rail 21, and on this rail I mount back check levers such as the lever 22, each back check lever being pivotally mounted on a pin 23 carried by a block 24 adjustably clamped on the upper face of the rail 21 by a clamping screw 25. The rail 21 has a downward extension or flange 26 on which I attach a pivot block 27 corresponding to each hammer, and each of these blocks 27 pivotally supports on a pin 28, a jack lever 29. I prefer to mount the hammers directly on the upper sides of the back check levers 22, as this enables me to bring the center of gravity of the hammer and its shank out of line with the hammer pivot 23. In order to accomplish this I provide the hammer with a head 30 of the usual construction, said head being attached at an angle (preferably slightly less than 90°) to the hammer shank 31, the lower end of the hammer shank being carried in a block or hub 32 that is secured on the upper side of the lever 22. The levers 22 and 29 are preferably wood, and also the block 32. This makes for lightness, and the wood is also easily worked into the desired shape.

Above the location of the rail 21 I provide a return spring rail 33 provided with springs such as the spring 34, corresponding to each hammer; and the lower ends of these springs are bent to form curved heads 35 that are received in notches 36 formed at the rear edge of each block 32.

I provide contact means for imparting movement from the jack lever 29 to the hammer 32, and this means is preferably constructed in accordance with my prior invention disclosed in my said application, Serial No. 197,061. This contact means involves the use of a roller on one of these parts 22 and 29, and a spring-pressed rocker on the other of these parts. In the present instance, I have illustrated a roller 37 supported on bracket arms 38 extending down from the back check lever 22, and on the jack lever 29 I provide upwardly projecting bracket arms 39 that pivotally support a rocker 40, said rocker having a forwardly projecting stop end 41 carrying an adjustable stop 42 that normally rests against a stop pad 43 secured on the upper face of the jack lever 29.

A coil spring 44 normally thrusts upwardly against a tail arm 45 projecting rearwardly on the rocker 40, and normally holds the rocker against the stop pad 43.

The upper portion of the rocker 40 is in the form of a cam 46 covered by a pad 46a and shaped so that the pad presents a substantially horizontal driving face 47, the function of which is to contact with the roller 37 and impart a striking movement to the hammer. Toward the forward end of the cam 46 it is cut away on an angle to form a relief face 48. When the parts are at rest as illustrated in Fig. 1, the driving face 47 is in contact with the roller, and the location of this face is on a vertical line passing slightly to the left of the pivot 49 of the rocker 40. With this arrangement it will be evident that when the key 6 is depressed, the consequent upward swinging movement of the jack lever 29 will impart movement through the driving face 47 to the roller 37, and thence to the back check lever 22 and the hammer, causing the hammer shank 31 to swing rearwardly and strike the hammer head 30 against the string 50 that is mounted on the back board 51 of the casing.

When this action takes place the hammer rebounds from the spring and is back-checked in the manner indicated in Figure 2. In order to accomplish this I provide a back check pad 52 supported on the forward end of the jack lever 29 and a cooperating back check pad 53 carried at the forward end of the back check lever 22. The cooperation of these pads is fully illustrated in Figure 2. Of course, they will only operate if the key 6 is held down after being struck. When the key is struck and held down in this way, the rocker 40 will assume the relation to the roller indicated in Figure 2; that is to say, the roller will move out of contact with the driving face 47, and the spring 44 will hold the relief face 48 against the face of the roller. However, if a repeat note is to be struck, as soon as the key 6 is released, it will return to its elevated position through the agency of a spring to be described hereinafter, and when this occurs the jack lever 29 will swing down slightly and the spring 44 will then rock the rocker 40 toward the left sufficiently to bring the driving face 47 under the roller again. The immediate depression of the key 6 for a repeat note, will then operate to drive the hammer head 30 against the string 50, and repeat the note.

Any suitable means may be employed for normally holding the key 6 in its elevated position. I prefer to employ a coil spring 54 to accomplish this, said spring being carried in spring sockets 55 formed by drilling into the adjacent faces of the base board 4 and the sub-key 11. The movement from the key 6 to the sub-key 11 may be imparted in any suitable manner, but preferably through the agency of a push rod 56, the upper end of which is held against the under face of the key 6 near its forward end, and the lower end of which thrusts against the upper face of the sub-key 11 at its forward end. If desired, an anchoring pin 57 may be provided on the lower end of the push rod, and this pin is preferably in line with the spring sockets 55 so that it assists in holding the spring 54 in place.

The sub-key 11 is constructed and mounted on the pin 13 like an ordinary piano key, with the forward end of the sub-key located directly under, and in line with, the forward end of the keyboard key 6. When the key 6 is depressed, the force exerted by the fingers of the players is transmitted to the forward end of the sub-key, and as the sub-key is mounted like an ordinary keyboard key, its resistances in the striking movement simulate very closely the resistances encountered in striking and depressing an ordinary piano key. The action mechanism proper, that is to say, the parts of the hammer action operated by the rear end of the sub-key, are so constructed as to prevent the development of any sudden resistance as ordinarily takes place where a jack driving the hammer is set off to terminate the driving action of the hammer.

The upper end of the push rod 56 is preferably guided through an opening 58 in the keyboard 3.

The damper 59 may be controlled by the cam post 60 extending up from the tail end of the jack lever 29, which engages the tail end of the damper lever 61, which lever is mounted on a pivot 62 at the rear end of the block 63 clamped on the upper side of the rail 21. The damper is normally held against the string by a bow spring 63. The free end of this spring engages

a wire shank 64 that supports the damper 59. The damper may be adjustable on the shank 64 through the agency of a set screw 65.

In the position of rest of the hammer, the shank 31 rests against the pad 66 on the face of an inclined rest rail or back stop 67.

The casing 1 may be provided with the usual hinged cover 68, the rear end of which is attached by a hinge 69, and the forward end of which is provided with the keyboard section 70 connected to the body of the cover by a hinge 71. This is the usual arrangement enabling the keyboard to be exposed when desired, without raising the entire cover.

It is understood that the embodiment of the invention described herein is only one of the many embodiments this invention may take, and I do not wish to be limited in the practice of the invention, nor in the claims, to the particular embodiment set forth.

What I claim is:

1. In a spinet type piano action, the combination of a sub-key, a fulcrum for supporting the sub-key at an intermediate point on its length, means for imparting movement to the sub-key operating to elevate the rear end of the sub-key when the same is actuated, a hammer having a head and a downwardly extending shank, a back-check lever carrying the said hammer shank, means for pivotally supporting the said lever toward the rear of the piano action, a jack-lever with means for pivotally supporting the same toward the rear of the piano action so that the jack-lever extends toward the front of the piano below the back-check lever, contact means between the jack-lever and the back-check lever including a roller on one of the same, and a rocker pivotally mounted on the other of the same, a stop for the said rocker, and a spring for urging the rocker to engage the stop, said rocker having a driving face for imparting movement to the hammer to swing the same rearwardly to strike the string, a return spring for the hammer, and back-check pads carried by the jack-lever and the back-check lever cooperating with the said return spring to hold the hammer with its head near the string when the sub-key is held depressed after the same has been actuated, said rocker having a relief face in contact with the roller when the back-check pads are in contact, said relief face being held against the roller by the said rocker spring.

2. In a spinet type piano action, the combination of a sub-key, a fulcrum for supporting the sub-key at an intermediate point on its length, means for imparting movement to the sub-key operating to elevate the rear end of the sub-key when the same is actuated, a hammer having a head and a downwardly extending shank, a back-check lever carrying the said hammer shank, means for pivotally supporting the said lever toward the rear of the piano action, a jack-lever with means for pivotally supporting the same toward the rear of the piano action so that the jack lever extends toward the front of the piano below the back-check lever, contact means between the jack-lever and the back-check lever including a roller on one of the same, and a rocker pivotally mounted on the other of the same, a stop for the said rocker, and a spring for urging the rocker to engage the stop, said rocker having a driving face for imparting movement to the hammer to swing the same rearwardly to strike the string, a return spring for the hammer, and back-check pads carried by the jack-lever and the back-check lever cooperating with the said return spring to hold the hammer with its head near the string when the sub-key is held depressed after the same has been actuated, said rocker having a relief face in contact with the roller when the back-check pads are in contact, said relief face being held against the roller by the said rocker spring, said rocker spring operating when the sub-key is released and reactuated, to move the rocker into a position to hold the said driving face of the rocker in driving contact with the roller.

3. In a spinet type piano action, the combination of a sub-key, a fulcrum for supporting the sub-key at an intermediate point on its length, means for imparting movement to the sub-key operating to elevate the rear end of the sub-key when the same is actuated, a hammer having a head and a downwardly extending shank, a back-check lever with means for pivotally supporting the same toward the rear and so that the lever extends forwardly from its pivotal support, a jack-lever with means for pivotally supporting the same toward the rear so that the jack-lever extends forwardly under the back-check lever, a roller carried by the back-check lever, a rocker pivotally mounted on the jack-lever, a stop for the same, and a spring urging the rocker toward the stop, a return spring for the hammer, back-check pads carried by the jack-lever and the back-check lever cooperating with the said return spring to hold the hammer near the string when the sub-key is held depressed after the same has been actuated, said rocker having a driving face through which the striking movement is imparted from the jack-lever to the hammer to swing the same rearwardly to strike the string, said rocker having a relief face held against the said roller by the rocker-spring when the back-check pads are in contact and holding the hammer head near the string.

4. In a spinet type piano action, the combination of a casing having a substantially upright front board, a substantially horizontal keyboard back of the same, a key supported on the keyboard, a base board located below the keyboard, a sub-key located in line with the key and below the same, a fulcrum for supporting the sub-key on the base board at an intermediate point on the length of the sub-key, a push rod guided through the keyboard with its upper end in contact with the under side of the key, means for supporting the push rod on the outer end of the sub-key, said push rod operating when the key is depressed to elevate the rear end of the sub-key, a hammer having a head located at about the level of the key and having a downwardly extending shank, a back check lever with means for pivotally supporting the same toward the rear of the piano action, a jack-lever with means for pivotally supporting the same, contact means between the jack-lever and the back-check lever for imparting striking movement from the jack-lever to the hammer to swing the same rearwardly to strike the string, a return spring for the hammer, and back-check pads carried by the jack-lever and the back-check lever cooperating with the said return spring to hold the hammer with its head near the string when the sub-key is held depressed after the same has been struck.

CARL SCHULZE.