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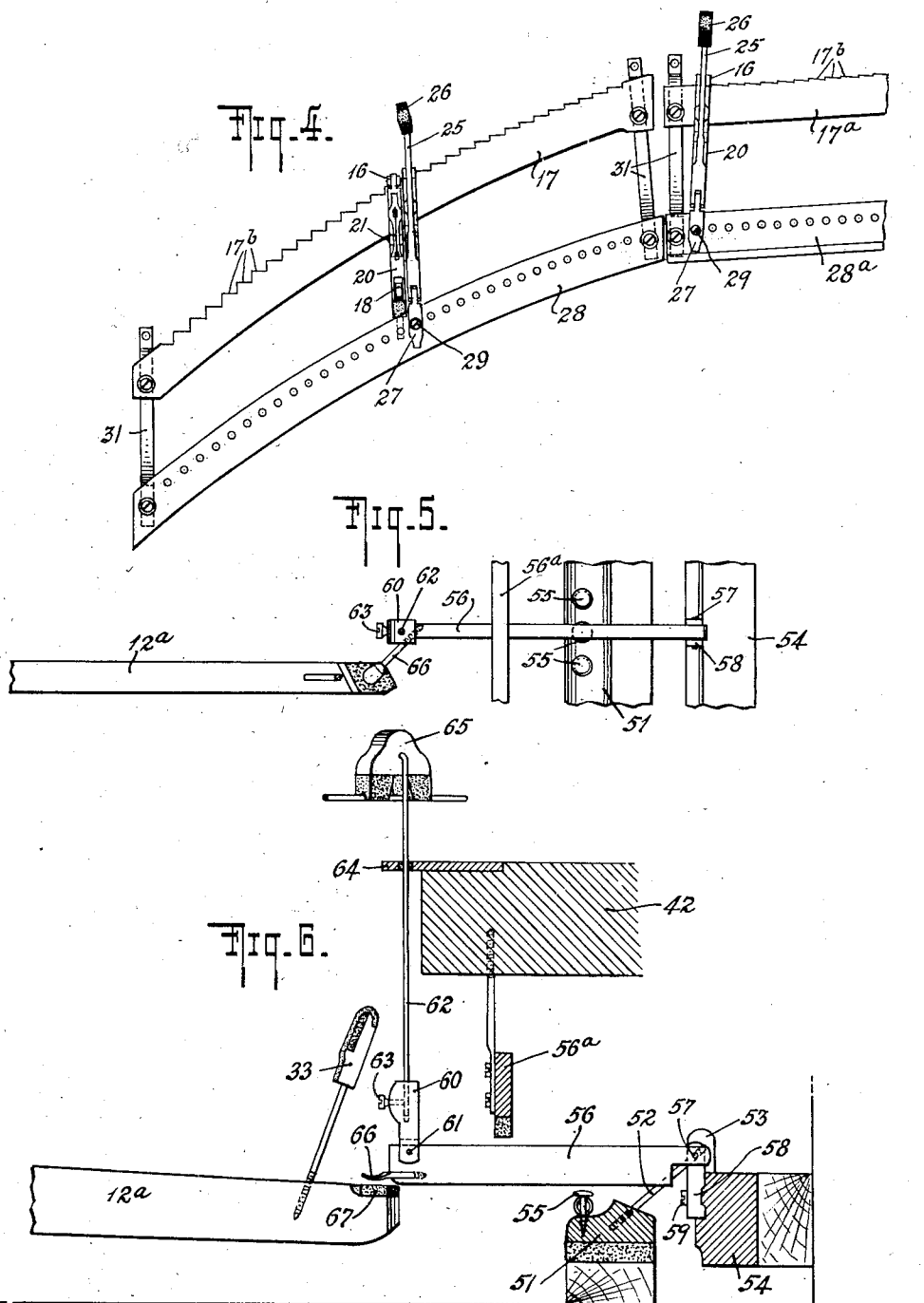
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PIANO

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WITNESS

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## UNITED STATES PATENT OFFICE

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PIANO

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14 Claims. (Cl. 84—239)

The invention relates to pianos and its object is to produce an instrument of efficient tone quality possessing great touch-sensitiveness and capacity of repetition of individual notes independent of the extent of depression of the keys at the moment when the note is repeated, all assembled in compact form to produce an artistic piece of furniture adapted to the limited dimensions of the modern apartment, while at the same time being capable of use in and of adorning more spacious quarters of large residences.

At the present time there are practically only two types of pianos in use, the upright and the grand, both bulky in appearance and incapable of artistic development to match modern ideas of interior decoration.

About seventy years ago a type of piano known as the square piano was in extensive use but in about 1880 the making of square pianos came to an end. This was due in large measure to the fact that the interior arrangement of parts in the square piano was such that for repetition of any note it was necessary for the key to return fully to its normal position at rest so that it was impossible to secure the "repetition" which is characteristic of grand piano actions and which is responsible for the universal acceptance of the grand piano as the most touch-responsive instrument. A person accustomed to playing a grand or an upright piano finds it exceedingly difficult for this reason to play one of the old square pianos. Attempts to correct the defect of the square piano and to give such a piano a sensitiveness of touch equal to that of a grand piano proved unavailing with the result that for over fifty years the square piano has been obsolete.

In the instrument of the present invention the casing is of a generally oblong rectangular shape, the key-board being situated at one of the longer sides. The strings are positioned horizontally, the base strings extending from near one of the front corners to an opposite rear corner region and having their striking points in the vicinity of the latter. The treble strings extend from the longer rearward side of the instrument in general diagonal directions toward the front of the instrument and, in part, cross a part of the bass strings which lie, in a different plane from that occupied by the treble strings. This arrangement not only enables an adequate tone to be produced but at the same time accommodates all of the strings with the necessary length thereof for the required tone effect within a compass such as 3 x 5 feet. Due to this arrangement of the strings, the striking points of the hammers for the bass

strings are arranged as an arc whose projection on the horizontal line of the key-board is shorter than the space occupied by the keys for the bass strings. The key levers, accordingly, for the bass strings, are so shaped that they extend angularly from the rear parts of the keys toward the striking points of the strings. Substantially the same general condition of angularity of key levers back of the parallel keys applies in the case of the treble strings. The pivots for the key levers are so placed as to obtain together with the customary weighting of the individual levers a substantial uniformity of leverage as between the several key levers taking into consideration that they are necessarily to a large extent of different lengths and practically all at a different angular relation with respect to their associated key section. A double escapement and repetition grand action is interposed between the key levers and the hammers and means are provided whereby notwithstanding the diverse angular relation of the several hammers, the actions and the hammer shanks will be assembled and maintained in parallel with the slant or angle of the key lever rearwardly of its fulcrum. Means are also provided for making it possible in connection with an instrument of this character and construction to make use of a damper of the type which has been found to be the most satisfactory in grand pianos.

The instrument assembled as described is of small dimensions and is capable of decorative development so that in appearance it will look rather like a table or desk than like a piano. On the other hand, when played as a piano, it has a full sonorous tone equal to that of any ordinary upright piano and in fact superior in tonal quality to that of the upright piano and approximating that of a baby grand.

The invention is illustrated in the accompanying drawings, in which Fig. 1 is a plan view of the instrument, with parts removed for the sake of clearness; Fig. 2 is a similar view illustrating the arrangement of the actions and the hammers controlled thereby; Fig. 3 is an enlarged transverse section through the treble strings of the piano illustrating the piano action in detail, together with the associated damper mechanism, approximately along the line 3—3 of Fig. 1; Fig. 4 is a plan view on a still larger scale of the bass section and a portion of the treble section indicating the preferred construction and arrangement of the hammer shank rail, the wippen or repetition rail, and how the actions are associated therewith; Fig. 5 is a detail in plan of parts of the mechanism shown in Fig. 6; Fig. 6

is a fragmentary section illustrating certain details of the damper mechanism; and Fig. 7 is a plan view of the pedal-controlled damper-operating lever.

5 The frame or case of the piano is indicated at 10 and as illustrated in Figs. 1 and 2 is of oblong form, the frame being supported by legs 11, preferably of ornamental form and design. The keyboard extends to the front of the instrument so as to be accessible to the player in the customary manner, and consists of individual parallel keys 12 extending rearwardly into the case 10. The keys 12 are formed from the outer portions of wood members, the remainders of which constitute the key levers 12<sup>a</sup> which in the case of practically all of the levers extend angularly with reference to the parallel key sections 12, as shown in Fig. 2. The degree of angularity in the case of each of the key levers differs with respect to practically each of the levers, this being due to the arrangement of the strings to be hereinafter described and the necessity of having the key levers reach to the region below the striking point of the several strings. The several angularly extending key levers are pivoted on the blocks 8 and are slotted to rock on the pins 7 in the customary fashion. As will be seen in Fig. 2, the arrangement of the pins 7 at least in the bass section of the instrument follows in general an arc so positioned with reference to the capstan screws 13 that the leverage of all the key levers would remain approximately the same, notwithstanding the fact that the effective part of the lever for the lowest of the bass keys is very much shorter than that of the higher notes of the bass register. Each key lever is provided near the end portion of its angularly extending section with a capstan screw 13, each of which engages a wippen of the type commonly used in grand pianos, said wippen being shown generally at 14 (Fig. 3). The aforesaid grand wippens 14 may in general be of any known or suitable construction and in the form illustrated each comprises a support 15 having its one end pivoted at 15<sup>a</sup> to a flange 16 by which it is fastened to the wippen rail 17 by the screw 6. The support 15 is provided at its opposite end with a grand jack 18 pivoted at 19 to the support 15 and having its upper end movably disposed within a slot in the repetition lever 20. The latter is pivoted at 21 upon an upright standard 5 forming part of the support 15, and is provided with the usual button 22 carried by an adjusting screw in the known manner, and adapted, by engagement with the support 15, to limit the pivotal movement of the repetition lever 20 in one direction. The customary grand lever spring arrangement whereby the repetition lever 20 is maintained in and returned to its normal position is shown at 23, while the usual repetition hook for arresting the pivotal movement of the repetition lever 20 in the opposite direction is illustrated at 20<sup>a</sup>. The conventional grand jack spring and regulating screw button and punching are included in each grand wippen, together with the grand spoon mounted on the support 15 for engagement by the aforesaid punching in the usual manner for the usual purposes.

It will be noted in Fig. 3 that the capstan screw 13 of each key 12 engages a projection 15<sup>b</sup> depending from each support 15 and located in relative proximity to the pivot 19 and at a relatively larger distance from the pivot 15<sup>a</sup>. In other words the points at which the capstan screws 13 engage the grand wippens are much

nearer one end of the supports 15 than the other ends thereof. This arrangement was necessitated by the fact that the key levers, due to the arrangement of the strings in the casing, are of limited dimensions and therefore would have an undue load to overcome in the playing of the piano, if the projection 15<sup>b</sup> (and the capstan screws 13) were located, as in ordinary grand wippens, near the central part of the support 15. This feature of the new piano provides a greater leverage between the keys 12 and the grand wippens 14, makes the keys less hard to depress in striking the notes, gives greater throw to the wippens and increases the responsiveness of the keys 12 and the other parts of the action to rapid fingering of the player. By this arrangement a sensitiveness and power are obtainable in the new instrument equivalent to that of a standard grand piano. This arrangement also permits the distance from the fulcrum 7 to the capstan screw 13 to be shortened and the advantage of great touch sensitiveness is gained by the combination of the two features (1) of a long leverage on the wippen and (2) a short leverage from the key lever fulcrum to the capstan screws.

As shown in Fig. 3 the repetition lever 20 in each grand wippen 14 engages a felt-covered roll 24 connected with the shank 25 of the hammer 26. Each of the shanks 25 is pivotally connected with a flange 27 which in turn is secured to its respective hammer rail 28 or 28<sup>a</sup>. In the preferred arrangement, each flange 27 is fastened to the hammer rail 28 or 28<sup>a</sup> by means of a single screw 29 so that in assembling the action the hammers 26 may be individually adjusted into exact registry with the cooperating grand wippens 14, it being understood that the screws 29 are accurately positioned with respect to the grand wippens 14 to permit these results to be attained. In their normal positions the hammer shanks 25 are supported from 24 with their hammer ends resting slightly above the hammer rest rails 30 which are supported in the customary manner upon the wippen rails 17 and 17<sup>a</sup>. The latter and the hammer rails 28 and 28<sup>a</sup>, are carried by brackets 31 mounted on a base frame 9 in the case 10, said brackets also serving to support the conventional regulating rail 32 for cooperation with the grand jack 18 in the well known way. Each key lever 12<sup>a</sup> is provided at its inner end with the customary back check 33 cooperating in the usual manner with the associated hammer 26.

As shown in Fig. 2 the arrangement comprises wippen rails 17 and 17<sup>a</sup>, and hammer rails 28 and 28<sup>a</sup> carried by the supporting brackets 31. The rails 17<sup>a</sup> and 28<sup>a</sup> are inclined relatively to the major axis of the case 10. These rails 17<sup>a</sup> and 28<sup>a</sup> carry the grand wippens 14 and hammers 26 in two groups (see Fig. 2) for cooperation with the respective groups 34, 35, and 36 of treble strings illustrated in Fig. 1. The arrangement further includes a curved wippen rail 17 and an associated curved hammer rail 28, supported upon two brackets 31 as shown in Figs. 2 and 4. The arrangement of the curved rails 17 and 28 is such that they constitute substantially independent continuations of the straight rails 17<sup>a</sup> and 28<sup>a</sup>, the relative positions of the curved rails 17 and 28 being such that they converge toward each other in a direction away from the straight rails 17<sup>a</sup> and 28<sup>a</sup>. The curved rails 17 and 28 carry the wippens and hammers which cooperate with the bass strings 37.

As shown in Fig. 4 the curved wippen rail 17

is preferably provided along its outer edge with a series of steps 17<sup>b</sup> which increase gradually in depth from the inner end of said rail 17 to the outer end thereof; these steps 17<sup>b</sup> constitute bearing positioning and attaching surfaces for the flanges 16 of the grand wippen 14 and enable the latter to be grouped in accurately positioned relation to the several key levers 12<sup>a</sup> and to define the position which the several hammer shanks 25 shall occupy in the assembly. Preferably, the straight wippen rail 17<sup>a</sup> is also provided with stepped recesses of a similar character and for a similar purpose.

These steps or notches 17<sup>b</sup> are preferably so cut that their lateral faces will be in line with the directions of the angular parts of the key levers 12<sup>a</sup> extending beyond the pivots 7, the balance of each notch representing a seating surface for the flanges 16 of the actions, said seating surface being in each case arranged at right angles to the lateral surface of the notch or in any event at right angles to the directions of the several key levers 12<sup>a</sup> so that said seating surfaces with respect to each successive notch will depart constantly from parallelism with each other and with the longitudinal axis of the instrument always, however, to the same extent that the key levers depart from rectangular relation with respect to said axis. The lateral faces of the notches need not necessarily have the described relation with respect to the key levers but it is preferable that they should be arranged in such relation as it aids in conveniently positioning the flanges 16. The notches are preferably placed on the vertical rear side of the wippen rail, but they may also be placed on one of the horizontal sides of such rail, in which case, for example, the wippen rail might extend a little further back in the instrument and the flange 16 be attached upon the upper surface and similarly, if the notches were cut on the under surface of the wippen rail, the flange 16 might take the form of an angle piece screwed to the bottom of the rail. The positions of the pivots for the wippen support 15 will in any such case, however, always remain the same.

If the wippen rails 17—17<sup>a</sup> are notched in such a manner as to properly automatically position the wippen with relation to the key levers, notches for positioning the hammer shank flanges 27 in their proper relative positions are not necessary, so that in the preferred construction any special notching of the hammer rails 28, 28<sup>a</sup> is dispensed with. The rails 28, 28<sup>a</sup> are, however, preferably tapped in advance to receive the screws 29 at the proper point with relation to the registry of the key levers and the hammer shank flanges.

Obviously other position-defining means than notches adapted to accomplish an equivalent effect may be used in place of such notches without departing from the scope of the invention and the notches in the wippen rails 17 and 17<sup>a</sup> may even be dispensed with altogether, in which event the structure will appear as shown in Fig. 2. In such a construction each of the wippen and the hammer shanks is secured on its respective rail by means of a screw and without the use of a position-defining means and may still, without unreasonable inconvenience, be properly positioned by the mechanic by using his eye to establish alignment of each with its associated key lever before tightening the screw.

The arrangement adapted in the new instrument makes it possible to have all the wippen of uniform dimensions and all the hammer shanks

and flanges of the same length, which feature is, of course, of extreme importance in connection with the making of the several parts, since it would prove altogether too complicated and expensive to make and to install special wippen or hammer shanks for each of the several keys.

The strings are all mounted upon the metal or string frame 38 by means of the conventional pegs 39 and tuning pins 40, the treble strings of the groups 34 and 35 converging toward each other from the associated pegs 39 to the cooperating tuning pins 40 in constantly varying degrees of inclination to the case 10, while the treble strings of the group 36 extend at approximately right angles to the major axis of said case 10 in not quite but generally parallel relation to each other. The group 37 of bass strings, on the other hand, extends lengthwise of the case 10 in inclined relation to the major axis thereof from one of the front corner portions of the instrument to a diagonally opposed corner portion and so as to converge toward each other from the cooperating tuning pins 40 to the associated pegs 39, as shown in Fig. 1. The string frame 38 is suitably apertured to permit the hammers 26 to engage the co-operating strings, and carries the sounding board 41 which, as illustrated in Fig. 3, is located beneath said frame 38 and secured in place in any convenient manner. The string frame 38 is supported in the case 10 upon suitable rails 42 and is fastened in position by screws or the like 43 (Fig. 1).

In addition to the parts so far described, the novel piano includes damper mechanism which corresponds in dimensions and effect substantially to the corresponding mechanism of grand pianos. This mechanism comprises the usual foot-operated pedal means which may be of any conventional type and accordingly has been omitted from the drawings; the aforesaid pedal means is operatively connected with the lifter rod 44 which is vertically guided in an apertured guide member 45 and at its upper end carries an adjustable head 46 adapted to engage the one end of a damper-operating member 47 as shown in Fig. 3. The member 47 is of substantially U-form and is pivotally mounted in bearings 48 depending from the bottom of the case 10 and maintained in and returned to its normal position by means of a leaf spring 49 secured to the bottom of said case 10. The shorter arm of the damper-operating member 47 is in engagement with the lower end of a member 50 slidably mounted for vertical movement in the bottom of the casing 10 and having its upper end in contact with the damper rail 51; the latter is carried by members 52 pivotally connected with lugs 53 (Fig. 6) projecting upwardly from a rail 54 suitably mounted in the case 10, as will be more fully set forth hereinafter, the arrangement being such that the damper rail 51 is pivotally movable in vertical directions by the action of the aforesaid pedal means and associated elements. The damper rail 51 carries regulating button screws 55 of conventional type arranged to engage damper levers 56 pivoted at 57 upon flanges 58 fastened in proper positions on the rail 54 by means of screws 59 or their equivalent, as illustrated in Fig. 6. The customary stop rail 56<sup>a</sup> depends from the adjacent rail 42 for arresting the upward movements of the damper rail levers 56 when any one or the entire set of levers 56 abut against the rail 56<sup>a</sup>. At their free ends the damper levers 56 are each provided with a flange 60 pivoted at 61 and carrying the lifter wire 62 adjustably fixed in place by means of a set screw 63; each lifter wire 62 is guided for

vertical movement in an apertured guide plate 64 fastened to and projecting inwardly beyond the adjacent rail 42, and at its upper end carries a damper 65 of conventional type adapted to engage the associated piano string or strings from above in a manner corresponding to the damper arrangement of a grand piano. In order to raise the dampers 65 to permit the desired vibration of the piano strings when the keys 12 are actuated in the playing of the instrument, each damper lever 56 is provided with a spoon 66 so arranged as to project over and into the path of movement of the inner end of the associated key lever 12<sup>a</sup>, as illustrated in Fig. 6. In the preferred arrangement each key lever 12<sup>a</sup> carries a felt or similar pad 67 for contact with the spoon 66 of its cooperating damper lever 56. As is clearly shown in Fig. 2, the rail 54 is fixed in the case 10 at an inclination to the rear wall thereof and extends throughout the area occupied by the piano strings which are intended to be acted upon by the dampers 65; the latter are of conventional form designed for cooperation with the respective bass and treble strings in the manner common to grand pianos. To condense the arrangement into the smallest possible area and to provide a construction of maximum compactness and efficiency, the damper levers 56 of suitable dimensions are straight throughout and are located in spaced parallel relation as illustrated in Fig. 2. In order to effect the proper association with the respective keys 12 the spoons 66 are positioned to project from the individual damper levers 56 in several different ways. As shown in Fig. 2 some of the spoons 66 accordingly extend straight from the levers 56, while others project therefrom at varying angles relatively to said levers 56. In any case the arrangement is such as to bring each spoon 66 into a position to be engaged by the key levers 12<sup>a</sup> with which the particular damper 65 is associated.

To facilitate the removal of the action from the case 10, all parts of said action are mounted upon a base board 9, which is removably secured in said casing in any convenient manner so that by moving the base board out of the casing the entire action will become readily accessible. In that connection the notch arrangement 17<sup>b</sup> of the wippen rail is also of advantage, since it enables the mechanic to repair and remove and to replace each wippen with the greatest ease without requiring any disturbance of the hammer shank flanges.

With the novel arrangement and construction illustrated in the drawings and described in the specification, it is possible to provide a piano of the square type, which is relatively small in size and yet possesses all of the advantages of a rapid and responsive key action and high tonal quality of a standard grand piano. The technique required in the playing of practically all modern music is accordingly capable of being exercised to the fullest extent and to the best possible advantage in the new piano. In the arrangement as set forth hereinbefore, the strings are engaged by the hammers at those points which produce the best vibration of said strings. The responsiveness of the action to the operation of the keys is also enhanced by having the points of engagement between the key levers and the grand wippens positioned as hereinabove described, at a greater distance from the pivots on which said wippens swing than heretofore. The wippens are all alike and interchangeable. The curves of the wippen rail 17 and the curved ham-

mer rail 28 are respectively of such radii and so located relatively to each other as to converge in one direction, which enables the hammer shanks and flanges all to be of the same length, thus materially simplifying the construction and assembling of the instrument. The stepped formation of the curved wippen rail 17 also contributes to this factor, and the single screw attachment of each flange 27 to the hammer rails 28 and 28<sup>a</sup> enables the hammers to be adjusted into exact alignment with the associated wippens. The arrangement is furthermore such that the individual wippens are easily removable by simply removing the screws, whereby the flanges 16 are fastened to the wippen rails 17. In the novel piano the dampers are all located in a regular arrangement, which is important to the most efficient results and is made possible by the location of the rail 54 and the position of the spoons 66 on the damper levers 56.

Various changes in the specific forms shown and described may be made within the scope of the claims without departing from the spirit of the invention.

I am aware that the general type of action used by me in the combination which makes up the new instrument has been heretofore used in connection with grand pianos but in grand pianos the actions were all aligned and parallel and located at the same distance from the keys so that the question of using such actions in this way in a grand piano presented no difficulties, but it has always been regarded as impossible to embody actions of this character in pianos where the strings were arranged in the manner characteristic of the bass string section, for example, of a square piano. I have, however, succeeded by the described organization in not only demonstrating that it was possible at all to bring about such a combination, but in finding how it could be done in a thoroughly practical and commercial way. The effect of the present invention is to introduce to the market at a time when the public demand for existing pianos is at its lowest point a new instrument of such attractiveness, compactness, volume, tone quality, and sensitiveness to touch as to compel immediate recognition and to create a new demand.

I claim:

1. In a piano having an oblong substantially rectangular casing and having a set of double escapement and repetition grand actions and a keyboard arranged along a longer side and operatively connected to said actions, said piano having strings arranged in a plurality of groups, one of said groups comprising treble strings arranged in a substantially horizontal plane extending from the side opposite the keyboard at least in part fanwise towards the keys, and another of said groups comprising bass strings arranged in a different horizontal plane from those of the first group and extending fanwise from a front corner of the case diagonally rearwardly.

2. In a piano having an oblong substantially rectangular casing and having a set of double escapement and repetition grand actions and a keyboard arranged along a longer side and operatively connected to said actions, said piano having strings arranged in a plurality of groups, one of said groups comprising treble strings arranged in a substantially horizontal plane extending from an end portion of the side opposite the keyboard at least in part fanwise towards the keys, and another of said groups comprising bass strings arranged in a different horizontal plane

from those of the first group extending from the front corner at the same end at which the ends of the strings of the first group are secured diagonally rearwardly in a fanwise manner.

3. In a piano having an oblong substantially rectangular casing and having a keyboard arranged along a longer side, and operatively connected to a double escapement and repetition grand action, said piano having strings arranged in a plurality of groups, one of which constitutes a treble group arranged substantially parallel to the shorter dimension of the casing, a second of which is arranged fanwise towards the keys, and a third of which is arranged in a different plane fanwise from a front corner of the casing diagonally rearwardly.

4. In a piano having an oblong substantially rectangular casing, a keyboard of parallel keys arranged along a longer side of said casing, key levers associated with the keys and extending in major part at an angle from the keys, the said angles of the several levers being to a large extent different from each other, said piano having strings arranged in a plurality of groups, one of said groups comprising treble strings arranged in a substantially horizontal plane extending from the side opposite the keyboard at least in part fanwise towards the keys, and another of said groups comprising bass strings arranged in a different horizontal plane from those of the first group and extending fanwise from a front corner of the case diagonally rearwardly, a set of double escapement and repetition grand actions for said strings, and means for supporting the major part of said actions in slanted position with reference to the keys and all of them in parallel with the slant or angle of their associated key levers.

5. A piano such as set forth in claim 4 in which dampers are provided for the bass and at least part of the treble strings, actuating means for said dampers arranged in parallelism with each other and consequently out of alignment with the angles of the key levers, and members projecting from the ends of the actuating means nearest the dampers and extending toward a position where they control the dampers, said extensions being generally non-parallel to each other.

6. In a piano having an oblong substantially rectangular casing and having a keyboard arranged along a longer side of said casing, a string frame having strings arranged thereon in a plurality of groups, one of said groups comprising treble strings arranged in a substantially horizontal plane extending from the side opposite the keyboard at least in part fanwise towards the keys, and another of said groups comprising bass strings arranged in a different horizontal plane from those of the first group and extending fanwise from a front corner of the case diagonally rearwardly, a relatively straight wippen rail arranged lengthwise of said casing, an associated relatively straight hammer rail in spaced parallel relation thereto, a curved wippen rail extending away from one end of the straight wippen rail, an associated curved hammer rail in spaced converging relation to the curved wippen rail, double escapement and repetition wippens all of the same size pivotally secured to said wippen rails, means operatively connecting said wippens with said keys, and cooperating hammers secured to said hammer rails and having shanks all of the same length.

7. In a piano having an oblong substantially rectangular casing, a keyboard of parallel keys

arranged along a longer side of said casing, key levers associated with the keys and extending in major part at an angle from the keys, the said angles of the several levers being to a large extent different from each other, said piano having strings arranged in a plurality of groups, one of said groups comprising treble strings arranged in a substantially horizontal plane extending from the side opposite the keyboard at least in part fanwise towards the keys, and another of said groups comprising bass strings arranged in a different horizontal plane from those of the first group and extending fanwise from a front corner of the case diagonally rearwardly, a set of double escapement and repetition grand action wippens, means for supporting the major part of said wippens in slanted position with reference to the keys and all of them in parallel with the slant or angle of their associated key levers, said means comprising a notched wippen rail, means pivotally supporting the several wippens seated in the notches of said wippen rail, the seating faces of said notches extending in constant departure from parallelism with respect to the longitudinal axis of the instrument to the same extent that the key levers depart from rectangular relation with respect to said axis, an associated hammer rail, and cooperating hammers secured to said hammer rail.

8. In a piano having an oblong substantially rectangular casing, a keyboard of parallel keys arranged along a longer side of said casing, key levers associated with the keys and extending in major part at an angle from the keys, the said angles of the several levers being to a large extent different from each other, said piano having strings arranged in a plurality of groups, one of said groups comprising treble strings arranged in a substantially horizontal plane extending from the side opposite the keyboard at least in part fanwise towards the keys, and another of said groups comprising bass strings arranged in a different horizontal plane from those of the first group and extending fanwise from a front corner of the case diagonally rearwardly, a set of double escapement and repetition grand action wippens, means for supporting the major part of said wippens in slanted position with reference to the keys and all of them in parallel with the slant or angle of their associated key levers, said means comprising a notched wippen rail, the notches of which consist of lateral faces in alignment with the several angles of the key levers and of seating faces at right angles to the lateral surfaces, said seating faces extending in constant departure from parallelism with respect to the longitudinal axis of the instrument to the same extent that the key levers depart from rectangular relation with respect to said axis, means pivotally supporting the several wippens mounted on said seating faces, an associated hammer rail, and cooperating hammers secured to said hammer rail.

9. In a piano having an oblong substantially rectangular casing and having a keyboard arranged along a longer side of said casing, a string frame having strings arranged thereon in a plurality of groups, one of said groups comprising treble strings arranged in a substantially horizontal plane extending from the side opposite the keyboard at least in part fanwise towards the keys, and another of said groups comprising base strings arranged in a different horizontal plane from those of the first group and extending fan-

wise from a front corner of the case diagonally rearwardly, a relatively straight wippen rail, an associated relatively straight hammer rail in spaced parallel relation thereto, a curved wippen rail extending away from one end of the straight wippen rail, an associated curved hammer shank rail in spaced converging relation to the curved wippen rail, double escapement and repetition wippens pivotally secured to said wippen rails, cooperating hammers secured to said hammer shank rails and having shanks all of the same length, key levers operatively associated with said wippens, said key levers being in the major part in non-parallel relation, a rail located in an oblique position in said case, straight damper levers pivotally secured to said rail in spaced parallel relation to each other, dampers carried by said damper levers adapted to engage predetermined strings, and spoons carried by said damper levers and projecting in varying directions therefrom to operatively connect said non-parallel key levers with said parallel damper levers.

10. In a piano having an oblong substantially rectangular casing and having a keyboard arranged along a longer side of said casing, a string frame having strings arranged thereon in a plurality of groups, one of said groups comprising treble strings arranged in a substantially horizontal plane extending from the side opposite the keyboard at least in part fanwise towards the keys, and another of said groups comprising bass strings arranged in a different horizontal plane from those of the first group and extending fanwise from a front corner of the case diagonally rearwardly, a curved wippen rail for said bass strings having its outer edge provided with steps, an associated curved hammer shank rail in spaced converging relation to the curved wippen rail, double escapement and repetition wippens pivotally mounted on the stepped edge of said wippen rail, hammers secured to said hammer shank rail and pivotally adjustable relatively thereto, key levers connected with said wippens at points in proximity to the free ends thereof for operating said wippens and hammers, a rail located at the rear of said case, damper levers pivotally mounted on said rail and extending in spaced, parallel relation toward said wippen rail in varying relation to the associated key levers, dampers carried by said damper levers and engaging said bass strings from above and spoons projecting from said damper levers in varying directions above and into registry with the associated key levers.

11. A piano such as set forth in claim 10 in which the rail on which the damper levers are mounted extends in oblique relation to the rear wall of the piano case and all of the damper levers are arranged at right angles with respect to said rail.

12. In a piano having an oblong substantially rectangular casing and having a keyboard arranged along a longer side thereof, a string frame mounted in said casing in a substantially horizontal position, groups of treble strings on said frame arranged substantially parallel to the shorter dimension of the casing, additional groups of treble strings on said frame arranged fanwise towards the keys, a group of bass strings on said frame arranged in a different horizontal plane from said treble strings and extending fanwise from a front corner of the casing diagonally rearwardly, a straight wippen rail extending transversely to said treble strings, an asso-

ciated straight hammer shank rail in spaced parallel relation thereto, a curved wippen rail contiguous to the one end of said straight wippen rail and extending transversely to said bass strings, a curved hammer shank rail contiguous to the one end of said straight hammer shank rail and in spaced converging relation to said curved wippen rail, said rails all extending lengthwise of said case, double escapement and repetition wippens pivotally mounted on said straight wippen rail and said curved wippen rail, hammers having shanks all of the same length pivotally mounted on said straight hammer shank rail and said curved hammer shank rail in operative relation to the respective wippens, said wippens and hammers extending transversely to the major axis of said case, and key levers extending transversely of said case in non-parallel relation and operatively connecting said wippens to the keyboard.

13. In a piano having an oblong substantially rectangular casing and having a keyboard of parallel keys arranged along a longer side of said casing, a string frame having strings arranged thereon in a plurality of groups, one of said groups comprising treble strings arranged in a substantially horizontal plane extending from the side opposite the keyboard at least in part fanwise towards the keys, and another of said groups comprising bass strings arranged in a different horizontal plane from those of the first group and extending fanwise from a front corner of the case diagonally rearwardly, a set of double escapement and repetition wippens for said strings, each of said wippens comprising a support pivotally mounted at one end on a wippen rail, and provided at its other end with a grand jack, an upright standard mounted on said support intermediate the ends thereof for pivotally supporting a repetition lever, and a projection depending from said support and located intermediate said grand jack and said upright standard and nearer the former than the latter, key levers associated with said keys, and capstan screws provided on said key levers for operatively engaging with the projections on said wippens.

14. In a piano having an oblong substantially rectangular casing and having a keyboard of parallel keys arranged along a longer side of said casing, said piano having strings arranged in a plurality of groups, one of said groups comprising treble strings arranged in a substantially horizontal plane extending from the side opposite the keyboard at least in part fanwise towards the keys, and another of said groups comprising bass strings arranged in a different horizontal plane from those of the first group and extending fanwise from a front corner of the case diagonally rearwardly, a set of double escapement and repetition grand actions for said strings, key levers associated with said keys and extending in major part at an angle from the keys, means for supporting said grand actions in parallel with the slant or angle of their associated key levers, capstan screws provided on said key levers for engaging said grand actions, the major part of said capstan screws being variably distanced from said keyboard, and means for pivotally supporting said key levers, the fulcrums of said key levers being so positioned relative to their associated capstan screws as to obtain a substantial uniformity of leverage as between the several key levers.