This invention relates to a piano key, key bed and key fingers which may be formed of die cast metal for use primarily in the keyboard of a piano, but with modifications in piano accordions, organs and harpsichords.

In the conventional construction of piano keys and key beds, a problem is encountered due to the fact that while the keyboards with the natural and sharp keys thereon are of a standard size and form, the back end of the key bed, including the key fingers, varies in most instruments, due to the fact that the division in the spacing of the strings and piano action is different for nearly every model of piano and for every manufacturer thereof. This prevents standardizing of piano keyboards. For example, it would require, instead of 7 forms or dies for the 7 different types of keys, 88 forms or dies because the back ends of the keys or key fingers are all different. This condition has made it prohibitive to form or cast the keys of a plastic material, such as Celulloid or the like, since the numerous dies would be too costly.

The object of this invention is to devise an all metal key and key bed which may be die cast from zinc or metal alloy, the surface of which may be finished to resemble the usual black and white ivory or Celulloid finish by coating the keys with baked enamel or the like, and wherein the keys throughout the entire keyboard may be cast from 7 dies for all models of instruments. This is accomplished by forming the key fingers integrally with the key, but of such construction that it may be readily bent to conform to its position with respect to the spacing of the particular piano action, scale or string division thereof, and varied in length in accordance therewith.

Other features of the invention will be made apparent from the following description and the attached drawings.

The full nature of the invention will be understood from the accompanying drawings and the following description and claims.

Fig. 1 is a top plan view showing a portion of the keyboard with a pair of natural keys and a sharp key, with their key fingers. Fig. 2 is the same as Fig. 1, showing a side elevation. Fig. 3 is the same as Fig. 1, showing a front elevation thereof. Fig. 4 is a section taken on the line 4—4 of Fig. 2. Fig. 5 is a plan view of the key bed with the keys removed. Fig. 6 is a front elevation of the front rail octave unit. Fig. 7 is an end view thereof. Fig. 8 is a section taken on the line 8—8 of Fig. 6. Fig. 9 is a front elevation showing an octave unit of the balance rail. Fig. 10 is an end elevation thereof. Fig. 11 is a section taken on the line 11—11 of Fig. 9. Fig. 12 shows a side elevation of a modified form of key and front guide rail. Fig. 13 is a section taken on the line 13—13 of Fig. 12.

In the drawings there is shown a section of a keyboard which is particularly applicable to a piano, but which, with modifications, may be equally applicable to a piano accordion, organ or harpsichord keyboard. Said keyboard comprises a key bed 10 having screwed thereto a cast metal front guide rail 11 with integrally formed upward guide pins 12 for the natural keys and pins 13 for the sharp keys. Spaced therefrom and extending parallel thereto there is a cast metal balance rail 14 which is screwed to the key bed and having integrally formed therewith the upstanding and slightly angularly positioned balance pins 15 for the natural keys and 16 for the sharp keys. The upper surface of each of said rails is provided with a felt stop strip 17 of the usual type, a similar strip 18 being provided along the back portion of the key bed.

As shown in Figs. 5 to 11, inclusive, said rails are cast in octave units, as indicated at 11a and 14a, with fractional units at each end thereof, as indicated at 11b, 11c and 14b, 14c. Each of the octave units 11a are identical and may be produced from the same die or mold. The same is true of each of the units 14a, as well as the units 11b, 11c, 14b and 14c. Cast metal octave units may then be assembled and secured to the key bed to form their respective front and balance rails, as shown in Fig. 5.

The natural key 20 comprises a unitary body structure die cast or molded from metal and is suitably finished with a baked enamel or the like to simulate, both as to appearance, form and size, the conventional key usually made of wood with an ivory or Celulloid facing. Near the front end of said keys, which are hollowed so as to be open at their bottom, as shown in Fig. 4, a pair of downwardly extending parallel spaced and vertical fins 21 are formed integral with the top surface. Said fins are provided on their inner surfaces with felt bushings 22, the fins with their bushings being so spaced as to embrace the guide pin 12 so as to be guided in the vertical movement of the key.

Similarly, the sharp keys 23 are cast with suitable fins 24 having felt bushings 25 to embrace and be guided by the sharp guide pins 13. Cast integrally with the keys and extending rearwardly therefrom there are key fingers 26 for
the natural keys 20 and 27 for the sharp keys 23. Said key fingers are of substantial depth, to the extent of the natural keys, to lend rigidity there-
to in a vertical direction, but are narrow as to width to permit them to be slightly bent for ac-
commodation to variations in the spacing and division of the various piano actions. Near the
keys and over the balance rail 14 the key fingers are cast with an enlarged loop portion indicated
at 28 in the key fingers 26, and at 29 in the key fingers 27. The inner surfaces of the loops are
tapered, as shown in dotted lines in Fig. 2, indi-
cated at 31. The loops 28 and 29 are adapted to
embrace the balance rail pins 15 and 16, respec-
tively.

Beyond the loop portions and at the rear of
the key fingers they are formed with bifurcated
fork portions indicated at 31, into which a wooden
block 23 may be adjusted and rigidly locked,
said block being adapted to receive and support
for adjustment the usual capstan screw 33.

From the foregoing, it will be observed that
the key bed may be formed by assembling a series
of small castings made from three dies and which include the guide pins. The same is true of
the balance rail and the balance pins. Similarly,
all the keys may be cast from 7 dies, in-
cluding both the naturals and the sharps, rep-
resenting each key in the octave. The keys
may thereupon be readily assembled and mounted
upon the key bed by applying a slight bend
to their respective key fingers for aligning said
fingers with the particular piano action to which
they are applied.

In the modified form shown in Figs. 12 and
13, the key 126 is formed with a central guide
fin 121 instead of the spaced fins 21 of Fig. 4.
Correspondingly, the front rail 114 is cast with a
pair of spaced guide pins 112 provided with
felt bushings 122 on their inner faces between
which the single fin 121 may be guided.

The invention claimed is:
1. A cast metal piano key formed with a top
plate and end wall, a rearwardly extending finger
formed integrally therewith, said finger being
of substantially the depth of the key to provide
rigidity in its vertical plane and of reduced width
to permit bending in its horizontal plane, means
provided intermediate the ends of said finger
for pivotally locating said key, spaced arms
formed on the free end of said finger, and a
wooden block secured between said arms for sup-
porting a capstan screw therein.

2. A piano key comprising a unitary body
structure of substantially rigid die cast mate-
rnal capable of being deformed and including a
finger engaging portion and a rear operating
portion, said finger engaging portion of con-
ventional size and shape and said rear operat-
ing portion of reduced lateral dimension but of
substantial depth, whereby said operating por-
tion will possess rigidity in a vertical direction
but is deformable in a lateral direction, and a
capstan-bearing portion on said rear operating
portion.

3. A piano key comprising a unitary body
structure of substantially rigid die cast material
capable of being deformed and including a fin-
ger engaging portion and a rear operating por-
tion, said finger engaging portion of conven-
tional size and shape and said rear operating
portion of reduced lateral dimension but of sub-
stantial depth, whereby said operating portion
will possess rigidity in a vertical direction but is
defformable in a lateral direction, a capstan-
bearing portion on said rear operating portion,
and a loop engaging portion inwardly from the
ends of said rear operating portion.

4. A piano key comprising a unitary body
structure of substantially rigid die cast material
capable of being deformed and including a fin-
ger engaging portion and a rear operating por-
tion, said finger engaging portion of conven-
tional size and shape and said rear operating
portion of reduced lateral dimension but of sub-
stantial depth, whereby said operating portion
will possess rigidity in a vertical direction BUT IS
deformable in a lateral direction, pliable fins de-
pending from the finger engaging portion of
said key in spaced relation to each other and
adapted to be bent more or less into frictional
engagement with the upstanding pin of a guide
rail to govern the action of said key.

5. A piano key comprising a unitary body
structure of substantially rigid die cast mate-
rnal capable of being deformed and including
a finger engaging portion and a rear operating
portion, said finger engaging portion of con-
ventional size and shape and the said rear op-
erating portion of reduced lateral dimension but
of substantial depth, whereby said operating
portion will possess rigidity in a vertical direction
but is deformable in a lateral direction, and a
pin depending from the finger engaging portion
of said key to be frictionally engaged by the
spaced upstanding fins of a guide rail to gov-
ern the action of said keys.

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