April 29, 1958 L. E. HAYSLETT 2,832,251

ORGAN KEY

Filed July 7, 1953 3 Sheets-Sheet 1

Fig. 1.

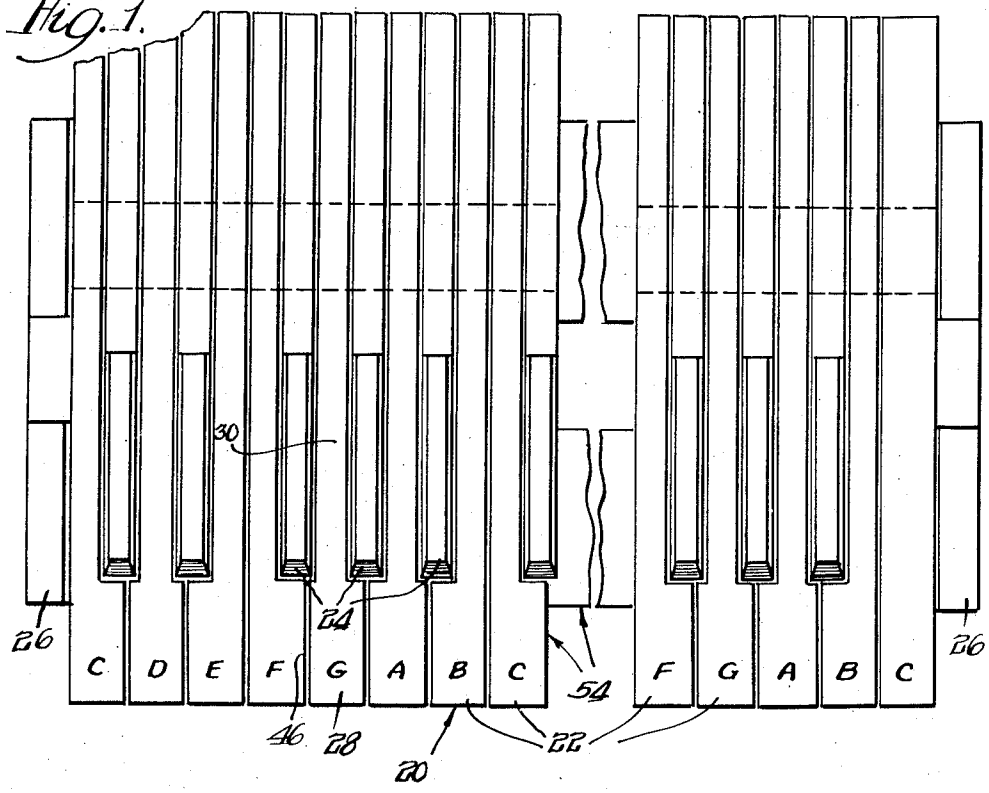
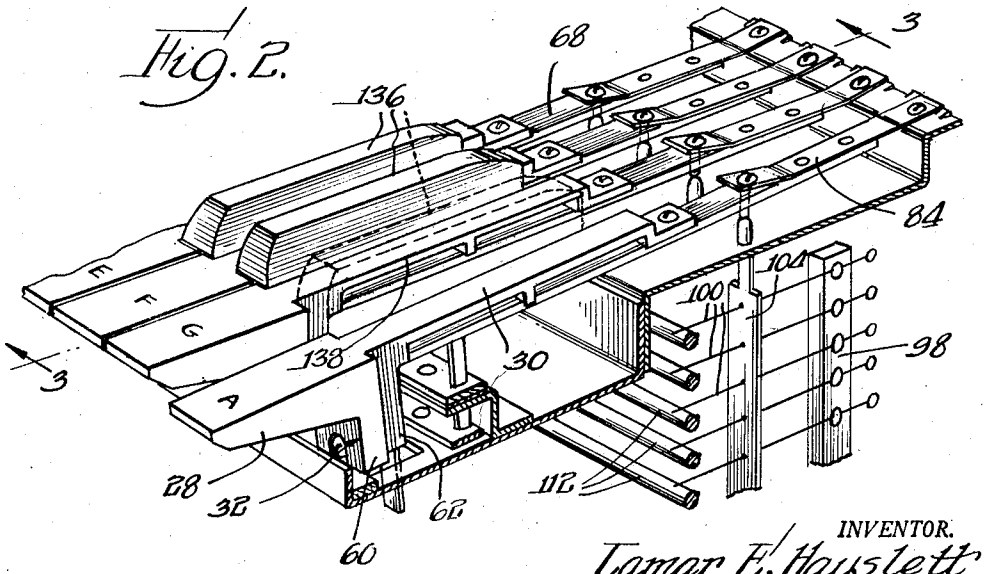


Fig. 2.



INVENTOR.

Taman E. Hayslett

BY

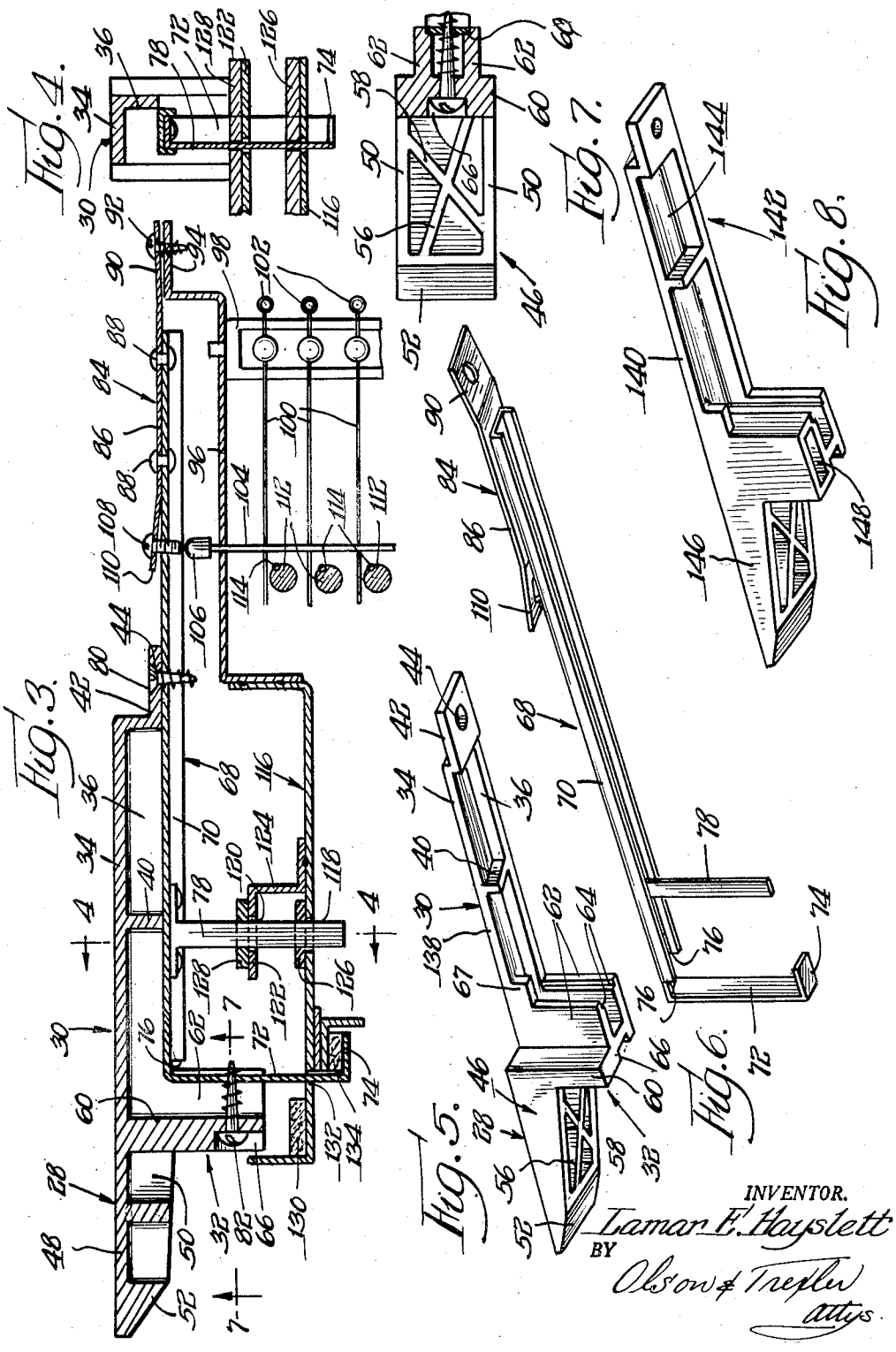
Olson & Trexler

attys.

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ORGAN KEY

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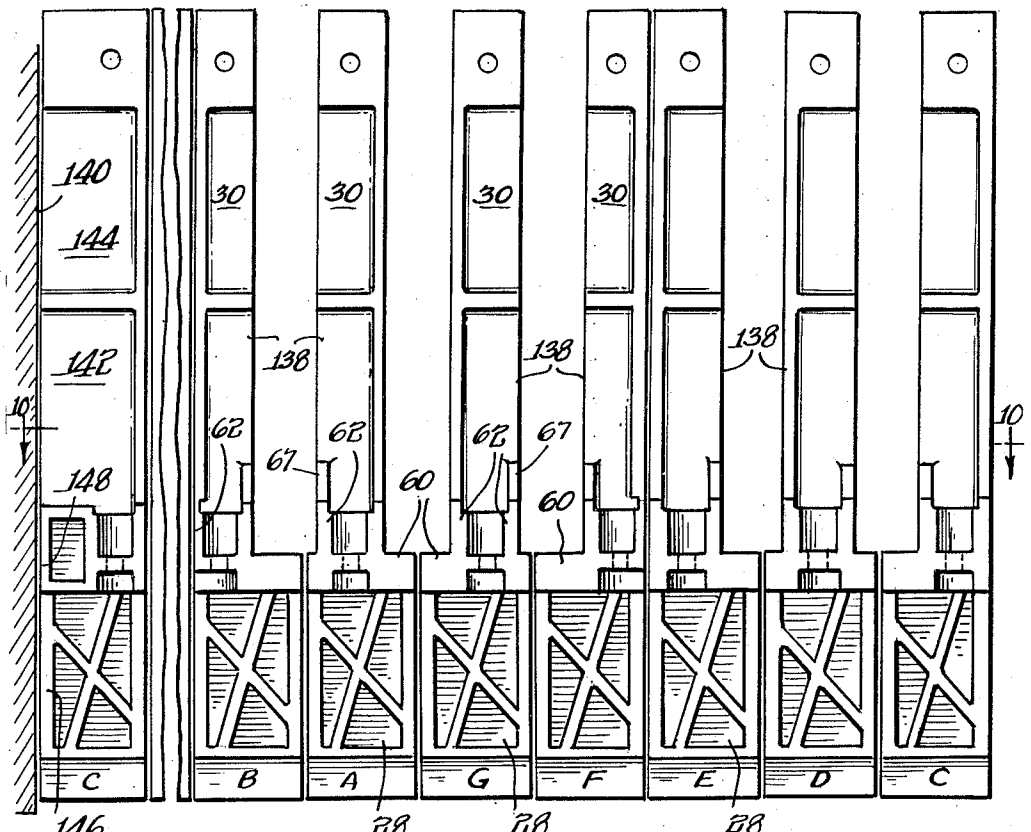
INVENTOR.
Lamar E. Hayslett
BY
Olson & Trexler
attys.

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ORGAN KEY

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Fig. 9.



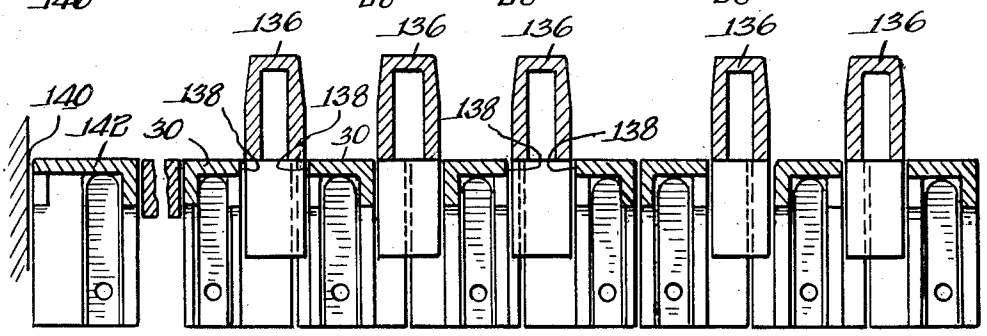


Fig. 10.

INVENTOR.
Lamar E. Hayslett
BY
Olson & Trexler
attys.

United States Patent Office 2,832,251 Patented Apr. 29, 1958

2,832,251

ORGAN KEY

Lamar E. Hayslett, Shelbyville, Tenn., assignor to The Rudolph Wurlitzer Company, North Tonawanda, N. Y., a corporation of Ohio

Application July 7, 1953, Serial No. 366,483

11 Claims. (Cl. 84—433)

This invention is concerned with a molded key of the organ or piano type.

It has been conventional practice for a great many years to make organ and piano keys of wood, the finger contact or playing surfaces being covered with ivory, plastic or other material, to effect a smooth and attractive finish. This presents a satisfactory appearance with all of the keys in rest poistion, but when any key is in playing or depressed poistion the unfinished side surface of the adjacent keys are visible.

Wooden keys have further disadvantages. They are heavy, and consequently the inertia is high. Consesequently, there must be either a slow return action, or stiff return springs must be used which makes depression of the keys difficult. Furthermore, wooden keys covered with ivory or plastic cannot conveniently be held to close tolerances, and considerable initial adjustment is necessary after assembly. Wooden keys also are susceptible to warping and to splitting and cracking when exposed to dampness.

It is obvious that a key constructed entirely of plastic could be made to have a uniformly finely finished and attractive appearance. However, merely making a key of plastic would not solve the problem of high inertia and would present additional difficulties. Specifically, molded articles made from plastic of reasonable cost tend to shrink and ultimately to split and crack if there is any substantial concentrated mass of plastic.

It is an object of this invention to provide a practical plastic key of the organ or piano type.

Some other objects of this invention are to provide a molded plastic organ or piano key of a particular shape which saves material; has less weight and consequent low inertia, yet requisite strength; which can be properly molded; which is easily handled in assembly; and wherein the various keys of an octave take several different constructions.

Another object of this invention is to provide an overhanging portion of an organ key making the key more readily accessible, wherein the overhanging portion presents a solid appearance.

In order to obtain the above objects, this invention contemplates molding the keys in a skeleton construction with the shanks thereof having a substantially L-shaped cross section. Advantage is taken of adjacent black keys for hiding the open sides of the shanks.

Other and further objects and advantages as well as the principles of the invention will be understood from the following description when taken in connection with the accompanying drawings, wherein:

Fig. 1 is a top view of an electronic organ keyboard constructed in accordance with the principles of the invention;

Fig. 2 is a perspective view showing several of the keys and showing the manner in which an open side of a key shank is hidden by the adjacent black key;

Fig. 3 is an enlarged longitudinal sectional view through one of the keys as taken along the line 3—3 of Fig. 2;

Fig. 4 is a cross sectional view through the key taken along the line 4—4 of Fig. 3;

Fig. 5 is a perspective view of one of the keys taken from beneath the key;

Fig. 6 is a perspective view of the associated key bar taken from beneath the key bar;

Fig. 7 is a horizontal lower view of a part of the key and partly in section as taken along the line 7—7 of Fig. 3;

Fig. 8 is a perspective view similar to Fig. 5, but showing a different key;

Fig. 9 is a bottom view of a portion of the keyboard; and

Fig. 10 is a cross sectional view through the keyboard as taken along the line 10—10 of Fig. 9.

Referring now in greater particularity to the figures wherein similar numerals are utilized to identify similar parts throughout, a keyboard 20 of an organ or the like is shown from above in Fig. 1. The keyboard 20 comprises a plurality of white keys 22 for playing the whole notes, and a plurality of black keys 24 for playing the sharps and flats, all as is conventional. Suitable parts 26 of the organ cabinet are arranged at opposite ends of the keybord. Most of the white keys have black keys between them, although as is well known in the art and as may be seen in Fig. 1 there are no black keys between the E and F keys and between the B and C keys. Additionally, there is no black key above the high C key at the extreme right end of the keyboard.

A typical key and its mounting are shown in Fig. 3. This key, specifically the F key, comprises an integral molded construction having a body portion 28, a shank 30, and a depending skirt or apron 32. As may be seen in Fig. 3 and also in Figs. 4 and 5, the shank 30 has an L-shaped cross section presenting an upper finger contact or playing flange 34, and a vertical flange 36. An intermediate transverse rib 40 affords stiffening of the shank. The inner end of the shank 30 is downwardly offset as at 42 and is provided with a suitable screw hole 44.

In the specific case of the G key illustrated, the left side of the body portion 28 forms a straight line with the left side of the shank 30, the flange 36 lying flush along this side. The right side of the body portion 46 is offset outwardly as may be seen to provide part of a recess accommodating the adjacent A_b black key. The body portion 28 has an upper playing or finger contact web 48 forming a continuation of the flange 34 of the shank. This web is provided along its longitudinal edges with depending stiffening flanges 50. The leftmost of the stiffening flanges forms a continuation of the shank flange 36. The body portion 28 includes a solid end piece 52 best seen in Figs. 3, 5 and 7. The end piece 52 and a part of the body portion 28 extend outwardly from the underlying portion of the organ cabinet as may be seen at 54 in Fig. 1. The solid construction of the end piece 52 makes the entire body appear to be solid when viewed from the front of the organ. Strength and rigidity are imparted to the body portion by substantially diagonal cross flanges 56 and 58. As will be noted in Fig. 7, the flanges or walls 56 and 58 do not run directly between the corners formed where the side walls 50 join the ends of the body portion, but are offset somewhat from these corners. This does away with the relatively large masses of plastic that would be present if the flanges or walls 56 and 58 ran directly into the corners. Such masses would be more likely to split and crack than are the relatively thin walls provided.

The depending portion or apron 32 previously mentioned comprises a transversely extending wall 60 from

which a pair of vertical walls 62 extend forwardly. These walls are spaced apart and are provided at their forwardly extending edges with inner shoulders 64. A screw head recess 66 is provided in the outer face of the wall 60 and is aligned with the space between the walls 62. A corner wall 67 parallel to the shank flange 36 braces the opposite edge of the top flange 34 of the shank.

Each key is mounted on a metal key bar 68 best seen in Figs. 3 and 6. Each key bar 68 comprises a channel-shaped body portion 70 having at one end thereof a depending arm 72 with a forwardly extending finger 74 at the lower end thereof. The side flanges of the body 70 are terminated short of the arm 72 as at 76. A T-shaped guide 78 is secured by means such as rivets within the channel-shaped body 70 and extending outwardly therefrom parallel to the arm 72.

The key bar 68 and key are held together by screws 80 and 82, the former passing through the opening 44 in the offset wall or flange 42, and the latter having its head fitting in the recess 66 with its shank extending between the walls 62 of the depending skirt or apron 32. The arm 72 fits against the internal shoulders 64, but does not form a snug fit therewith at the angle between the body portion 70 and arm 72. Accordingly, when the key bar is elongated relative to the key with changes in temperature, this corner merely fits more snugly against the shoulders 64. Conversely, when the key bar shortens relative to the key this corner merely pulls outwardly a slight bit from the seat formed by the shoulders 68 without damage either to the key or key bar. This disposition of the attaching screws 80 and 82 in different planes thus will be seen to be of considerable importance.

A leaf spring attaching member 84 is secured to the key bar at the opposite or inner end thereof. Each spring member 84 comprises a flat portion 86 secured to the key bar by any suitable means such as rivets 88.

The extending end of the spring member 84 is upwardly deflected at 90 and is apertured for receipt of a screw or the like 92 which attaches the spring member to an upwardly offset horizontal flange 94 of a mounting plate 96. The mounting plate extends substantially from end to end of a keyboard and may be of intgeral construction or otherwise.

An insulating support 98 is secured beneath the plate 96 and carries a vertically spaced array of substantially horizontal flexible wires 100 having looped inner ends or eyelets 102 for attachment to lead wires. The wires 100 are adapted to be moved up and down for vertical movement of their free outer ends. To effect movement of the wires 100 an insulating strip 104 having a suitable number of spaced holes is placed over the wires. A rubber cap or bumper 106 is placed on the upper end of the strip 104 which is vertically reciprocable through a slot in the mounting plate 96. A screw 108 is threaded through the key bar directly above the rubber cap 106 for abutment against said cap to force the wires 100 down. The screw 108 passes through an upwardly deflected end 110 on the spring member 84 before being threaded through the key bar. This spring end portion 110 pushes up against the clamping face of the screw 108 to maintain tension on the threads thereof and thereby to lock the screw in adjusted position.

A plurality of insulating rods 112 is arranged transversely of the wires 100. As will be understood, there is a vertical set of the wires 100 for each key of the keyboards, and each rod 112 is arranged to be contacted by corresponding wires of each set. The rods 112 are rotatably mounted, and each carries a longitudinally extending conductive insert or wire 114. The rods 112 normally are positioned so that the wires 114 cannot be engaged by the wires 100. However, actuation of suitable stop controls individually rotates the rods 112 selectively to position the wires 114 for engagement by the wires 100 when the latter are deflected downwardly by the insulating strip 104.

A relatively wide and shallow guide tray 116 is secured to the mounting plate 96 by securing vertical flanges of the mounting plate and the guide tray together. The guide tray 116 is provided with a series of apertures 118 receiving the stems of the T-shaped guide members 78. Aligned slots 120 are provided in the horizontal flange 122 of a substantially Z-shaped bracket 124. The slot 118 and 120 are large enough to avoid engagement with the guide member 78, and strips 126 and 128 with slots small enough to engage the guide member 78 fairly snugly and to keep the guide member out of contact with the flange 122 and tray 116 are suitably affixed to the tray 116 and to the flange 122, respectively. The strips 126 and 128 preferably are formed of polyethylene, and the engagement of a polyethylene with the metal of the guide member 78 affords a smooth and pleasant key action. Guiding of the guide member 78 by the two spaced strips 126 and 128 insures movement of each key without twisting or lateral displacement thereof.

A strip of felt 130 is affixed along the guide tray 116 adjacent the rear vertical flange thereof for engagement by the skirt or apron 32 to limit downward movement of the key. The arm 72 of the key bar extends through a slot 132 in the bottom of the guide tray, and a felt strip 134 is suitably secured beneath the central portion of the tray for engagement by the key bar finger 74 to limit upward movement of the key. The normal upward deflection of the end section 90 of the spring member 84 holds the finger 74 against the upstop 134, while flexing of the spring member 84 allows the key to be depressed by an organist's finger until the skirt or apron thereon engages the downstop. The resilience of the spring 84 returns the key to its normal position when it is released.

As has been noted heretofore, the shank 30 of each key is L-shaped in cross section. The open side or free edge of each key is never exposed to the eye, and each key therefore presents a finished appearance at all times. As may be seen in Fig. 10, a black key 136 is used to shield each free edge 138 except for the free edge 140 of the high C key 142 which is hidden by the organ cabinet part 26. The manner in which the black keys hide the free edges 138 is illustrated in Fig. 2 wherein the A key is shown in depressed position. This would expose the free edge of the G key except for the A_b black key which is shown in dash lines to illustrate how the free edge of the G key otherwise would be exposed. The parts of the white or natural keys extending inwardly beyond the rear edges of the black keys 136 are housed within the organ cabinet and are never seen by the eye.

In order that the black keys may hide the free edges of all of the white keys, the L-shaped cross sections of the shanks 30 are reversed as may be seen in Figs. 9 and 10. Furthermore, the shanks and their corresponding forwardly extending walls 62 and cooperating recesses 66 are all positioned differently relative to the associated key bodies 28 so that the white keys and black keys may conform to the conventional sizes and spacing while the actuating connections remain uniformly spaced. The B, D, E and G keys at first glance appear to be similar as do the A, C and F keys. Closer inspection reveals that the shank and associated wall and recess of the A key are moved in a slight distance from the side of the key body 28 corresponding to the free edge 138 of the shank, while the F key has its free edge moved over far enough that the vertical flange of the key lies along the side wall of the body portion 28. Similarly, the B and E keys differ slightly in that the outermost of the forwardly projecting walls 62 of the B key is thinner than the corresponding wall of the E key, the shank of the B key is narrower than that of the E key, and the recess 66 of the B key, being closer to the edge of the key, opens outwardly of the key while that of the E key does not.

The D and G keys obviously differ from the B and E keys in having their shanks shifted over a bit so that the flange sides thereof are displaced inwardly from the corresponding body side wall. The shank of the G key is displaced in this direction somewhat more than that of the D key.

The high C key **142** has a shank **144** which is of the same width as the body portion **146** since there is no adjacent black key. Additional rigidity is imparted to the wide horizontal flange of the shank **144** without adding weight by a tubular section **148** of rectangular cross section formed in place of the corner of the vertical wall **60** found in the skirts or aprons of the remainder of the keys.

Thus it will be seen that every white key in an octave differs from every other key, particularly in the position of the free edge of the key, and the position of the forwardly extending walls **62**, and in the position of the screw head recess **66**.

It will be seen that the organ or piano type key disclosed herein is a practical plastic key which has no large masses to split, crack, or otherwise deform. The key is of molded plastic which gives a finished appearance. The particular shape of the key saves material, and leads to lower weight and consequent lower inertia without sacrificing strength and without sacrificing the finished appearance of the key. The key can be molded readily, and the L-shaped cross section of each key shank simplifies manual handling of a key during assembly.

The overhanging portion of each key presents the keys in a most readily available position in the keyboard, while the particular configuration of the key body and overhanging portion provides substantial strength, low inertia, and a finished appearance.

Various changes in structure can be made in the illustrative example described and shown herein and form a part of the invention in so far as they fall within the spirit and scope of the appended claims.

The invention is hereby claimed as follows:

1. A one piece molded key of the organ or piano type comprising a body portion having downwardly opening recess means therein and an upper playing surface, a shank of L-shaped cross section having horizontal and vertical flanges and extending longitudinally from said body portion, said shank having transverse bracing means, said transverse bracing means extending substantially the full width of the horizontal flange and the depth of the vertical flange, and means on said key for attachment to a musical instrument of the organ or piano type, said body portion, shank and attachment means being integrally molded of plastic.

2. A one piece molded key of the organ or piano type as set forth in claim 1, wherein the body portion has a plurality of downwardly opening recesses.

3. A key of the organ or piano type comprising a body portion having an upper playing surface and a plurality of downwardly opening recesses defined by side and end walls and a pair of intersecting, substantially diagonally arranged walls, said diagonally arranged walls having their ends spaced from the intersections of the side and end walls, a shank of L-shaped cross section extending longitudinally from said body portion, and means on said key for attachment to a musical instrument of the organ or piano type, said body portion, shank, and attachment means being integrally molded of plastic.

4. A one piece molded key of the organ or piano type comprising a body portion, a shank of L-shaped cross section extending longitudinally from said body portion, said shank having transverse brace means, a depending portion adjacent the junction of said shank and said body portion adapted for engagement with stop means to limit depression of said key, and means on said depending portion and on said shank for attachment to a musical instrument of the organ or piano type, including a pair of integral walls extending forwardly from said depending portion for engagement with a supporting member, said body portion, depending portion, shank and attachment means being integrally molded of plastic.

5. A one piece molded key of the organ or piano type as set forth in claim 4, wherein the forwardly extending walls comprise a pair of walls provided at their front edges with internal, confronting shoulders forming a seat for a support member.

6. A one piece molded key of the organ or piano type as set forth in claim 5, wherein the depending portion is provided with a screw head receiving recess aligned with the space between the forwardly extending walls and disposed on the opposite side of said depending portion from said walls, said depending portion including a screw shank receiving hole between said recess and the space between said walls.

7. A one piece molded key of the organ or piano type comprising a body portion, a shank of skeletal construction extending longitudinally from said body portion, a depending portion on said key adjacent the junction between said body portion and said shank, a pair of forwardly extending walls on said depending portion having internal, confronting shoulders at their front edges adapted to receive a supporting member in only one predetermined position, and means on said depending portion and on said shank adapted for attachment to a supporting member for mounting said key in a musical instrument of the organ or piano type, all of the foregoing parts of said key being integrally molded of plastic.

8. A one piece molded key of the organ or piano type comprising a body portion having downwardly opening recess means therein and an upper playing surface, a shank of L-shaped cross section having a horizontal flange and extending longitudinally from said body portion, a downwardly directed wall at the end of said shank opposite said body portion, a horizontally extending flange on the lower edge of said downwardly extending wall displaced vertically from horizontal shank flange, an intermediate transverse stiffening rib on said shank, and means on said key for attaching said key to a supporting member with said horizontally extending flange and said transverse rib bearing against said supporting member and said horizontal shank flange spaced above the said member.

9. An octave of one piece molded keys of the organ or piano type, each key comprising a body portion having downwardly opening recess means therein and an upper playing surface, a shank of L-shaped cross section extending longitudinally from said body portion and having a free longitudinal edge, a depending portion adjacent the junction between said shank and said body portion, and a pair of spaced apart walls extending forwardly from said depending portion and having internal, confronting shoulders adapted for cooperation with a support member in only one position, said depending portion having a screw head receiving recess aligned with the space between said pair of forwardly extending walls and on the opposite side of the depending portion from said walls, the free edge, forwardly extending walls, and screw head recess of each key being positioned relative to the body of that key differently from every other key in the octave.

10. A key of the organ or piano type comprising a body portion having an upper playing surface and a plurality of downwardly opening recesses defined by side and end walls arranged generally transversely of one another and by a pair of intersecting, substantially diagonally arranged walls, a shank extending longitudinally from said body portion, and means on said key for attachment to a musical instrument of the organ or piano type, said body portion and shank being integrally molded of plastic.

11. A one-piece molded key of the organ or piano type as set forth in claim 10 wherein the ends of the substantially diagonally arranged walls are spaced from the intersections of the side and end walls.

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