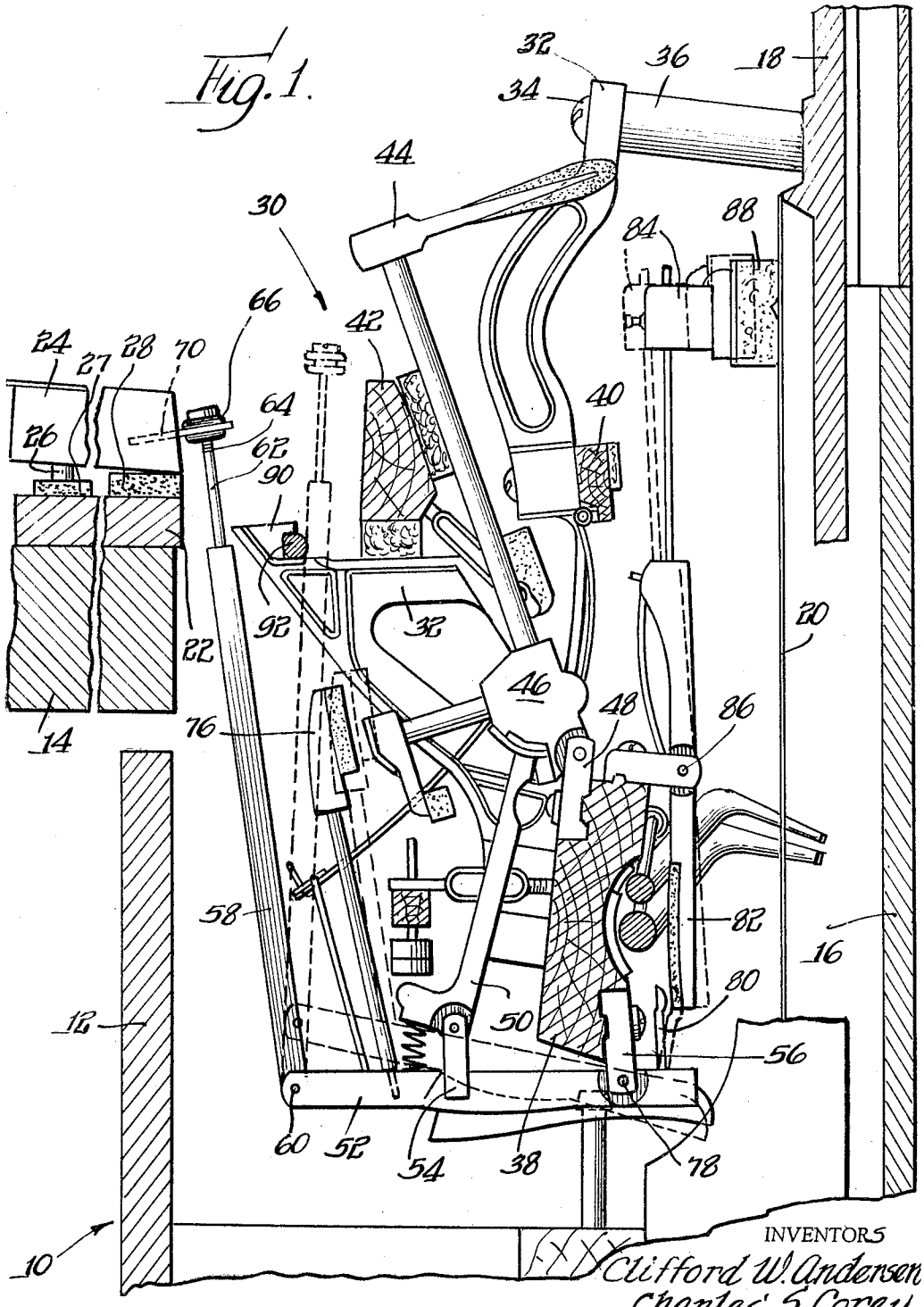
Oct. 25, 1966 C. W. ANDERSEN ET AL 3,280,686

PIANO ACTION

Filed July 20, 1959 2 Sheets-Sheet 1

Fig. 1.



INVENTORS
Clifford W. Andersen
Charles S. Corey
By: Olson & Trevithick Attys

Oct. 25, 1966 C. W. ANDERSEN ET AL 3,280,686

PIANO ACTION

Filed July 20, 1959 2 Sheets-Sheet 2

Fig. 2.

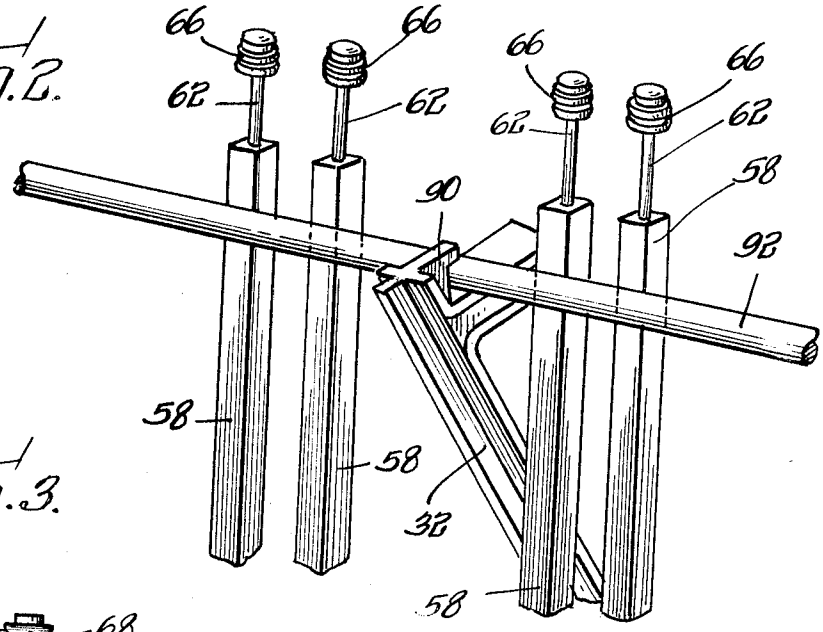


Fig. 3.

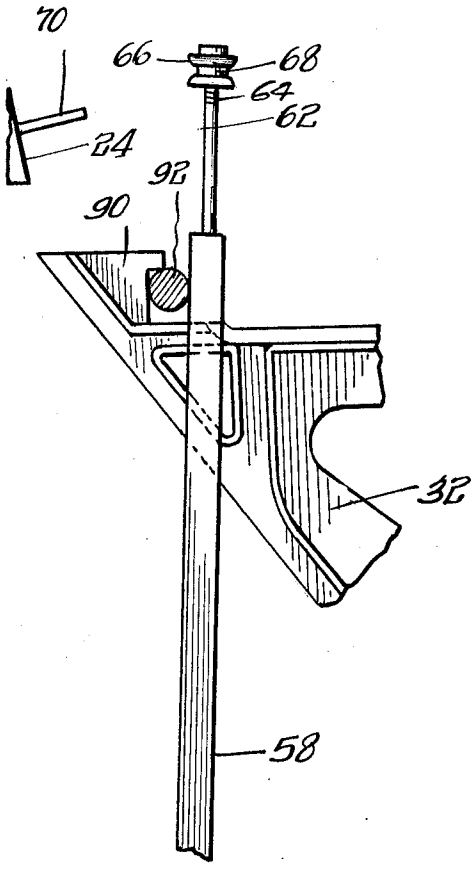


Fig. 4

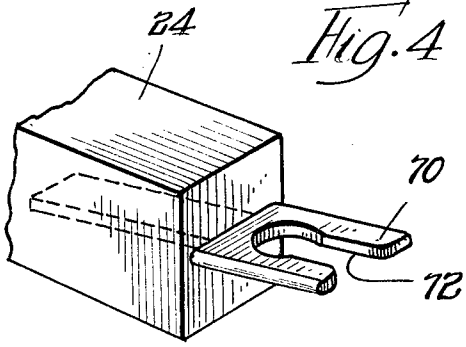
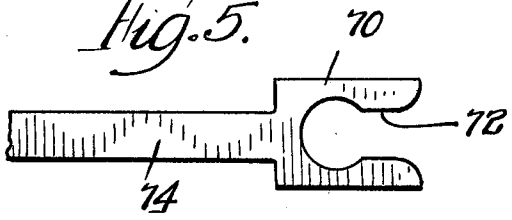


Fig. 5.



INVENTORS.
Clifford W. Andersen
Charles S. Corey
By: Olson & Trexler Attys.

United States Patent Office

3,280,686

Patented Oct. 25, 1966

3,280,686

PIANO ACTION

Clifford W. Andersen and Charles S. Corey, De Kalb, Ill., assignors to The Wurlitzer Company, Chicago, Ill., a corporation of Ohio

Filed July 20, 1959, Ser. No. 828,176

12 Claims. (Cl. 84—240)

This invention relates generally to piano actions and more particularly to piano actions of the inverted-sticker-type.

A general problem with piano actions of the inverted-sticker-type is the proclivity of the stickers to fall in all directions when not connected to the piano keys. Accordingly, removal and reinstallation of such an action becomes quite difficult. It is therefore, an important object of the present invention to provide an improved piano action of the inverted-sticker-type in which the stickers are readily restrained for installation or removal of the action.

An additional problem encountered in installing or removing a piano action is the difficulty of transporting the action past the strings without inadvertently damaging the damper felts. Hence, another object of the invention is to provide a piano action in which the dampers are retracted when the stickers are restrained.

Ordinarily, in piano actions of the inverted-sticker-type, the sticker is driven by an auxiliary whip arrangement which is operated, in turn, by the piano key. Since touch adjustments must be made by properly shimming this auxiliary whip arrangement, altering the touch of such an action becomes a complicated undertaking. Furthermore, complete elimination of the auxiliary whip arrangement would simplify construction of the action and reduce its cost. Accordingly, still another object of the invention is to provide a piano action in which the sticker is directly actuated by the key and in which touch settings are quickly and easily made.

And still another object of the invention is to provide a piano action of the inverted-sticker-type in which the sticker is directly actuated by the piano key and in which lost motion is prevented from occurring between the jack and the butt.

Additional objects and features of the invention pertain to the particular structure and arrangements whereby the above objects are attained.

The structure in accordance with the invention includes a keyfork driven into the end of a piano key and a rubber grommet and a screw by which a wooden sticker can be secured directly to the keyfork.

The invention, both to its structure and mode of operation, will be better understood by reference to the following disclosure and drawings forming a part thereof, wherein:

FIG. 1 is a side elevational sectional view showing a piano action in accordance with the invention;

FIG. 2 is a perspective fragmentary view showing a number of stickers restrained by a dowel rod constrained in an action bracket;

FIG. 3 is a fragmentary side elevational view of the showing of FIG. 2;

FIG. 4 is a fragmentary perspective view of a keyfork secured in the end of a piano key; and

FIG. 5 is a plan view of the keyfork shown in FIG. 4.

Referring now in detail to the drawings, specifically to FIG. 1, a piano structure **10** is shown to include a front panel **12**, a keybed **14** and a frame **16**. In conventional manner, a backplate **18** is secured to the frame **16**, piano strings **20** being suitably mounted to the backplate **18**. Similarly, a balance rail (not shown) is mounted on panel **22** fastened to the keybed **14** in order to support a plurality of piano keys **24**. While each key **24** pivots about the balance rail on a balance pin, a guide pin **26** guides the outer end of the key and is surrounded by a felt washer **27** serving as a downstop. A keybed felt **28** is appropriately secured to the end of panel **22** in order to support key **24** in rest position.

Depression of a key **24** is arranged to cause striking of the corresponding string **20** through a piano action **30**, the piano action **30** being mounted in the piano by means of a number of action brackets **32**. Each of the brackets **32** is fastened to the backplate **18** by a screw **34** and a tubular, action spacer **36**. A mainrail **38**, a spring rail **40** and a hammer rail **42** extend through the piano to be affixed to each of the action brackets **32** for purposes of supporting the individual action members.

Piano action **30** is of the inverted-sticker-type; and as is well known, each hammer **44** of such an action includes a butt **46**, butt **46** pivotally mounted to the mainrail **38** by means of a butt flange **48**. Hammer **44** is urged to strike a string **20** by means of a jack **50** which is pivotally mounted to a whip **52** by means of a jack flange **54**. Whip **52** is, in turn, mounted pivotally to mainrail **38** by a whip flange **56**, an abstract or sticker **58** being pivotally mounted to whip **52** by a pin **60** in order to actuate jack **50** when key **24** is depressed.

A screw **62** threadedly engages the free end of sticker **58**, sticker **58** being preferably fabricated from wood or other rigid material. Accordingly, screw **62** can enter a hole bored axially in sticker **58** or can be screwed directly into the sticker. In accordance with a feature of the invention, screw **62** is provided with a knurled portion **64** which is adapted to retain above it a resilient grommet **66**. As is best shown in FIG. 3, grommet **66** incorporates a circumferential slot **68**. Grommet **66** is preferably molded from rubber although it can also be fashioned from felt.

A keyfork or yoke **70** is secured to the end of piano key **24**, keyfork **70** being advantageously provided with a keyhole slot **72** (FIGS. 4 and 5) adapted to receive grommet **66** at the circumferential slot **68**. Keyfork **70** can be fabricated from steel and can be plated for corrosion resistance if desired.

In a preferred embodiment of the invention, keyfork **70** is provided with a tongue **74** which can be driven directly into key **24**, preferably at an angle in order to keep from splitting the wood of which key **24** is customarily made. If desired, tongue **74** may be coated with rosin in order to achieve better attachment.

It will be realized that provision of the knurled portion **64** effectively prevents axial movement of screw **62** relative to keyfork **70** and the concomitant occurrence of lost motion between grommet **66** and the head of screw **62** and between jack **50** and butt **46**. Consequently, the undesirable noise which would otherwise be associated with this lost motion is eliminated. Knurled portion **64** also

prevents the grommet from slipping down the shank of the screw when the keyfork is dissociated therefrom.

Furthermore, it will become apparent that the sensitivity of the touch setting can be readily regulated by merely advancing or retracting screw **62** from the end of sticker **58**.

When it is desired to remove the piano action **30**, sticker **58** may be readily separated from key **24** by pushing grommet **66** from its engagement with keyfork **70**. Next, sticker **58** is pushed back until it engages backcheck **76** rigidly secured to whip **52**. Continued pushing of sticker **58** causes whip **52** to pivot about pin **78**; and as a result, spoon **80** engages the damper lever **82** urging damper **84** to pivot about pin **86**. This movement withdraws damper felt **88** from contact with string **20**.

The piano action **30** will now be rearranged as shown in dashed outline in FIG. 1. In this configuration, it should be noted, sticker **58** is disposed to the rear of a hook **90** which projects from action bracket **32**. Thus disposed, sticker **58** may be restrained in such position by means of a dowel rod **92** inserted longitudinally through action **30** between hook **90** and sticker **58**, it being understood that each bracket **32** has such a hook **90**, the dowel being positioned behind all such hooks. This arrangement is shown clearly in FIGS. 2 and 3.

As is suggested in FIG. 2, a number of stickers **58** can be restrained by the dowel rod **92**. When all of the stickers **58** have been so restrained, the screws **34** may be loosened and withdrawn from the action brackets **32** and the entire action easily withdrawn from the piano. It will be recognized that retracting the dampers **84** as hereinabove described greatly facilitates removal of the action by reducing the possibility of damage to the felts **88** as might be occasioned by their being dragged across or along the strings **20** upon removal of the action **30**.

The above procedure is easily reversed for reinstallation of the piano action.

The specific example herein shown and described is illustrative only. Various changes in structure will, no doubt, occur to those skilled in the art; and these changes are to be understood as forming a part of this invention insofar as they fall within the spirit and scope of the appended claims.

The invention is claimed as follows:

1. In a piano action, the combination comprising: a piano key; a keyfork driven into the vertical end face of said key; a grommet adapted to engage said keyfork; a screw; and a sticker secured to said keyfork by said screw and said grommet.

2. In a piano action, the combination comprising: a piano key; a keyfork driven into the vertical end face of said key at an angle; a grommet adapted to engage said keyfork; a screw knurled to retain said grommet; and a sticker secured to said keyfork by said screw and said grommet.

3. In a piano action, the combination comprising: a wooden piano key; a keyfork driven into the vertical end face of said key; a rubber grommet adapted to engage said keyfork; a screw knurled to retain said grommet; and a wooden sticker secured to said keyfork by said screw and said grommet.

4. In a piano action, the combination comprising: a piano key; a keyfork secured to said key; a grommet adapted to engage said keyfork; a screw; a sticker secured to said keyfork by said screw and said grommet; an action bracket; hook means on said action bracket adjacent said sticker opening away from said key, whereby said sticker can be restrained by a rod removably associated with and passing through said hook when said sticker is not secured to said keyfork.

5. In a piano action, the combination comprising: a piano key; a keyfork secured to said key; a grommet adapted to engage said keyfork; a screw; a sticker secured to said keyfork by said screw and said grommet; an action bracket; hook means on said action bracket adjacent said sticker opening away from said key; damper means on said action bracket; and means operably connecting said sticker and damper means whereby said sticker can be restrained by a rod removably associated with and passing through said hook when said sticker is not secured to said fork, said sticker simultaneously engaging said means operably connecting said sticker and said damper means in order to retract said damper means.

6. In a piano action, the combination comprising: a sticker having at its upper end a slender shank topped by an enlargement, said shank being knurled below said enlargement, a grommet on said shank held up in abutment with said enlargement by the knurling, a piano key, and means operatively connected to said key and engaging said grommet for raising and lowering said sticker upon manual operation of said key.

7. The combination set forth in claim **6** wherein the grommet is provided with a peripheral kerf receiving said engaging means.

8. In a piano action of the drop type, the combination of, a manually operable key lever fulcrumed intermediate its ends, an elongated endwise reciprocable link having a head thereon, a ring of resiliently yieldable material on said link and having a flange at the upper end abutting against the underside of said head, means comprising a protuberance on said link maintaining said ring in fixed longitudinal position on the link in relation to said head, and a fork rigid with and projecting from the rear end of said key and having a rearwardly opening notch with the legs thereof straddling said ring and abutting the underside of said flange, the edges of said fork legs defining a generally circular hole at the closed end of said notch and a narrower slot at the outer end thereof, and said ring being held in said hole but being compressible to permit shifting of the ring edgewise out of said notch through said slot.

9. In a drop type piano action, the combination of, a swingable key lever having a rearwardly opening fork at its end, a grommet of yieldable material having a hole therethrough and an outwardly opening peripheral groove snugly received between the legs of said fork and held thereby against edgewise displacement relative to said key lever, a pull link for transmitting the motion of said key lever including a screw having a head larger than said grommet hole and a shank inserted through said hole to bring the head into abutment with one end face of said grommet, and a continuous circumferential rib integral with the screw shank and large enough in diameter to retain the grommet but small enough to expand the grommet and slide through the hole therein during insertion of said shank through said grommet, said rib forming a positive stop abutting the opposite end face of said grommet to retain said grommet in position adjacent said head, whereby said grommet is held against sliding movement along said shank and whereby bouncing of said head away from the grommet at the end of the striking motion of said key lever is prevented.

10. In a drop type piano action, the combination of, a swingable key lever having a rearwardly opening fork at its end, a grommet of yieldable material having a hole therethrough and an outwardly opening peripheral groove snugly received between the legs of said fork and held thereby against edgewise displacement relative to said key lever, a pull link for transmitting the motion of said key lever including a screw having a head larger than said grommet hole and a shank inserted through said hole to bring the head into abutment with one end face of said grommet, and a continuous circumferential rib integral with the screw shank and small enough to slide through said hole during insertion of said shank through said grommet, said rib engaging the opposite end face of said grommet to resist movement of said grommet away

from said head, whereby said rib tends to hold said grommet against sliding movement along said shank and whereby bouncing of said head away from the grommet at the end of the striking motion of said key lever is resisted.

11. A piano action as defined in claim **10**, wherein there is an additional continuous circumferential rib integral with the screw shank disposed below said first named continuous circumferential rib and of substantially similar shape.

12. A piano action as defined in claim **8**, wherein said protuberance is disposed on said link in a position in relation to the thickness of the ring so as to maintain the ring in contact with said link head.

References Cited by the Examiner

UNITED STATES PATENTS

235,370	12/1880	McCammon	84—250
2,061,154	11/1936	Heitzmann	84—240
2,156,963	5/1939	Betz	84—240
2,260,348	10/1941	Stein	84—240
2,324,037	7/1943	Socin	84—240
2,548,890	4/1951	Knoblaugh	84—240
2,761,345	9/1956	Knight	84—250

RICHARD B. WILKINSON, *Primary Examiner.*

C. W. ROBINSON, LEYLAND M. MARTIN, LEO SMILOW, *Examiners.*

L. H. MARSHALL, *Assistant Examiner.*