Sept. 6, 1960 C. E. DRAKE 2,951,728

DUST PROOF BALL BEARING SLIDES

Filed Oct. 14, 1957 2 Sheets-Sheet 1

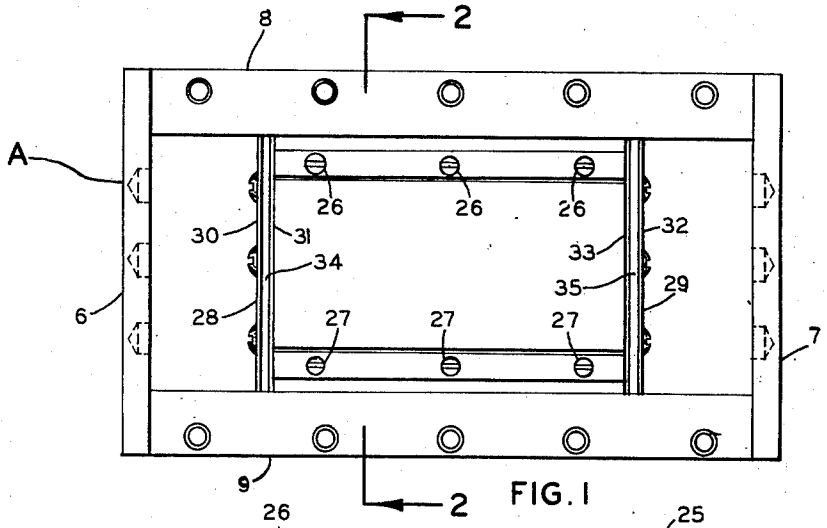


FIG. 1

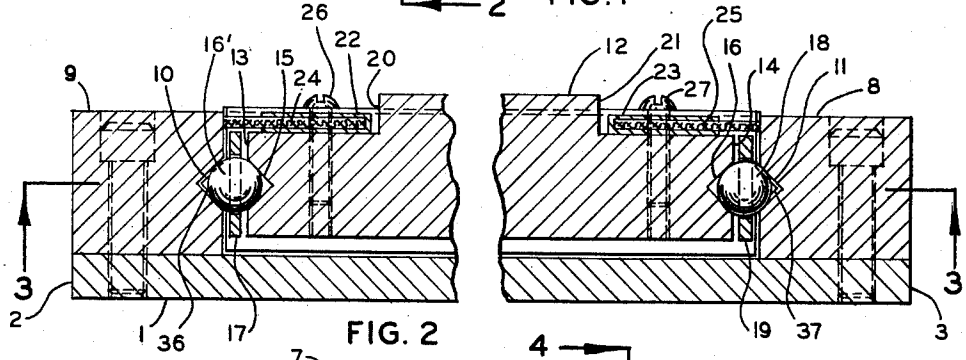


FIG. 2

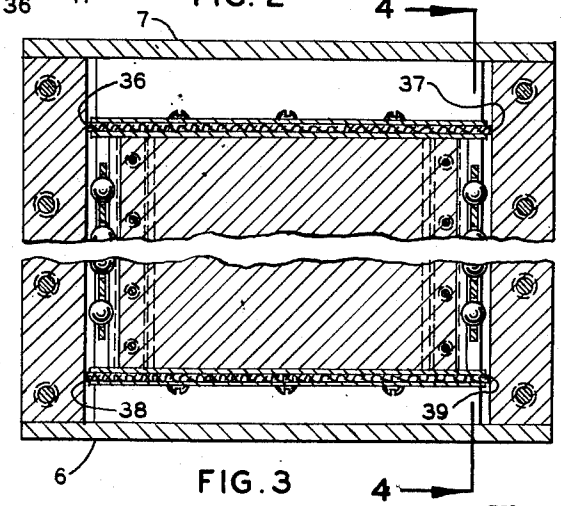


FIG. 3

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Sept. 6, 1960 C. E. DRAKE 2,951,728

DUST PROOF BALL BEARING SLIDES

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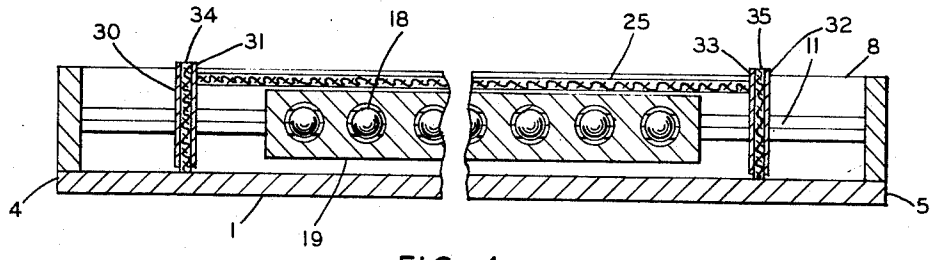


FIG. 4

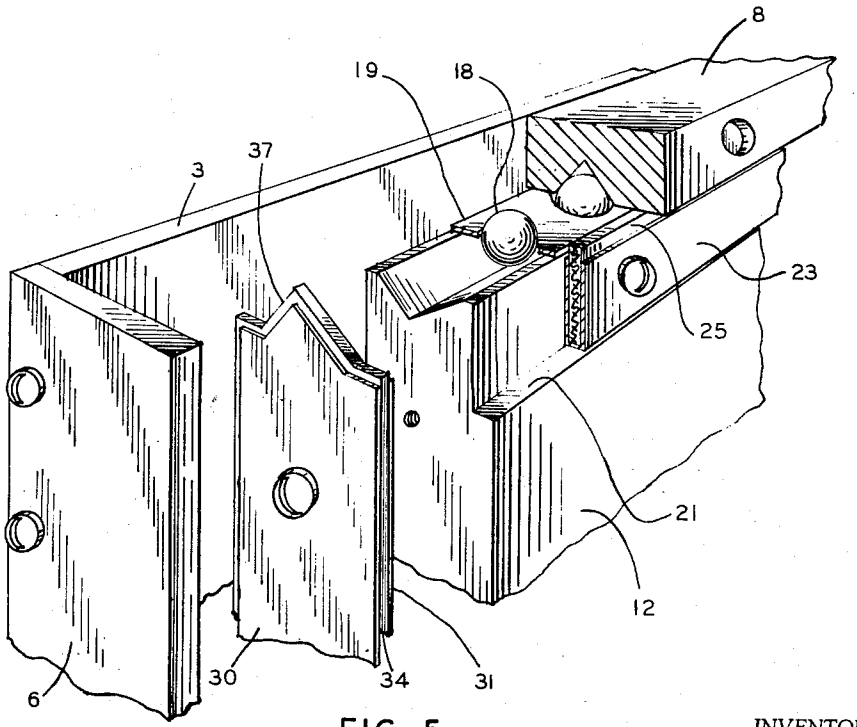


FIG. 5

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DUST PROOF BALL BEARING SLIDES

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6 Claims. (Cl. 308—3.5)

This invention relates in general to slides and, more particularly, to a dust proof ball-bearing slide.

In various types of precision cutting and grinding machines, the tool or grinding wheel is usually mounted on some type of slide so that the cutting surface of the tool or grinding wheel may be fed along predetermined paths toward and away from the work. In such slides, it is important that the bearing surfaces be machined to close dimensional tolerances or otherwise accurately constructed since large tolerances in the slides will cause inaccurate travel of the cutter which, in turn, will produce inaccurate work. Cutting or grinding is almost always employed in finishing hardened alloy steel and results in fine dust-like particles of abrasive metal being dispersed about the machine, and frequently some of the dust-like particles become lodged in the bearing surfaces of the slide. The bearing surfaces are, furthermore, usually lubricated with the result that the particles stick to and become mixed with the lubricant, and, in time, continued movement of the slide will result in rapid wear of the bearing surfaces and excessive tolerances in the slide. Furthermore, the particles will substantially increase the friction between the bearing surfaces causing erratic movement of the slide, and, in some cases, the slide may actually jam, necessitating complete disassembly thereof.

Although slide machinery may be periodically disassembled and cleaned, such operation is often uneconomically time consuming, and, furthermore, this does not materially prevent wear of the bearing surfaces between periods of cleaning.

It is, therefore, one of the objects of the present invention to provide a ball-bearing slide which substantially prevents dust and other abrasive particles from contacting the bearing surfaces therein.

It is also an object of the present invention to provide a ball-bearing slide of the type stated in which the ball-bearing surfaces are rendered relatively wear-resistant and capable of maintaining accurate tolerances during prolonged use.

It is an additional object of the present invention to provide a ball-bearing slide of the type stated which is trouble-free in operation and requires relatively little maintenance.

With the above and other objects in view, my invention resides in the novel features of form, construction, arrangement, and combination of parts presently described and pointed out in the claims.

In the accompanying drawings—

Fig. 1 is a top plan view of a dustproof ball-bearing slide constructed in accordance with and embodying the present invention;

Fig. 2 is a sectional view taken along line 2—2 of Fig. 1;

Fig. 3 is a sectional view taken along line 3—3 of Fig. 2;

Fig. 4 is a sectional view taken along line 4—4 of Fig. 3; and

Fig. 5 is a fragmentary perspective view, partly broken away and in section, of the ball-bearing slide.

Referring now in more detail and by reference characters to the drawings, which illustrate a preferred embodiment of the present invention, A designates dust proof ball-bearing slide comprising a rectangular base plate 1 having longitudinal edges 2, 3, and transverse edges 4, 5, the latter having the parallel end plate 6, 7 bolted thereto and extending at right angles to the base plate 1. Also bolted to the base plate 1 and marginally aligned with the edges 2, 3 are upstanding channels 8, 9, each of which extend between and abut end plates 6, 7, and formed in the channels 8, 9, are lengthwise extending inwardly presented V-shaped bearing races 10, 11.

Mounted for shiftable movement along channels 8, 9 is a generally rectangular slide plate 12 of somewhat shorter length than the base plate 1 and having longitudinal edges 13, 14 provided with V-shaped bearing races 15, 16 which are complementary to the races 10, 11. Mounted in the races 10, 15 are a plurality of freely rollable ball-bearings 16' which are held in spaced relationship by a thin ball-retaining strip 17, and similarly mounted in the races 11, 16 are a plurality of ball-bearings 18 which are held in spaced relationship by a ball retaining strip 19. The slide plate 12 is, furthermore, cut away at the edges 13, 14 in the provision of lengthwise extending slots 20, 21 adapted for flushing fitting reception of U-shaped sheet metal channels 22, 23, and snugly fitted within the channels 22, 23 are felt sealing strips 24, 25 which extend slightly outwardly beyond the edges 13, 14 and bear sealing-wise against the channels 8, 9. The channels 22, 23 and felt strips 24, 25 are secured within the slots 20, 21 by means of bolts 26, 27 which extend in to the slide plate 12.

Bolted facewise against the transverse margins of the slide plate 12 is a pair of end seals 28, 29 comprising sheet metal strips 30, 31, 32, 33, which confine felt sealing strips 34, 35, the sealing strips 34, 35 being of somewhat larger size than the sheet metal strips 30, 31, 32, 33 so as to extend a small distance marginally outwardly thereof and bear sealing-wise against the base plate 1. At their opposite ends, the seals 28, 29 are provided with triangular projections 36, 37, 38, 39 which fit into the races 10, 11 so that the felt strips 34, 35 contact the races 10, 11 in seal-forming relationship therewith.

In use, the base plate 1 may be mounted on a cutter or grinder (not shown) in any conventional manner and, thereafter, a tool post holder or other similar cutter mounted on the slide plate 12. Prior to assembly of the slide A, the ball-bearings 16, 18 may, if desired, be lubricated so that the slide plate 12 is more freely shiftable. As the slide plate 12 is shifted to and fro along the channels 8, 9, the felt strips 24, 25, 34, 35 will, at all times, seal the races 10, 11, 15, 16 and the ball-bearings 16', 18 and prevent the entrance of dust, dirt and other abrasive materials from damaging any of the bearing surfaces. It will, therefore, be apparent that slides manufactured in accordance with the present invention are relatively wear resistant and are capable of maintaining acccurate tolerances during prolonged periods of use.

It should be understood that changes and modifications in the form, construction, arrangement, and combination of the several parts of the dust proof ball-bearing slide may be made and substituted for those herein shown and described without departing from the nature and principle of my invention.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A dust proof slide comprising a base plate, a pair of spaced channels secured to and upwardly extending from said base plate, said channels each being provided with an inwardly presented surface which is substantially per-

pendicular to said base plate and includes an elongated first raceway which is parallel to and spaced from said base plate, a pair of end plates secured to and upwardly extending from said base plate intermediate said channels, a slide plate including a substantially rectangular block sized for disposition between said channels and end plates and provided with a pair of parallel sides each having an outwardly presented second raceway which is complementary to said first raceway, said second raceway being spaced from the bottom of said slide plate by a distance slightly less than the distance between said first raceway and the top surface of said base plate, said slide plate also including a pair of spaced elongated shoulders which are located above and extend along said second raceway, bearing means operatively mounted in the complementary first and second raceways for slidably mounting said slide plate above said base plate between said end plates substantially within the confines of said base plate and the channels and end plates thereunto attached, first wiper means operatively mounted substantially near each end of said slide plate for simultaneously removing waste from said base plate and said channels as said slide plate is moved therebetween, and second wiper means operatively mounted on the elongated shoulders of said slide plate and extending outwardly therefrom abutting the upper portion of the inwardly presented surfaces on said channels for shielding said bearing means and the common surfaces of said base plate and slide plate from waste particles.

2. A dust proof slide comprising a base plate, a pair of spaced channels secured to and upwardly extending from said base plate, said channels each being provided with an inwardly presented surface which is substantially perpendicular to said base plate and includes an elongated first raceway which is parallel to and spaced from said base plate, a pair of end plates secured to and upwardly extending from said base plate intermediate said channels, a slide plate including a substantially rectangular block sized for disposition between said channels and end plates and provided with a pair of parallel sides each having an outwardly presented second raceway which is complementary to said first raceway, said second raceway being spaced from the bottom of said slide plate by a distance slightly less than the distance between said first raceway and the top surface of said base plate, said slide plate also including a pair of spaced elongated shoulders which are located above and extend along said second raceway, bearing means operatively mounted in the complementary first and second raceways for slidably mounting said slide plate above said base plate between said end plates substantially within the confines of said base plate and the channels and end plates thereunto attached, first wiper means operatively mounted substantially near each end of said slide plate for simultaneously removing waste from said base plate and said channels as said slide plate is moved therebetween, and second wiper means operatively mounted on the elongated shoulders of said slide plate and extending outwardly therefrom abutting the upper portion of the inwardly presented surfaces on said channels for shielding said bearing means and the common surfaces of said base plate and slide plate from waste particles, said second wiper means including a U-shaped channel having a pair of parallel elements and an inwardly presented bight and a felt pad nestedly disposed between said parallel elements and said bight and extending outwardly therefrom.

3. A dust proof slide comprising a base plate, a pair of spaced channels secured to and upwardly extending from said base plate, said channels each being provided with an inwardly presented surface which is substantially perpendicular to said base plate and includes an elongated first raceway which is parallel to and spaced from said base plate, a pair of end plates secured to and upwardly extending from said base plate intermediate said channels, a slide plate including a substantially rectangular block sized for disposition between said channels and end plates and provided with a pair of parallel sides each having an outwardly presented second raceway which is complementary to said first raceway, said second raceway being spaced from the bottom of said slide plate by a distance slightly less than the distance between said first raceway and the top surface of said base plate, said slide plate also including a pair of spaced elongated shoulders which are located above and extend along said second raceway, bearing means operatively mounted in the complementary first and second raceways for slidably mounting said slide plate above said base plate between said end plates substantially within the confines of said base plate and the channels and end plates thereunto attached, first wiper means operatively mounted substantially near each end of said slide plate for simultaneously removing waste from said base plate and said channels as said slide plate is moved therebetween, said first wiper means comprising a pair of spaced parallel plates and a felt pad nestedly disposed therebetween, and second wiper means operatively mounted on the elongated shoulders of said slide plate and extending outwardly therefrom abutting the upper portion of the inwardly presented surfaces on said channels for shielding said bearing means and the common surfaces of said base plate and slide plate from waste particles.

4. A dust proof slide comprising a base plate, a pair of spaced channels secured to and upwardly extending from said base plate, said channels each being provided with an inwardly presented surface which is substantially perpendicular to said base plate and includes an elongated first raceway which is parallel to and spaced from said base plate, a pair of end plates secured to and upwardly extending from said base plate intermediate said channels, a slide plate including a substantially rectangular block sized for disposition between said channels and end plates and provided with a pair of parallel sides each having an outwardly presented second raceway which is complementary to said first raceway, said second raceway being spaced from the bottom of said slide plate by a distance slight less than the distance between said first raceway and the top surface of said base plate, said slide plate also including a pair of spaced elongated shoulders which are located above and extend along said second raceway, bearing means operatively mounted in the complementary first and second raceways for slidably mounting said slide plate above said base plate between said end plates substantially within the confines of said base plate and the channels and end plates thereunto attached, first wiper means operatively mounted substantially near each end of said slide plate for simultaneously removing waste from said base plate and said channels as said slide plate is moved therebetween, said first wiper means comprising a pair of spaced parallel plates and a felt pad nestedly disposed therebetween, and second wiper means operatively mounted on the elongated shoulders of said slide plate and extending outwardly therefrom abutting the upper portion of the inwardly presented surfaces on said channels for shielding said bearing means and the common surfaces of said base plate and slide plate from waste particles, said parallel plates and felt pad of said first wiper means being sized for simultaneous contiguous engagement with the inwardly presented surfaces of said channels and the upwardly presented surface of said base plate between said channels, said felt pad being sized slightly larger than said parallel plates whereby to come into direct contact with said channels and said base plate.

5. A dust proof slide comprising a base plate, a pair of spaced channels secured to and upwardly extending from said base plate, said channels each being provided with an inwardly presented surface which is substantially perpendicular to said base plate and includes an elongated first raceway which is parallel to and spaced from

said base plate, a pair of end plates secured to and upwardly extending from said base plate intermediate said channels, a slide plate including a substantially rectangular block sized for disposition between said channels and end plates and provided with a pair of parallel sides each having an outwardly presented second raceway which is complementary to said first raceway, said second raceway being spaced from the bottom of said slide plate by a distance slightly less than the distance between said first raceway and the top surface of said base plate, said slide plate also including a pair of spaced elongated shoulders which are located above and extend along said second raceway, bearing means operatively mounted in the complementary first and second raceways for slidably mounting said slide plate above said base plate between said end plates substantially within the confines of said base plate and the channels and end plates thereunto attached, first wiper means operatively mounted substantially near each end of said slide plate for simultaneously removing waste from said base plate and said channels as said slide plate is moved therebetween, said first wiper means comprising a pair of spaced parallel plates and a felt pad nestedly disposed therebetween, and second wiper means operatively mounted on the elongated shoulders of said slide plate and extending outwardly therefrom abutting the upper portion of the inwardly presented surfaces on said channels for shielding said bearing means and the common surfaces of said base plate and slide plate from waste particles, said second wiper means including a U-shaped channel having a pair of parallel elements and an inwardly presented bight and a felt pad nestedly disposed between said parallel elements and said bight and extending outwardly therefrom whereby said first and second wiper means coact to enclose completely the common surfaces between said base plate and slide plate thereby protecting said common surfaces from extraneous matter, and also to sweep away extraneous matter which lies in the path of said slide plate as it moves within said base plate.

6. A dust proof slide comprising a base plate, a pair of spaced channels secured to and upwardly extending from said base plate, said channels each being provided with an inwardly presented surface which is substantially perpendicular to said base plate and includes an elongated first substantially V-shaped raceway which is parallel to and spaced from said base plate, a pair of end plates secured to and upwardly extending from said

base plate intermediate said channels, a slide plate including a substantially rectangular block sized for disposition between said channels and end plates and provided with a pair of parallel sides each having an outwardly presented second substantially V-shaped raceway which is complementary to said first raceway, said second raceway being spaced from the bottom of said slide plate by a distance slightly less than the distance between said first raceway and the top surface of said base plate, said slide plate also including a pair of spaced elongated shoulders which are located above and extend along said second raceway, bearing means operatively mounted in the complementary first and second raceways for slidably mounting said slide plates above said base plate between said end plates substantially within the confines of said base plate and the channels and end plates thereunto attached, first wiper means operatively mounted substantially near each end of said slide plate for simultaneously removing waste from said base plate and said channels as said slide plate is moved therebetween, said first wiper means comprising a pair of spaced parallel plates and a felt pad nestedly disposed therebetween, and second wiper means operatively mounted on the elongated shoulders of said slide plate and extending outwardly therefrom abutting the upper portion of the inwardly presented surfaces on said channels for shielding said bearing means and the common surfaces of said base plate and slide plate from waste particles, said second wiper means including a U-shaped channel having a pair of parallel elements and an inwardly presented bight and a felt pad nestedly disposed between said parallel elements and said bight and extending outwardly therefrom, whereby said first and second wiper means coact to enclose completely the common surfaces between said base plate and slide plate thereby protecting said common surfaces from extraneous matter, and also to sweep away extraneous matter which lies in the path of said slide plate as it moves within said base plate.

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