This invention relates to machine tool slide assemblies and particularly screw machine slide assemblies.

The slides of screw machines are required to carry many different types of tools and to very accurately guide such tools in their approach to and retraction from the work and in their cutting operations. Frequently heavy stresses are imposed on said slides in the course of their travel, the direction of such stresses varying considerably in different tool operations. Consequently such slides and their guides are subject to considerable wear and it is necessary from time to time to compensate for wear to avoid rocking or swaying of the tools or other deviation from accurate rectilinear travel. It is to be noted in this connection that a slight lateral play of a slide in its guide ways is often considerably multiplied at the cutting edge of the tool.

Objects of the invention are to adapt wear to be taken up with great accuracy by adjustment of a tapered gib installed upon and movable with a tool-carrying slide; to correlate a guide rail with the slide and gib and to provide an improved means for adjusting the rail to take up lateral play of the slide.

These and various other objects are attained by the construction hereinafter described and illustrated in the accompanying drawings, wherein:

Fig. 1 is a top plan view of the improved slide and its mounting.
Fig. 2 is a side elevational view of the same.
Fig. 3 is a rear end view of the slide and its mounting.
Fig. 4 is a cross sectional view of the same taken on the line 4—4 of Fig. 1.
Fig. 5 is a longitudinal vertical sectional view taken on the line 5—5 of Fig. 3 showing a fully retracted position of a sliding wear-compensating gib.
Fig. 6 is a view similar to Fig. 5 but showing the gib fully inserted.
Fig. 7 is a detail perspective view of a yoke, two of which are used in the construction.
Fig. 8 is a fragmentary perspective view of said gib.

In these views, the reference character 1 designates an elongated rectangular slide having a plurality of undercut grooves 2 extended transversely across its top face to facilitate attachment to the slide of any desired tool holder (not shown). The sides of the slide are similarly grooved from end to end thereof to receive a pair of guide rails 3, the inner faces of the rails being downwardly convergent, preferably at a sixty degree angle, and the rail-receiving grooves having inner faces 4 engageable by and conforming to the convergent rail faces. The grooves further have horizontal top faces 4' which seat on the rails and bottom faces 5 inclined gradually upwardly from the rear to the front end of the slide. The bottom faces of the rails are horizontal, and tapered gibs 6 extending substantially the full length of the slide are inserted between such bottom faces and the groove faces 5, the bottom faces of the gibs being inclined to engage and conform to the faces 5. The relatively thick rear end of each gib rigidly carries a downwardly projecting lug 7, the rear face of the slide having its lower corner portions cut away to form recesses 8 proportioned to accommodate the lugs 7. The latter have central apertures 9 to accommodate studs 10 extending lengthwise of the slide and set adjustably into its rear end. Said gibs may be considered adjustable, wear-compensating elements of the slide on which they are carried. The studs 10 rigidly carry collars 11 for abutting the front faces of the lugs 7 and further carry nuts 12 for locking the lugs against said collars and thus accurately maintaining any adjustment of the gibs. The inner edge faces of the gibs are vertical, and the rail-receiving grooves of the slide have vertical faces 13 extending downwardly from the inclined faces 4 for engagement by said edge faces of the gibs. The vertical extent of the faces 13 is sufficient to maintain proper engagement with the gibs when the latter are in their fully inserted position.

The rails 3 extend laterally beyond the slide to seat on the upstanding walls 14 of a channel-shaped support 15 incorporated in the frame of a screw machine or other machine tool. The lower portion of the slide occupies the channel of said support, while preferably having a slight upward and lateral clearance from the support. Rows of headed studs 16 normally clamp the rails rigidly down against the walls 14, and the stud-receiving openings 17 of at least one of the rails have a slight elongation transverse to the rails, whereby the latter may be adjusted slightly to and from the slide as a further compensation for wear.

For accurately effecting an inward adjustment of either or both rails 3, each of the latter is formed in its under face with a cavity 18, substantially midway of the rail length, wherein is set a yoke 19 having apertures 20 in its ends, whereby the yoke is mounted without material
play on two adjoined studs 16, being thus anchored to the support 15. The mid portion of the yoke forms an upward projection increasing the yoke's thickness to accommodate a transverse opening 21 tapped to receive an adjusting screw 22. The rail is drilled to freely accommodate end portions of the screw 22, one such portion extending substantially to the outer face of the rail and having a socket or other provision for engagement by a wrench. The other end portion of the screw is formed with an annular groove 23 in which is tangentially fitted a pin 24 fixed in the rail, said pin allowing free rotation of the screw but restraining the latter from laterally movement. The described arrangement is such that a rotation applied to the screw 22 forces the corresponding rail to or from the slide, the yoke being restrained from shifting due to its mounting on the studs 16, and the screw 22 hence being fed through the yoke and transmitting its travel to the rail through the pin 24. It is, of course, necessary that the cavity 16 be sufficiently wider than the yoke 19 to afford the desired lateral shifting of the rail with respect to the yoke.

The described construction permits maintenance of an accurate guidance of the slide, which guidance, as heretofore stated, is vital to its use. When the vertical play of the slide becomes objectionable, the operator loosens the lock nuts 12, screws the studs a tentative distance inward and then forces the gibs in by means of the lock nuts until the play is fully eliminated. Having established the proper positions of the gibs, the gibs are locked firmly between the collars 11 and nuts 12, being thus held in place. The very gradual taper of the gibs permits an essential nicety of adjustment, such as to afford the slide free travel without deviation from straight line movement. If there is excessive lateral play of the slide due to wear at the inclined surfaces 4, compensation is made by loosening the clamping studs 16 of at least one of the rails 3 and adjusting such rail inwardly. Such adjustment is effected by rotating the screw 22, the corresponding yoke 19 then acting as a feed nut for the screw and the pin 24 compelling the rail to participate in inward movement of the screw.

The fact that the screws 22 are accurately disposed midway of the length of the rails assures that adjustment applied by said screws will uniformly take effect throughout the rail lengths, without tilting effect.

Both described adjustments, one effected by the gibs and the other by the rails, may be quite quickly accomplished, it being feasible, however, to adjust the gibs somewhat more rapidly and conveniently than the rails. This is desirable since there is greater wear on the faces 4 than on the faces 2, and it is hence more frequently necessary to adjust the gibs than the rails.

Provision of the recesses 8 in the rear face of the slide 1 reduces the amount of rearward projection of the gibs beyond the slide to a minimum. It is highly desirable to house in the gibs so far as feasible to prevent it being damaged or doing damage through striking some part of the machine.

What I claim is:

1. In a slide assembly for machine tools, the combination with a slide, a support for the slide, a pair of guide rails on the support engaged with opposite sides of the slide, at least one of such rails being adjustable on the support to and from the slide, and means for releasably clamping the adjustable rail to the support, of a feed nut housed within the adjustable guide rail, means for anchoring the feed nut to the support, an adjusting screw substantially transverse to the direction of travel of the slide and operatively engaging the feed nut, the adjustable rail being apertured to give access to said screw, and means connecting the adjustable rail to the screw to advance with the screw toward the slide.

2. A slide assembly for machine tools as set forth in claim 1, said clamping means comprising a plurality of spaced fasteners, and said anchoring means for the feed nut including at least one of said fasteners.

3. A slide assembly for machine tools as set forth in claim 1, said clamping means comprising a plurality of spaced fasteners, and said feed nut being formed by the mid portion of a yoke, said anchoring means for the feed nut including two of said fasteners, engaged by the end portions of said yoke.

4. A slide assembly for machine tools as set forth in claim 1, the adjusting screw having an annular groove, and the means connecting the adjustable rail to the screw being a pin substantially fixed in such rail and extended tangentially through said annular groove.

5. In a slide assembly for machine tools, the combination with a slide and a support for the slide, of a pair of guide rails on the support engaged with opposite sides of the slide, at least one of such rails being adjustable on the support to and from the slide, and a plurality of spaced fasteners releasably clamping the adjustable rail to the support, a yoke set into said cavity and having its ends anchored to two of said fasteners, the mid portion of said yoke forming a feed nut, an adjusting screw substantially transverse to the direction of travel of the slide and operatively engaging the feed nut, said screw having an extremity accessible for adjustment purposes, and means inducing movement of the rail in unison with lengthwise travel of the screw.

6. In a slide assembly for machine tools, the combination with a slide and a support for the slide, a pair of guide rails on the support engaged with opposite sides of the slide, at least one of such rails being adjustable on the support to and from the slide, and a plurality of spaced fasteners releasably clamping the adjustable rail to the support, of an interengaged feed nut and feed screw, one thereof being an insert housed in the adjustable rail and means for anchoring said insert to at least one of said fasteners, the other feed element being effective on the adjustable rail to advance it toward the slide responsive to a relative rotation of the screw and nut.

7. A slide assembly for machine tools as set forth in claim 6, said screw extending substantially transversely to the direction of travel of the slide, and the adjustable rail having an opening accommodating said screw.

8. In a slide assembly for machine tools, the combination with a slide, a support for the slide, a pair of guide rails on the support engaged with opposite sides of the slide, at least one of such rails being adjustable on the support to and from the slide, and a plurality of spaced fasteners releasably clamping the adjustable rail to the support, of a pair of interengaged screw threaded members one of which is housed within the adjustable rail and disposed between and anchored to two of said fasteners, the other of said members being effective on the adjustable rail to ad-
vance it toward the slide responsive to relative rotation of the threaded members.

MICHAEL J. SCHLITTERS.

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