

Dec. 5, 1944.

R. NIEMI

2,364,546

SINE PLATE

Filed Oct. 25, 1943

2 Sheets-Sheet 1

FIG. 1.

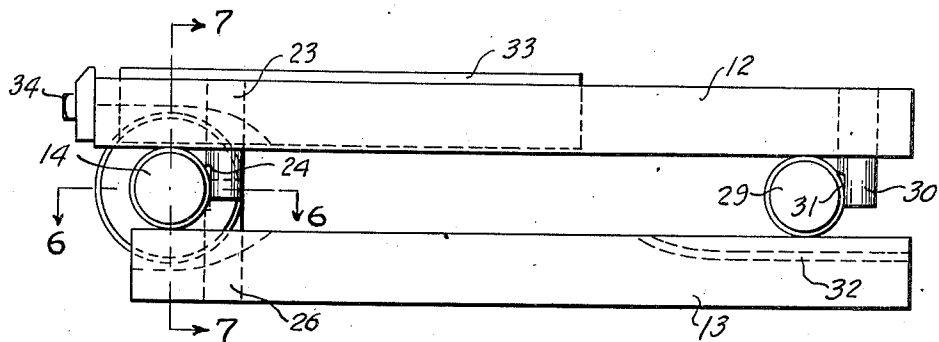


FIG. 2.

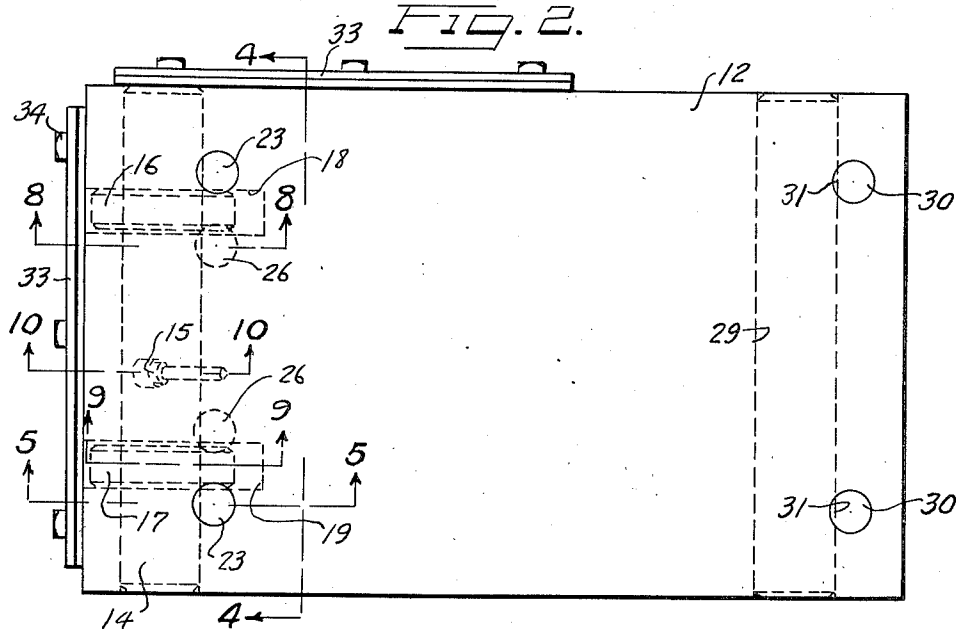
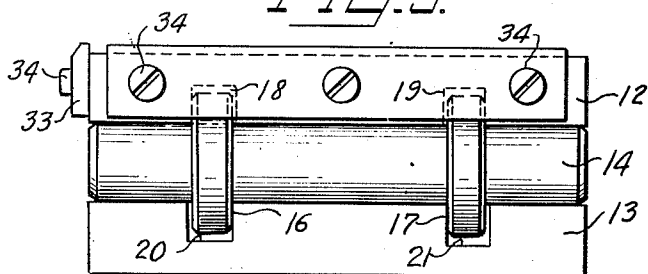


FIG. 3.



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2 Sheets-Sheet 2

FIG. 4.

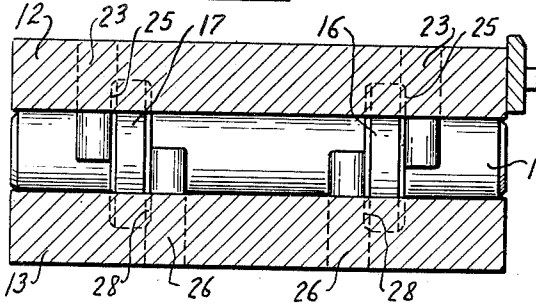


FIG. 5.

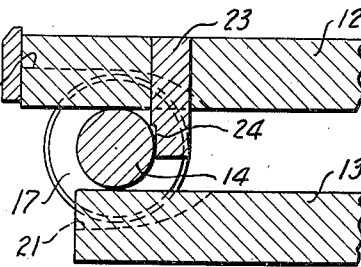


FIG. 6.

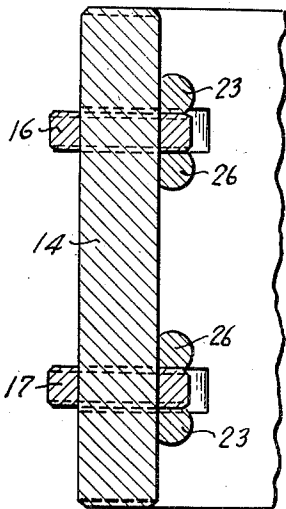


FIG. 9.

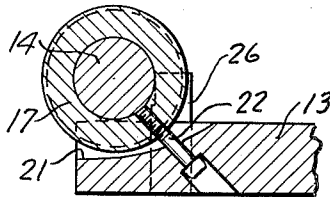


FIG. 8.

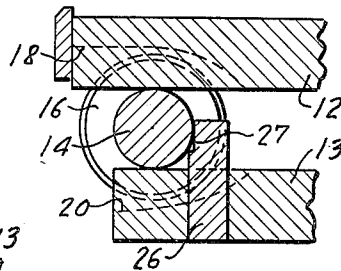


FIG. 10.

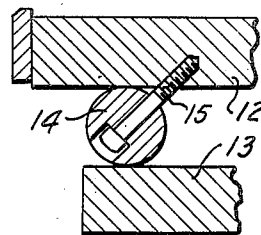
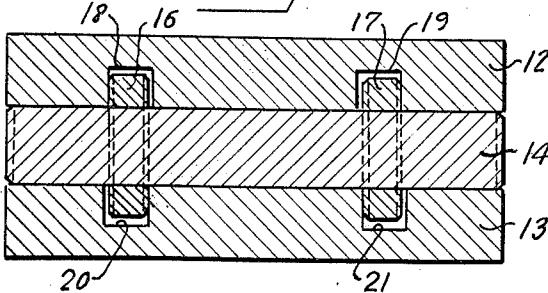


FIG. 7.



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UNITED STATES PATENT OFFICE

2,364,546

SINE PLATE

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Application October 25, 1943, Serial No. 507,646

7 Claims. (Cl. 33-174)

This invention relates to machine tools and has particular reference to a sine plate.

An object of the invention is to generally improve sine plates and particularly to provide a sine plate which is simple in construction, economical to manufacture, and easy to assemble.

Another object of the invention is the provision of a device of the character referred to which is constructed and arranged in such manner that many expensive machining operations are eliminated in its manufacture.

Another object of the invention is the provision of a sine plate which is constructed and arranged so that compensation for wear is easily made without the necessity of machining major parts of the device.

The foregoing, and other objects and advantages of the invention will become more apparent as the description proceeds, reference being made to the accompanying drawings, in which:

Figure 1 is a side elevational view of a device embodying my invention.

Fig. 2 is a top plan view of the device illustrated in Fig. 1.

Fig. 3 is a rear elevational view of the device illustrated in Fig. 1.

Fig. 4 is a sectional view taken substantially on the line 4-4 of Fig. 2.

Fig. 5 is a fragmentary sectional view taken substantially on the line 5-5 of Fig. 2.

Fig. 6 is a sectional view taken substantially on the line 6-6 of Fig. 1.

Fig. 7 is a sectional view taken substantially on the line 7-7 of Fig. 1.

Fig. 8 is a fragmentary sectional view taken substantially on the line 8-8 of Fig. 2.

Fig. 9 is a fragmentary sectional view taken substantially on the line 9-9 of Fig. 2.

Fig. 10 is a fragmentary sectional view taken substantially on the line 10-10 of Fig. 2.

Referring now more particularly to the drawings it will be understood that in the embodiment herein disclosed, my device consists of a top plate 12, and a lower or base plate 13, which are hinged together as at 14, as more particularly described hereinafter. The hinge pin 14 (Figs. 2 and 10) is secured to the top plate 12, by means of a screw 15. The hinge pin 14 carries two washers 16 and 17 (Fig. 3) adapted to engage the slots 18 and 19 formed in the top plate 12 and the slots 20 and 21 formed in the lower plate 13. It will be noted that the slot 18 is not in alignment with the slot 20, nor is the slot 19 in alignment with the slot 21. These slots are intentionally machined out of align-

ment so that the outside faces of the washers 16 and 17 will contact the walls of the slots 18 and 19, and so that the inside faces of the washers 16 and 17 will contact the inside walls of the slots 20 and 21. The washers 16 and 17 are secured to the bottom plate 13 (Fig. 9) by means of the screws 22.

Mounted in suitable bores in the top plate 12 are contact pins 23 which are undercut as at 24 and are adapted to provide surface contact with the hinge pin 14 (Fig. 5). The hinge pins 23 are also undercut as at 25 (Fig. 4) to provide surface contact with the washers 16 and 17 (Fig. 4), positioned in suitable bores in the base plate 13 of the pins 26. The pins 26 are undercut as at 27 (Fig. 8) to provide surface contacts with the hinge pin 14; they are also undercut as at 28 (Fig. 4) to provide surface contact with the washers 16 and 17. It will be noted that the pins 23 are positioned so as to contact the outer surfaces of the washers 16 and 17, and the pins 26 are positioned so as to contact the inner surfaces of washers 16 and 17 thus providing oppositely disposed balanced contact surfaces for the moving parts of the device. The pins 23 and 26 may easily be removed and replaced should unusual wear develop on the washers 16 and 17. It will therefore be seen that I have provided a hinging arrangement, which is simple in construction and which is easily disassembled for repairs when the same becomes necessary. In order to obviate the necessity of machining the underside of the top plate 12 to accommodate the rest pin 29, I secure pins 30 in suitable bores in the top plate 12, these pins are undercut as at 31 to provide surface contact with the rest pin 29. The rest pin 29 is secured to the underside of the upper plate 12 by means of a screw or bolt not shown as is the customary practice. The lower plate 13 may be provided with a cutout portion 32 adapted to engage small gauge blocks. The large gauge blocks are normally set on the upper surface of the rest plate 13. The upper plate 12 is provided with the usual adjustable stop plates 33, which are secured thereto by screws 34.

To assemble the device the washers 16 and 17 are first placed on the hinge pin 14 and moved into engagement with the pins 23, and the hinge pin 14 is secured in place to the plate 12. The lower plate 13 is then brought into position so that the washers 16 and 17 engage the pins 26 and the walls of the slots 20 and 21. The washers 16 and 17 are then secured to the plate 13

as previously indicated. The rest pin 29 may be secured at any time.

It will be understood that certain modifications may be made in the construction and arrangement of my device and that several of these devices could be combined to provide compound angular positions all of which are within the contemplation of the invention.

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

1. In a sine plate, the combination of upper and lower plates, a hinge pin secured to one of said plates, and washers on said hinge pin, said washers being secured to said other plate, said plates having slots adapted to accommodate said washers.

2. The combination defined in claim 1, in which there are removable pins secured in each of said plates, said pins being adapted to contact said washers and said hinge pin.

3. The combination defined in claim 1, in which there are removable pins secured in each of said plates, said pins being adapted to contact said washers and said hinge pin, the said

pins being undercut so as to provide surface contacts with said hinge pin and said washers.

4. The combination defined in claim 1, in which said washers are adapted to contact, on their opposite faces, the respective slots of said upper and lower plates.

5. The combination with a pair of plates, of a hinge pin secured to one of said plates, said hinge pin having mounted thereon two or more washers, said washers being secured to said other plate, and said washers being adapted to contact means carried on said plates.

6. The combination defined in claim 5, in which said last named means include removable pins positioned in staggered relation in said plates.

7. The combination defined in claim 5, in which one of said plates is provided with a pair of undercut pins and a rest pin in contact therewith, said pins and said rest pin being adapted to hold the free ends of said plates in spaced relation.

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