The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

The present invention relates to a covering for protecting machine tools and more particularly for a covering that will protect the guideways of cutting and grinding machines.

Although some types of protective coverings have been employed in the past for keeping dust, dirt, and chips out of the working parts of machine tools, heretofore no coverings have been used to protect the precision guideways of machines because the longitudinal travel of certain elements along the guideways has made it difficult to provide a convenient method of covering the guideways. Consequently heretofore the guideways of certain machines required continual cleaning by the operators and also expensive repair bills were incurred because frequently the guideways required hand scraping by skilled artisans. The method of requiring these precision guideways is not only expensive, but requires considerable time to accomplish and thus the loss of use of the machine causes a decrease in production output.

The guideways of grinding machines are particularly vulnerable to wear due to the small particles of abrasive material such as emery, corundum, and Carborundum, flaking off the grinding wheel and being deposited on the guideways. When moving elements pass over these deposited particles of abrasive material a grinding effect takes place which soon destroys the accuracy of the machine. Since grinding machines are normally used when greater accuracy is required than that obtainable on either milling machines or lathes, the condition of the guideways greatly affects the accuracy obtainable and it is therefore important that the guideways be maintained in good condition.

The invention disclosed herein provides novel means for protecting the guideways of tool machines by providing a covering made from a tough flexible material, such as neoprene, and by providing an ingenious method of mounting this covering so that it will not interfere with a moving element that is traversed along the ways. Neoprene, which is a product of E. I. du Pont de Nemours and Co., Wilmington, Delaware, is particularly suited for a covering of the type disclosed herein because it has good abrasion and oil resistance properties. However, there is no intention to restrict the present invention to this particular material since rubber, leather, cloth, and many other flexible materials would also give adequate protection for considerable periods of time.

The ingenious method of mounting the covering comprises fastening one side of the flexible material in a permanent manner to a slidable member which travels along the guideways. Another side of the flexible covering is secured to the back portion of the guideways and the end portions of the flexible material are each gathered in a fold. The two end portions of the flexible material are reinforced with metal stiffeners and resilient biasing means, such as extension springs, are fastened to these stiffeners and then to the outer portions of the guideways. As the slidable member of the grinding machine is operated up and down the guideways, the extension springs retract or stretch and thus maintain the flexible material snug over the end portions of the guideways. Any foreign matter will then be deposited on the flexible material rather than on the precision surfaces of the guideways, thus protecting these surfaces from a grinding effect when the slidable member travels along the guideways.

It is therefore a general object of the present invention to provide a new and useful covering that will protect the guideways of precision machine tools without interfering with the normal functioning of the guideway surfaces.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawing in which:

Fig. 1 shows a side view of a grinding machine with a covering protecting the diagonal guideways;

Fig. 2 shows an enlarged sectional view taken on line 2--2 of Fig. 1;

Fig. 3 shows a top plan view of the protective covering without the resilient biasing means; and

Fig. 4 is a partial sectional view taken on line 4--4 of Fig. 3 and shows a metal stiffener covering the end portions of the protective covering.

Referring now to the drawing wherein like reference characters represent like or corresponding parts, there is illustrated in Figs. 1 and 2 of the drawing a grinding machine 10 having a grinding wheel 11 which is driven by a motor 12. The motor 12 has a slidable member 13 attached thereto which guides on the diagonal guideways 14. The diagonal guideways are attached to a rotary head 15 which permits the angle of grinding to be changed. The rotary head 15 is part of the framework that travels on the horizontal guideways 16. The grinding machine 10 which is shown in Figs. 1 and 2 of the drawing forms no part of the present invention and is shown only to illustrate the manner of mounting the present invention. Only the important elements of the grinding machine 10 are shown in Figs. 1 and 2 that are required to illustrate the invention.

Referring still to Figs. 1 and 2 of the drawing, it can be seen that the present invention consists of a protective covering 17 and that it is shown attached to a grinding machine 10 for the purpose of illustrating the inventions, it being understood that the present invention could be equally adapted to protect the guideways of planers, shapers, lathes, milling machines, and other machine tools.

Referring now to Figs. 3 and 4 of the drawing, it can be seen that the protective covering 17 consists of a sheet of flexible material 18, such as neoprene or rubber, having a cut-out portion 19. The size of the sheet and various cutouts will of course depend upon the particular machine that is to be covered. A metal stiffener 20, which is formed to cover both sides of the flexible material 18, is fastened to each end of the flexible material 18 by means of screws 21 and nuts 22. A hook 23 is secured on each end of the protective covering 17 by screws 24. The flexible material 18 has a plurality of holes 24 punched therein, so that the side portions of the flexible material 18 can be fastened to the machine which is to be protected from foreign matter.

Referring again to Figs. 1 and 2 of the drawing, it can be seen that one side of the protective covering 17 is secured to the slidable member 13 by means of screws 25 that pass through the plurality of holes 24. A second side of the protective covering 17 is secured to the back side
26 of the guideways 14. The end portions 27 of the protective covering 17 are then folded inwardly and an extension spring 28 holds each end portion 27 of the protective covering 17 in position. The extension springs 28, as shown in Fig. 1 of the drawing, engages the hooks 23 that are attached to the protective covering 17 and the other end of each extension spring is fastened by means of hooks 29 and screws 30 to the outer portions of the guideways 14.

In operation, a part which is to be ground is mounted on the rotary worktable 31 and the grinding wheel 11 is moved into position by traversing the grinding machine 10 along the diagonal guideways 14 and the horizontal guideways 16. When the slidable member 13 is operated up and down along the diagonal guideways 14, the springs 28 retract or stretch and thus maintain the protective covering 17 over the end portions of the guideways 14 for all relative positions of the slidable member 13.

Abrasive dust and particles are deposited on the protective covering 17 rather than on the precision diagonal guideways 14 and costly repair bills are therefore eliminated.

It should be understood, of course, that the foregoing disclosure relates to only a preferred embodiment of the invention and that numerous modifications or alterations may be made therein without departing from the spirit and scope of the invention.

What is claimed:

1. A protective covering for isolating guideways of precision machine tools from abrasive dust comprising, a sheet of flexible material adaptable to be placed over the end portions of guideways of precision machine tools having a first side portion adaptable to be fastened to a slidable member on said guideways and a second side portion adaptable to fastened to the back side of said guideways, the remaining two side portions being each gathered in a fold, each said fold being adaptable to be biased along the outer portions of said guideways by resilient means whereby the said sheet of flexible material can be supported in sealing relation against the end portion of said guideways for all relative positions of said slidable member.

2. A protective covering as set forth in claim 1 wherein said resilient means adaptable for biasing each said fold along the outer portions of the guideways comprises a first extension spring having one end fastened to the end portion of one of said folds and a second extension spring having one end fastened to the other said fold, the remain-

3. A protective covering for isolating guideways of a precision grinding machine from abrasive dust comprising; a sheet of flexible material having a requisite opening on one side and a metal stiffener on each of two opposite sides, said flexible material being adaptable to be placed over the end portion of the guideways of a precision grinding machine, one side portion having the requisite opening adaptable to be fastened to a slidable member on said guideways and another side portion of said flexible material being adaptable to be fastened to the back side of said guideways and each side portion of said flexible material having metal stiffeners being each gathered in a fold; a first extension spring for biasing one of said folds having one end fastened to one of said metal stiffeners; and a second extension spring for biasing the other said fold having one end fastened to the other said metal stiffener, each remaining extension spring end being adapted to be fastened to the outer portions of said guideways whereby any motion of said slidable member along the said guideways would cause a change of tension in each of said extension springs thereby causing the said sheet of flexible material to be supported in sealing relation against the end portion of said guideways for all relative positions of said slidable member.

4. A protective covering for isolating precision parts of machine tools from abrasive materials comprising, a flat rectangular sheet of flexible material having a requisite opening on one side thereof, metal stiffeners secured on each of two opposite ends of said flexible material, a first hook secured to one of said metal stiffeners and a second hook secured to the other said metal stiffener, and resilient biasing means adapted to be attached to one each of said first and second hooks whereby said resilient means are adaptable to maintain the said sheet of flexible material in sealing relation against a precision part of a machine tool.

References Cited in the file of this patent

UNITED STATES PATENTS

848,578 Thelin Mar. 26, 1907
1,679,912 Mondloch Aug. 7, 1928
1,845,908 Cover Feb. 16, 1932