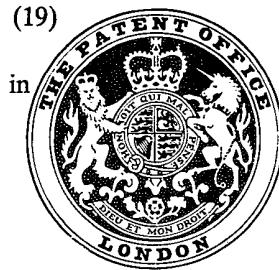


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## (54) LEVER OPERATED FEED DEVICE

(71) We, TO YODA - KOKI KABUSHIKI-KAISHA, a Japanese body corporate of 1-1, Asahi-machi, Kariya-shi, Aichi-ken, Japan, of Japanese Nationality, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement :

10 The present invention relates generally to a feed device of a lever-operated type and, more particularly, to such a device for sliding a slide block upon a base by manipulating a lever handle and for fixing the block thereon at a desired position.

15 In grinding machines of a certain type, there is provided a lever-operated feed device for a wheel head, in addition to an automatic feed device cooperating with a wheel handle. The lever-operated feed device conventionally has such a construction that a pinion shaft, which gears with a rack bar provided upon a stationary base, is rotated by manipulating a lever handle to move the wheel head, namely a slide block, and the slide block, after being moved a desired distance, is fixed upon the stationary base. However, as slide feed and fixing mechanisms of the prior art devices are

20 disposed at respective positions remote from each other, the working property in the device is very poor. Also, in the device, the manipulation for fixing the slide block is liable to be forgotten or omitted frequently.

25 It is an object of the present invention to provide an improved lever-operated feed device having enhanced working property in which manipulations for slide feed and fixing can be performed concentrically from the same place.

30 Briefly, according to the present invention, there is provided a lever-operated feed device for moving a slide block slidably guided upon a base, comprising in combination: a stationary toothed member extend-

ing in the direction of the slide movement of the slide block; a rotational sleeve rotatably supported by the slide block; a rotational toothed member provided upon the rotational sleeve and meshingly engaged with the stationary toothed member for sliding the slide block when rotated; a lever handle provided at one end of the rotational sleeve for rotating the same together with the rotational toothed member; a rod extending through the rotational sleeve, being rotatable therein and being in co-axial alignment therewith; a clamp handle provided at one end of the rod for rotating the same; and means connected with the rod for clamping the slide block upon the base when the clamp handle is rotated in one direction and for unclamping the slide block therefrom when the clamp handle is rotated in the other direction.

35 The rod extends through the rotational sleeve in co-axial alignment therewith, and the clamp handle is provided at one end thereof near the lever handle of the sleeve. With this configuration, working property in the device is improved or enhanced because the lever handle and the clamp handle are concentrated in a given place upon the slide block.

40 Various other objects, features and attendant advantages of the present invention will be more fully appreciated as the same becomes better understood from the following detailed description when considered in connection with the accompanying drawing, in which:

45 The sole illustration is a longitudinal sectional view of a device constructed according to the present invention.

50 Referring now to the drawing, there is shown a base 10 on which a slide block 11 is mounted slidably along a dovetail slide way 12. The slide block 11 has a support cylinder 13 fixed thereto, within which a rotational sleeve 14 is inserted, being rotatably and

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5 axially slidably disposed therein. At the lowermost end of the sleeve 14, there is formed a rotational toothed member, or a pinion 15, disengageably gearing with a stationary toothed member, or a rack bar 16, which is fixed upon the base 10, extending along the dovetail slide way 12. The sleeve 14 is provided at its uppermost end with an annular connector 17, integrally connected thereto, upon which a lever handle 18 is secured. A cup member 19 is inserted into a root portion 18a of the lever handle 18, being rotatable relative thereto and disposed in axial alignment with the sleeve 14, and a clamp handle 20 is pin-fixed to the cup member 19. The relative axial movement of the cup member 19 to the lever handle 18 is restrained.

10 Extending axially through the sleeve 14 is a clamp rod 21, the uppermost end of which is key-engaged with the cup member 19 in such a manner as to be axially slidable relative thereto. At the lowermost end of the clamp rod 21, there is formed a screw portion 23, which is extended through a support member 22 fixed upon the slide block 11 and is threadedly engaged with a clamp member 24. The clamp member 24 is formed at one end thereof with an oblique 15 surface 26, which abuts upon one of the oblique guide surfaces of the dovetail slide way 12 through a gib 25, and is formed at the other end thereof with a prominent portion 27, which is received within a depression formed upon the support member 22. It is therefore noted that the clamp member 24 has an L-letter form.

20 The lever-operated feed device according to the present invention is constructed as mentioned above, and when the lever handle 18 is rotationally manipulated, the pinion 15 engaging the stationary rack bar 16 is rotated, through the annular connector 17 and the sleeve 14, whereby the slide block 11 is moved along the dovetail slide way 12. When it is desired or needed to move the slide block 11 a long distance, the lever handle 18 is manipulated by one motion through the rotation of a considerable 25 angle. Immediately after such a manipulation, the lever handle 18 is lifted up to release the pinion 15 from the gearing with the rack bar 16, under the condition of which the lever handle 18 is reversely manipulated without having any load. Then, the pinion 15 is again meshed with the rack bar 16, so that it is possible to manipulate the lever handle 18 within such an angular extent as favored by an operator. The 30 release of the pinion 15 from the gearing with the rack bar 16 can also be carried out by lifting the clamp handle 20 up.

35 After being moved to a desired position in such a manner, the slide block 11 is fixed as follows: That is, the clamp handle 20 is

40 manipulated to be rotated in one direction together with the cup member 19 and the clamp rod 21, and thus, the clamp member 24 is threadedly moved or pivoted with the prominent portion 27 acting as a fulcrum. Consequently, the oblique surface 26 of the clamp member 24 is pressed upon the one of the oblique guide surfaces of the dovetail slide way 12, so that the slide block 11 can be fixed upon the base 10.

45 It is, of course, noted that the manipulations for the slide adjustment and the fixing can be done independently of each other, in other words, without interfering with each other.

50 As described above, in the present invention, the clamp rod 21 is connected to the clamp handle 20 and is disposed in overlapping co-axial alignment with the sleeve 14 connected to the lever handle 18. With this configuration, working property in the device can be remarkably enhanced, in comparison with those in prior art devices, since it becomes possible to perform, at one place, manipulations for the slide adjustment and the fixing of the slide block 11.

55 Obviously, many modifications and variations of the present invention are possible in light of the above teachings. It is therefore to be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described herein.

#### WHAT WE CLAIM IS:-

60 1. A lever-operated feed device for moving a slide block slidably guided upon a base, comprising in combination; a stationary toothed member extending in the direction of the slide movement of the slide block; a rotational sleeve rotatably supported by the slide block; a rotational toothed member provided upon the rotational sleeve and meshingly engaged with the stationary toothed member for sliding the slide block when rotated; a lever handle provided at one end of the rotational sleeve for rotating the same together with the rotational toothed member; a rod extending through the rotational sleeve, being rotatable therein and being in co-axial alignment therewith; a clamp handle provided at one end of the rod for rotating the same; and means connected with the rod for clamping the slide block upon the base when the clamp handle is rotated in one direction and for unclamping the slide block therefrom when the clamp handle is rotated in the other direction.

65 2. A feed device as claimed in Claim 1, wherein the rotational sleeve is axially slidably disposed in the slide block to release the rotational toothed member from meshing engagement with the stationary toothed member and is connected with the lever handle thereby to be moved axially.

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3. A feed device as claimed in Claim 2, wherein the clamp handle is rotatable relative to the lever handle, but is axially movable together therewith to allow axial movement of the rod, even when any one of the lever handle and the clamp handle is manipulated in the axial direction of the rod.

5 4. A feed device as claimed in any one of the preceding claims, wherein the stationary toothed member and the rotational toothed member are, respectively, a rack bar and a pinion.

10 5. A feed device as claimed in any one of the preceding claims, wherein the means connected with the rod comprises a screw portion provided upon the rod and a clamp member threadedly engaged with the screw portion and interposed between the base 20 and the slide block so as to draw the slide block to the base when the rod is rotated in the one direction.

25 6. A feed device as claimed in Claim 5, wherein a dovetail slide way is formed upon the base for guiding the slide block therealong, and wherein the clamp member is an L-letter member having at the ends thereof an oblique surface and a prominent portion which are brought into abutting engagements, respectively, with one of the guide surfaces of the slide way and with the slide block when the clamp handle is rotated in the one direction.

30 7. A feed device, substantially as described with reference to the accompanying drawings.

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