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FEED APPARATUS FOR MOVING THE PEELER
PIN HOLDER OF COPY MILLING MACHINES
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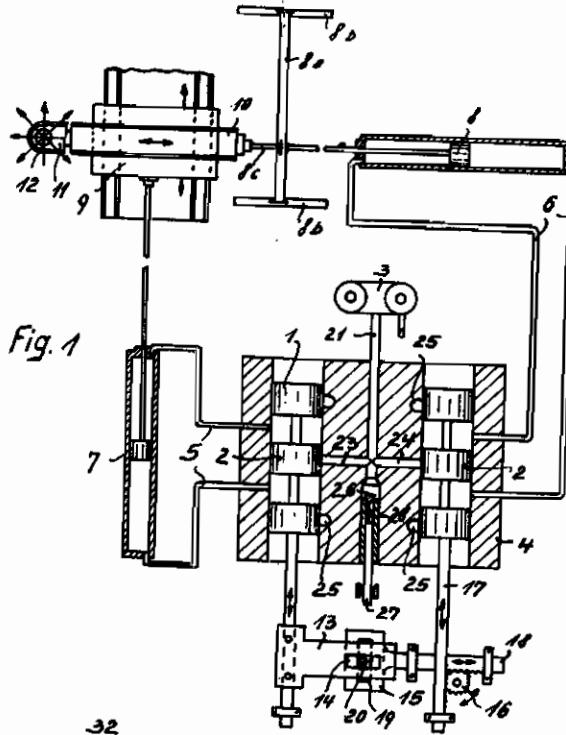


Fig. 1

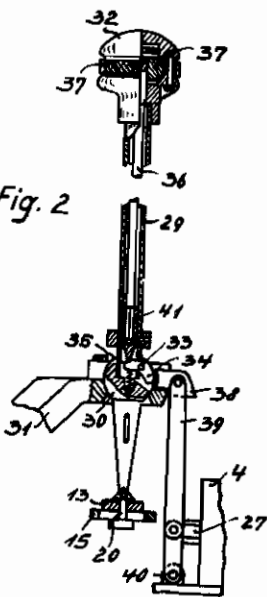


Fig. 2

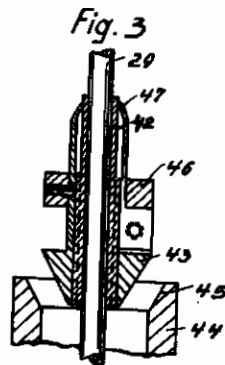


Fig. 3

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FEED APPARATUS FOR MOVING THE FEELER PIN HOLDER OF COPY MILL- ING MACHINES

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The invention concerns a feed device for moving the feeler pin holder of profile copying machines with hydraulic control in any desired direction by a single lever.

According to U. S. Patent (Ser. No. 205,684 of May 3rd, 1938) the pistons, which move the feeler pin mounted on a compound slide, are controlled by transversely grooved piston slides which are connected directly with the slides of the single lever, the slides being arranged at right angles to one another. Both pistons are fed by a pump, the flow of which is divided up according to the release of the piston slides. This enables the feeler pin to follow exactly the movements of the single lever. Furthermore a reliable and sensitive device is obtained, which transmits the movement of the single lever to the feeler pin.

The invention concerns a further improvement in this transmitting device in order to increase the simplicity of handling the control and to render it still more sensitive. It essentially consists in that not only the piston slides, which cause the movement of the feeler pin arranged on the compound slide may be controlled by the single lever, but also the flow of the pump, which is feeding the piston slides. Advantageously the single lever is provided with a device by which the pressure of fluid of the pump may be regulated independently of the lever's position.

Thus it is possible to stop the movement of the feeler pin while the lever is out of its centre position without bringing the single lever into the centre position. Thus the hydraulic feed movement in both directions may stop or start during any oblique position of the single lever. In addition it may be handled with the same hand which is moving the single lever, which remains in the position it happens to have occupied. Any desired interruption of the single lever control allows starting again at the very point, at which it has been interrupted. The control is rendered more sensitive and copying reliable and exact.

The device may be constructed in various ways. Preferably a latch, which advantageously is controlled by the button arranged at the end of the single lever, leans against the ball joint of the single lever, which latch controls the valve which is arranged in the pressure fluid pipes. The adjustment of the valve is appropriately effected by turning the button of the single lever. Thus the hand, which manages the single lever need not be taken from the top of the single lever when the device is stopped. This increases the sensitivity of the single lever control.

According to a further feature of the invention the swinging angle of the single lever, which by variation of its amplitude is controlling the speed of the feeler pin, is rendered adjustable.

For this purpose a cone, for example, arranged at the single lever, co-operates with a further cone, which surrounds the single lever. The cones may be adjusted towards each other. In this way the swing ways of the single lever may be limited equally in any direction of the circle.

The drawing represents an embodiment of the invention.

Fig. 1 shows a general view of the whole arrangement of the piston slides and the feeler pin mounted on the compound slide. Fig. 2 represents a longitudinal section of the single lever with the controller device for the pressure fluid. Fig. 3 represents the device for a controllable adjustment of the single lever's amplitude in section.

The piston slides 1, 2 for controlling the circulating flow are united in a casing 4 preferably being lodged parallel to each other. Pipes 5, 6 are leading from the cylinders of the piston slides 1, 2 to the pistons 7, 8 which are connected correspondingly with the parts 9 and 10 of the compound slide, which parts 9 and 10 are arranged at right angles to one another. On the part 10 the feeler pin holder 11 is arranged, in which the feeler pin 12 is fastened.

The piston slides 1, 2 are controlled by two slides which can be moved perpendicular towards each other, and by a single lever, which interlocks into these slides. For this purpose the piston 1 is connected with the slide 13, which is equipped with a vertical guiding slot 14. The pistons 1 and 2 being arranged parallel, the direction of the movement of the slide 15 is transmitted by a pinion 16 or the like, which, on the one hand meshes with a toothing of the rod 17 of the piston 2 and on the other hand with a toothing of the rod 18 of the slide 15. The slide 15 is equipped with a slot 19, which is arranged in a right angle to the slot 14 of the slide 13. Part 20 of the single lever, which controls both slides, interlocks into slots 14 and 19.

The pressure liquid from the pump 3 is forced into the piping 21, which is branching into pipes 23 and 24, which lead to each piston slide. Pipes 25 are reflux pipes which lead to the collecting vessel of the pump. A valve 26, which may be regulated by a lenker system, is built into pipe 21. By the valve 26 the pressure fluid pipe may be connected with the pipe 28, which is also leading to the collecting vessel of the pump, by which

arrangement the stream of fluid may be discharged unhindered.

By swinging out the single lever, point 20 may be moved in any desired radial circular movement or the like, whereby the piston slides 1 and 2 are moved in one or another direction by like or different ways. Pipes 23 and 24 are opened accordingly, i. e. according to the opening, the fluid of the pipe 21 is divided up. The fluid moves according to the distribution and influences pistons 7 and 8, the movements of which are transmitted to the feeler pin of the compound slide 9, 10. According to the movement of point 20, point 12 moves in radial, circular or any other desired direction. In order to be able to stop the movements of the pistons 7, 8 and consequently the compound slide 9 and 10 during any position of the single lever, according to the invention the pressure fluid pipe 21 may be connected with the reflux pipe 28 by opening of the valve 26, so that the pipes 23 and 24 are released from pressure. Thus the supply for the pistons 7 and 8 is interrupted and the fluid is forced through pipes 21 and 28 to the collecting vessel in circulation. Consequently both parts of the compound slide may be stopped if the valve 26 is opened. This is advantageously effected by a device arranged at the single lever, by which—during any desired position of the single lever—the valve 26 may be handled by the hand which is holding the lever.

Fig. 2 represents a constructive embodiment of this mechanism. The single lever's 29 ball joint 30 is lodged in a rigidly arranged part 31 of the machine. Its free end is equipped with a button 32 and the lever interlocks with part 20 into the slots of the slides 13, 15. In the ball 30 of the single lever a lever 34 is lodged, which swings round the axis 33. Its one arm 35 is kept under spring pressure and may be adjusted by a rod 36, lodged in the hollow lever 29. The rod is connected with a ring in the inside of the button 32. A latch 38 is set against the surface of the ball 30 and is carried by a lenker system 39. The lever 27 is linked with the valve 26. The rod 39 is mounted at 40. It continually is kept under spring pressure in such a way, that the latch 38 is set to the ball and the valve 28 is closed at the same time.

The device works as follows:

When the ring 37 is turned, the sleeve 41 is turned by the rod 36. As the sleeve slides in a screw feed, it is moved in longitudinal direction, whereby the arm 35 of the lever is pressed down and the other arm of the lever 34 stands out of

the outline of the ball. Thus the latch 38 is lifted from the ball 30 and the rod 38 is swung towards the casing 4. Thus the valve 26 is opened. The noses of the levers 34 and 38 are given such shape, as will be suitable for co-operation of the levers even if the single lever 28 occupies its utmost slanting position. This enables the valve 28 to work in any desired position of the single lever. If the ring 37 is turned the other way, the lever 34 may go back into the inside of the ball 30. The rod 39, which may be kept under spring pressure, follows this movement, whereupon the valve is closed. Now the latch 38 again is set to the surface of the ball 30.

By the single lever 29 not only the direction of the movement of the feeler pin 12, but also speed may be controlled. The amplitude of the single lever adjusts the speed of the movement of the feeler pin because by a variation of the single lever's amplitude the piston slides leave the outlet more or less open. This enables larger or smaller quantities of fluid to act on the pistons 7 and 8, which again leads to a quicker or slower movement of these pistons and consequently of the parts of the compound slide.

In order to keep the adjustment of the amplitude of the single lever under control there has been provided a device as shown in fig. 3. At the lever 29, for example, a fixed socket is arranged, onto which a cone 43 is screwed. The single lever 29 furthermore surrounds a socket 44, which is equipped with an inner cone 45, which fits in with the cone 43. By shifting the cones 43 and 45 towards each other, i. e. in axial direction, the gap is kept larger or smaller, which has the effect that the single lever is swung out more or less. The degree of the rigging out being a measure for the speed of the parts of the compound slide the speed may be adjusted by shifting of the cones. Appropriately the socket 44 is fixedly arranged and the cone 43 may be moved on box 42 in axial direction, for example by screws. It is of advantage to adjust the cone 43 by a handle ring 46 which has a grip surface. An indicator 47 which is connected with the cone 43 indicates the degree of adjustment in comparison with the fixed box 42, which may be equipped with a corresponding scale.

The interlocking of the cones which serves for adjusting the amplitude of the single lever is advantageous insofar, as the amplitude may be limited in all radial directions in a very simple manner. If the cones interlock completely, the single lever is fixed.

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