May 17, 1927. 1,628,878

F. E. GARDNER

WORK CARRIER

Filed April 14. 1924

Fig. 1

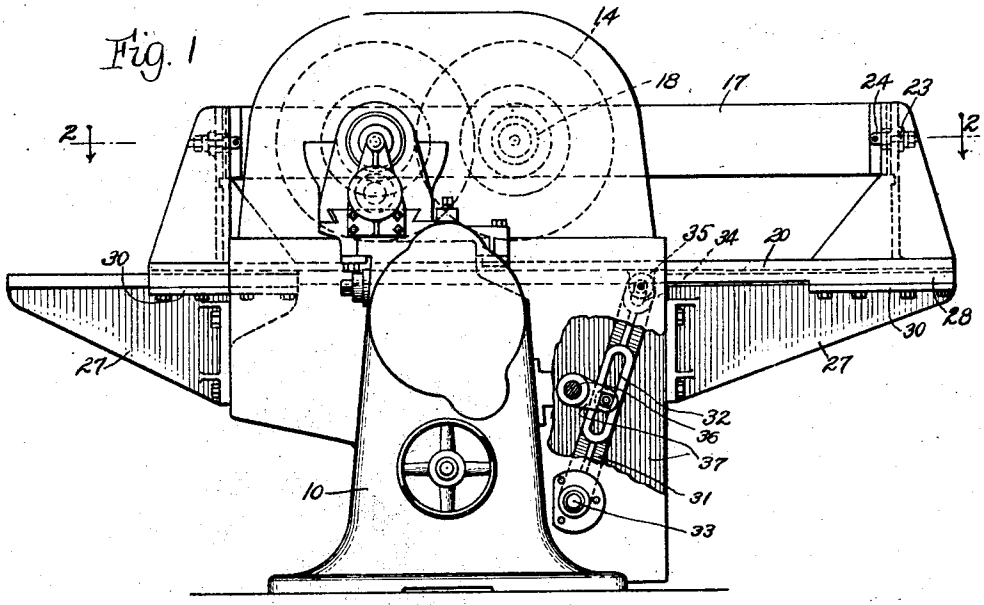


Fig. 2

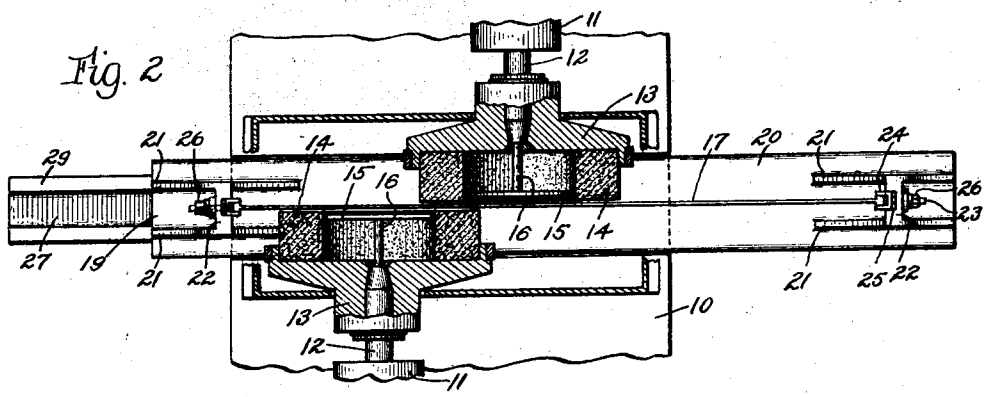
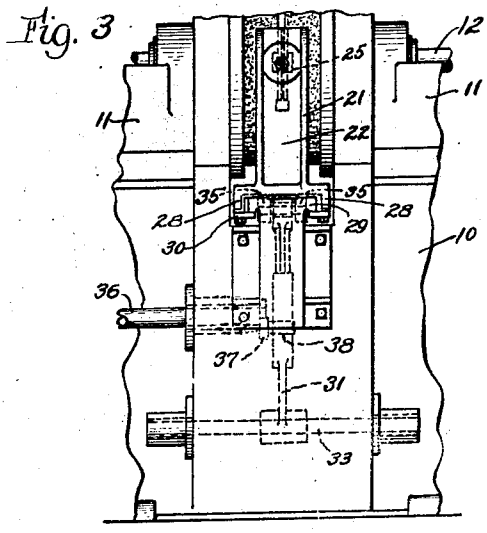


Fig. 3



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WORK CARRIER.

Application filed April 14, 1924. Serial No. 706,274.

This invention relates to improvements in work carriers for machine tools, and has particular reference to an improved carrier of the type illustrated in my copending application Serial No. 701,357, filed March 24, 1924.

An important object of my invention is to provide a thin metallic work carrier for feeding thin work blanks between the opposed faces of a plurality of operating elements.

Another object is to provide a carrier for thin work blanks which in its movement past an operating element will not bend or flex materially, and which will be firm and positive in operation.

A further object is to provide an improved support for the work supporting member of the work carrier.

Another object is to provide a carrier having a work supporting member of flexible material, and an improved means for tensioning said member and holding it taut throughout its movement.

More specifically, the invention contemplates the provision of a work carrier for machine tools such as grinding machines, said carrier comprising a thin flexible strip for feeding one or more work blanks across the face of an operating element or between the opposed faces of a plurality of elements, a support for guiding said strip throughout its reciprocation, and an adjustable tensioning means for holding said strip taut to prevent it from flexing against the face of either operating element.

Ancillary objects and advantages will become apparent as the description proceeds.

In the accompanying drawings, Figure 1 is an end view of a machine in which a work carrier embodying the features of my invention is used.

Fig. 2 is a fragmentary sectional view taken in the plane of line 2—2 of Fig. 1, and showing a plan view of the carrier.

Fig. 3 is a fragmentary side view of the machine showing one end of the carrier.

Referring to the drawings, I have illustrated the preferred embodiment of my invention as applied to a special type of grinding machine having opposed annular grinding elements arranged in parallel offset relation, but it is to be understood that the invention is susceptible to use with other types of machine tools and grinding machines.

The machine comprises generally a main frame or base 10 on the opposite ends of which are mounted a pair of spindle carriages 11. The parallel spindles 12 are journaled in the carriages 11, and are driven by any suitable means (not shown). A pair of heads 13 are secured to the adjacent ends of the spindles 12, and removably support the overlapping annular grinding elements 14. The central apertures of the grinding elements 14 are closed by circular guard plates 15 adjustably supported by rods 16 extending through the spindles 12.

Work is periodically fed into the grinding field between the overlapping faces of the grinding wheels 14 by a carrier comprising a thin reciprocating strip 17. The strip may be provided with any desired number of work receiving pockets or apertures 18, one aperture being shown in the present instance. Work blanks may be fed to the strip and discharged therefrom manually or mechanically, as desired. To adapt it for very thin work blanks such as piston rings, thrust collars and the like, the strip 17 preferably is made of extremely thin metal which is necessarily flexible. To tension and support the strip 17, its opposite ends are adjustably secured to a pair of upstanding brackets 19 located at opposite ends of a carrier slide 20.

The brackets 19 are preferably formed integral with the slide 20, and each comprises a pair of spaced parallel sides 21 connected by a transverse vertical web 22. Adjusting bolts 23 having square or non-rotatable heads 24 fitting within recesses 25 in the inner faces of the webs 22 extend through the latter and are longitudinally adjustable by means of nuts 26. The heads 24 are forked to fit over the ends of the strip 17, and are secured thereto, to adjustably connect them to the webs. It will be seen that by this construction, the strip 17 is held in a vertical plane, and can be properly tensioned by adjusting the nuts 26.

The slide 20 is mounted to reciprocate transversely of the base and is supported by lateral brackets 27 bolted to opposite sides of the base 10. Depending flanges 28 are formed at each end and on opposite sides of the slide, and fit over lateral guides 29 on the brackets 27. The slide 20 is held firmly in place throughout its reciprocation by a plurality of plates 30 secured to the under sides of the flanges 28 and fitting beneath the guides 29.

Any suitable means may be provided for reciprocating the slide 20. In the present instance an oscillating lever 31 having a longitudinal slot 32 midway of its length is supported at its lower end by a shaft 33 journaled in the base 10, and has a slotted connection 34 at its upper end with spaced depending lugs 35 on the under side of the slide 20. The lever 31 is operably connected to a shaft 36 by a revolving arm 37 secured to the latter, said arm having a pin 38 extending through and slidably engaging the slot 32. The shaft 36 is journaled in the base 10, and is driven by any suitable means (not shown). It will be seen that as the arm 37 revolves, the lever 31 will reciprocate the slide 20 and carrier strip 17 to feed the work blank between the grinding elements 14, the rate of movement being greatest when the work blank is completely in the grinding field.

It will be apparent that I have provided a carrier which can be made of a thickness suitable for extremely thin work blanks and which will be held taut throughout its reciprocation, thereby preventing contact with the faces of the grinding elements. The adjustable connection between the supporting brackets on the ends of the reciprocating slide and the ends of the carrier strip makes it possible to vary the tension as desired and to take up any slack due to stretching of the metal. The device is extremely simple in construction, and is positive and efficient in operation.

While I have illustrated my invention with considerable particularity, it is to be understood that various modifications and alternative constructions may be made without departing from the spirit and scope of the invention as expressed in the appended claims.

I claim as my invention:

1. A grinding machine comprising, in combination, a base, a pair of annular grinding elements disposed in opposed relation on said base, a slide mounted for reciprocation on said base below said grinding elements, a pair of brackets mounted on the ends of said slide, and a thin flexible work carrier adjustably secured at its opposite ends to said brackets and positioned to reciprocate between the opposed faces of said grinding elements.

2. A machine tool comprising, in combination, a base, a pair of operating elements mounted in opposed relation on said base a pair of lateral brackets secured to the side of said base, said brackets being formed with guideways on their upper edges, a slide mounted for reciprocation on said guideways, a pair of upstanding brackets mounted on the opposite ends of said slide, a carrier strip secured at its opposite ends to said upstanding brackets, adjustable means for tensioning said strip, and means for reciprocating said slide.

3. A machine tool comprising, in combination, a base, a plurality of operating elements mounted on said base, a pair of lateral brackets secured to the sides of said base, a slide mounted for reciprocation on said brackets transversely of said base a flexible carrier strip supported by said slide for reciprocation past the faces of said operating elements, means for holding said strip taut, and means for reciprocating said slide.

4. A machine tool comprising, in combination, a base, a pair of operating elements mounted in opposed relation on said base, a slide mounted for reciprocation transversely of said base, a flexible carrier strip supported by said slide for reciprocation between the faces of said operating elements, means for preventing flexure of said strip, and means for reciprocating said slide.

5. A machine tool having, in combination a base, an operating element supported on said base, a slide mounted to reciprocate transversely of said operating element, a pair of brackets carried by said slide, a carrier strip supported by said brackets parallel to said slide for reciprocation across the face of said operating element, means for preventing flexure of said strip, and means for reciprocating said slide.

6. A machine tool comprising, in combination, a base, an operating element mounted on said base, a pair of lateral brackets secured to opposite sides of said base, said brackets having guideways extending transversely of said base, a slide having depending flanges overlapping said guideways, a plurality of plates secured to said flanges and underlying said guideways, a flexible carrier strip positioned for movement across the face of said operating element, means on said slide for supporting said strip, and for holding it taut, and means for reciprocating said slide.

7. A machine tool comprising, in combination, a base, an operating element mounted on said base, a slide mounted for reciprocation on said base, a carrier strip positioned on said slide for reciprocation across said operating element, means on said slide for supporting and tensioning said strip, and means for reciprocating said slide.

8. A machine tool comprising, in combination, a base, an operating element mounted on said base, a slide mounted for reciprocation transversely of said base and below said element, a flexible carrier member, means on said slide for supporting said member for movement across said element, means for tensioning said member, and means for reciprocating said slide.

9. A machine tool comprising, in combination, a base, an operating element mounted on said base, a slide mounted for

transverse movement on said base, a pair of brackets mounted on opposite ends of said slide, a flexible carrier strip secured between said brackets and positioned to reciprocate across the face of said operating element, and means in one of said brackets for adjusting the tension of said strip.

10. A machine tool comprising, in combination, a base, an operating element mounted on said base, a movable member mounted for reciprocation transversely of said base, a pair of brackets positioned on said member at opposite sides of said operating element, a flexible member positioned to move past the face of said operating element and connected at its opposite ends to said brackets, one of said connections being capable of adjustment to vary the tension of said strip, and means for actuating said member.

11. A machine tool comprising, in combination, a base, an operating element mounted on said base, a member mounted for reciprocation transversely of said base and carrying a pair of brackets located at opposite sides of said operating element, one of said brackets comprising a transverse web, a flexible work supporting strip positioned to move past the face of said operating element and secured at its opposite ends to said brackets, one end of said strip being adjustably secured to said web, and means for reciprocating said member.

12. A machine tool comprising, in combination, a base, an operating element mounted on said base, and a work carrier for feeding work blanks across the surface of said element, said carrier comprising a movable support, a flexible member on said support for carrying said work blanks, means for preventing undue flexure of said member, and means for actuating said support.

In testimony whereof, I have hereunto affixed my signature.

FREDERIC E. GARDNER.