

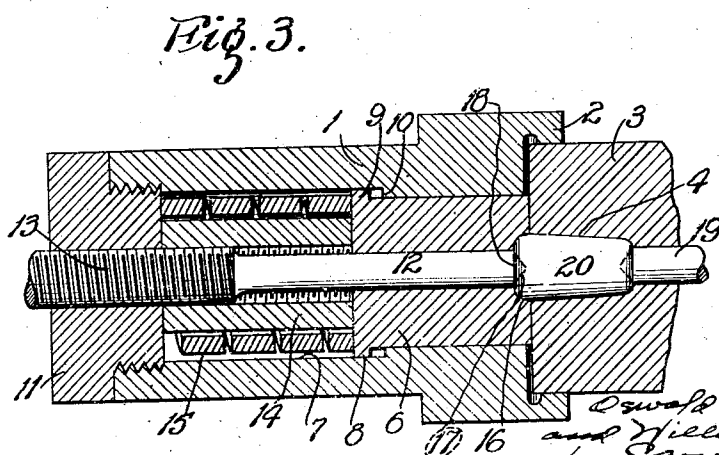
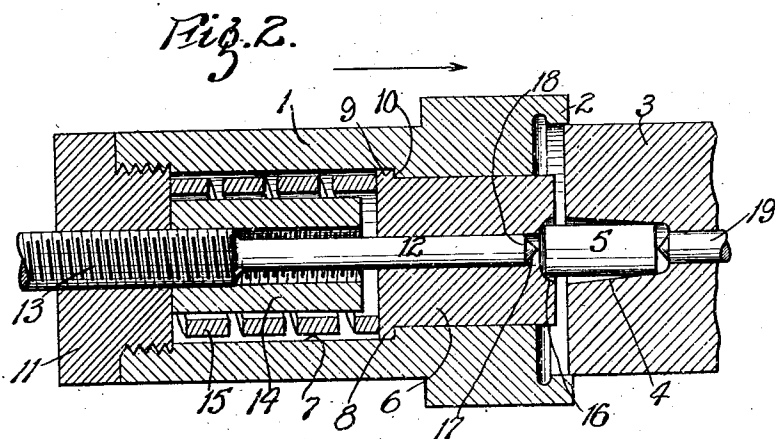
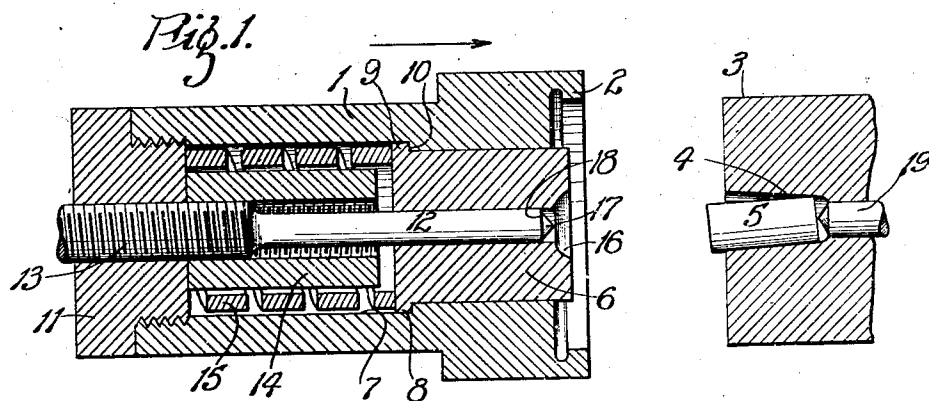
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ROLL MAKING MACHINE

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UNITED STATES PATENT OFFICE.

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ROLL-MAKING MACHINE.

Application filed October 26, 1923. Serial No. 671,043.

Our invention relates to roll making machine, particularly to a machine adapted to make, by a die-shaping operation, conical rolls such as are used in conical roller bearings; and has for its principal object a machine in which the roll is accurately centered before the die-shaping operation, whereby the roll is of accurate size and shape and is free from flashings. Other objects are the easy and rapid making of conical rolls for roller bearings and a machine in which the parts subject to hardest wear may be removed for replacement or repair.

The invention consists principally in providing the heading machine with a hollow punch in the bore of which is disposed a second punch, the hollow punch having a central depression adapted to engage the roll blank to accurately center it in the die just as the upsetting operation begins. The invention further consists in the parts and combination of parts hereinafter described and claimed.

In the accompanying drawing,

Fig. 1 is a sectional view of a heading machine embodying our invention, the parts being shown in their position prior to the die-shaping operation.

Fig. 2 is a similar view showing the roll blank centered in the conical die at the beginning of the die-shaping operation, and

Fig. 3 is a similar view showing the position of the parts at the end of the die-shaping operation.

A hollow punch holder 1 is mounted in the ram of a suitable machine, the construction of such machine forming no part of the present invention and not being shown in the drawing. The enlarged end portion of said punch holder 1 is provided with an annular flange 2 that is adapted to fit over the end of a die 3 in the conical seat 4 of which is disposed a cylindrical slug 5 of the volume required to make a conical roll. Thus the punch mechanism is centered with respect to the die.

Slidably mounted in the bore of the punch holder 1 is a hollow punch 6. The rear portion 7 of the bore of the punch holder is enlarged and the end portion 8 of the hollow punch is enlarged to fit such enlarged portion of said bore. Thus an annular rib 9 is formed on the punch and an annular shoulder 10 is formed in the punch holder,

the rib 9 and shoulder 10 cooperating to limit the forward movement of the punch 6 in the punch holder 1.

The rear end of the bore of the punch holder 1 is threaded to receive a threaded cap 11. A second punch 12 is disposed in the bore of the hollow punch and cooperates with said hollow punch to make the roll. Said punch has a threaded extension 13 whereby it is mounted in said threaded cap.

Mounted on said threaded extension 13 in the bore of the punch holder 1 is an interiorly threaded sleeve 14. Said sleeve constitutes a locking member for the inner punch 12 and also serves to limit the rearward movement of the hollow punch 6. Interposed between the cap 11 and the end of the hollow punch 6 is a helical spring 15 that tends to keep the punch in its outermost position in the punch holder.

The central portion of the hollow punch is provided with a depression 16 therein of suitable size and shape to form the rounded end edge of a conical roller for roller bearings. The inner punch 12 has a conical projection 17 thereon adapted to form a conical depression in the end of the roller and is disposed so that when the hollow punch is in the rearmost position in the punch holder, the end edge 18 of the inner punch is flush with the bottom of the depression in the outer punch, the conical projection extending therebeyond, the two punches together forming the end of a roller.

The punch mechanism is assembled as follows:

The inner punch 12 is mounted in the cap 11 and the sleeve 14 is mounted on the punch extension 13 in such position that when the hollow punch 6 is mounted on the inner punch and moved against the sleeve 14, the end edge 18 of the hollow punch is flush with the bottom of the depression 16 in the hollow punch 6. The hollow punch 6 is then removed from the inner punch 12, the spring 15 placed in position on the sleeve 14, the hollow punch is again mounted on the inner punch, and the punch holder 1 is screwed in place.

The operation of the machine is as follows:

A cylindrical slug 5 of the exact volume required for the roll is placed in the conical seat 4 in the die 3, as shown in Fig. 1. Pref-

erably, said die 3 is provided with a bore in which is disposed a member 19 that constitutes a knock-out and also serves to cooperate with the end of the die seat to form the small end of the roll. The ram of the machine moves forward carrying with it the punch mechanism. The hollow punch 6 is in its forward position in the punch holder and projects beyond the end of the inner punch 12. The annular flange 2 on the punch holder engages the die 3, thus accurately centering the punch mechanism with reference to the die. The slug is engaged by the depression in the hollow punch, such engagement serving to raise the end of the slug as shown in Fig. 2, and accurately center it in the conical die seat. As the ram continues to move forward, the hollow punch is forced back against the pressure of the spring until it rests against the sleeve and the inner punch is in operative position. After the hollow punch strikes said sleeve the hollow punch and the center punch move forward together, thus upsetting the slug in the die seat to form the conical roll 20. The finished roll 20 is shown in Fig. 3. After the roll is finished, the punch mechanism is withdrawn and the roll is ejected by means of the knock-out 19. The herein described mechanism has numerous advantages. It insures the accurate centering of the slug in the conical die seat and thus results in the making of a conical roll of the exact size and shape desired and a roll that is free from flashings

and projections, particularly at the large end.

Obviously numerous changes may be made without departing from the invention, and we do not wish to be limited to the precise construction shown.

What we claim is:

A roll making machine comprising a die having a conical, horizontally disposed seat, a knockout member forming the central end portion of said die and having a conical end adapted to form a depression in the end of the work, a hollow punch holder movable toward said die, said punch holder having an annular end flange adapted to fit over the end of said die, a hollow punch slidably mounted in the bore of said punch holder, said punch having a central concave depression adapted to engage the end of the work and center it in the die and shape said end of the work, a second punch fixed in said punch holder and disposed in the bore of said hollow punch and having a conical end adapted to form a depression in the end of the work in alinement with the depression formed by said knockout member, and means for limiting the movement of said hollow punch in said punch holder whereby said second punch forms the depression in the end of the work after said hollow punch has shaped said end.

Signed at Canton, Ohio, this 22nd day of October, 1923.

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