Dec. 12, 1933. A. RAFTER 1,938,932

MACHINE FOR ROLLING SHEET METAL SHAPES

Filed May 14, 1932 2 Sheets-Sheet 1

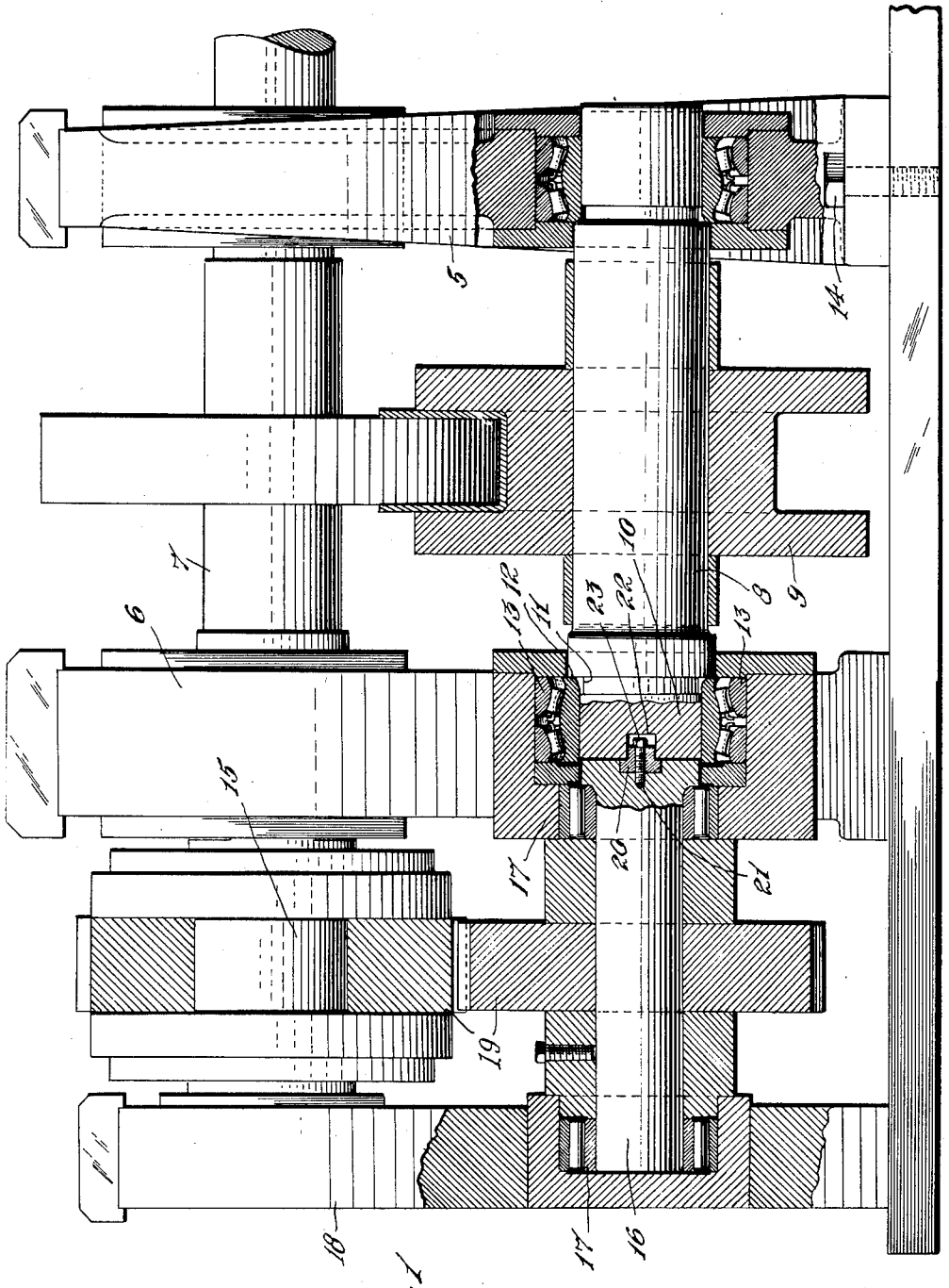


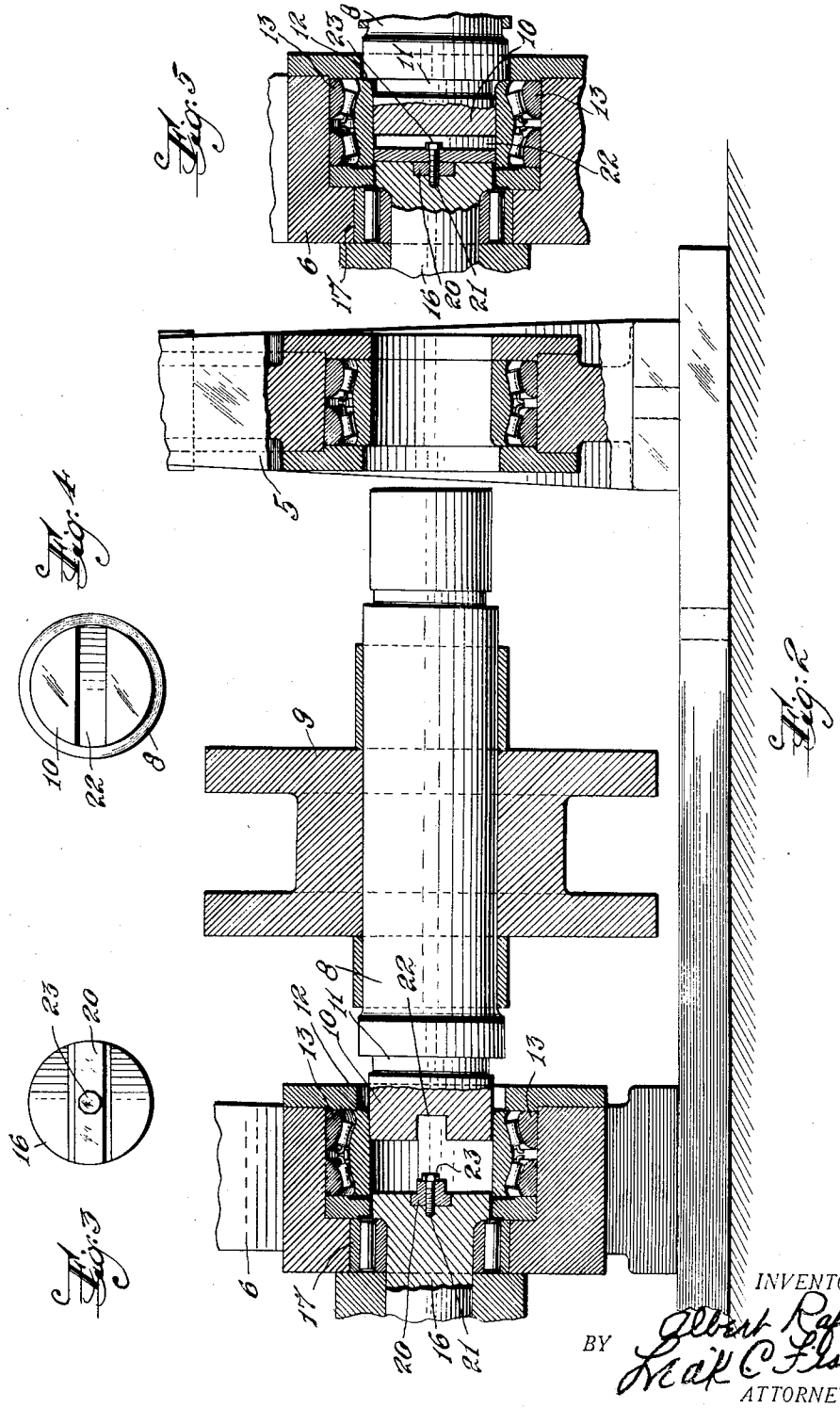
Fig. 1

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MACHINE FOR ROLLING SHEET METAL SHAPES

Albert Rafter, Belleville, N. J., assignor to Rafter Machine Company, Belleville, N. J., a partnership composed of Albert Rafter and John C. Rafter, Jr.

Application May 14, 1932. Serial No. 611,374

1 Claim. (Cl. 153—28)

This invention relates to metal forming machines of the type in which sheets of metal are formed into various shapes by passing them between a plurality of die rolls.

In U. S. Letters Patent No. 1,792,122 granted to me on February 10, 1931, is described a metal forming machine of the type herein considered. Such machines comprise a plurality of units of die rolls, each unit including an upper die roll and a lower die roll, and in many instances the machines have thirty or more die roll units. From time to time, it is necessary to change the die rolls in order to form different shapes. Also, when the machine has been using, for example, eighteen die roll units and it is desired to form a shape requiring only twelve die roll units, it is necessary to remove six of the units from the machine. Inasmuch as, heretofore, the die rolls have been mounted on spindles directly connected to driving means, the process of changing die rolls or removing spindles has been very inconvenient, sometimes requiring days of labor for the changing operation, for it has been necessary to substantially dismantle the entire machine in order to disconnect the spindles from the driving gears and associated parts.

It is an object of this invention to provide a two part spindle for use in metal forming machines, one part of the spindle being permanently connected to driving means, and the other part carrying a die roll and detachably connected to the first part.

A further object is the provision of economical and rapid means for facilitating the changing of die rolls and the removal of spindles in a metal forming machine.

These and other advantageous objects, which will later appear, are accomplished by the simple and practical construction and arrangement of parts hereinafter described and exhibited in the accompanying drawings, forming part hereof, and in which:

Fig. 1 is an elevational view of a die roll unit embodying my invention,

Fig. 2 is an elevational view showing a forward support moved to enable the withdrawal of a spindle,

Fig. 3 is an end view of the drive shaft employed in the die roll unit,

Fig. 4 is an end view of the spindle shaft employed in the die roll unit, and

Fig. 5 is a sectional view showing the key connecting the drive shaft and spindle sheared by an overload without affecting the other parts of the die roll unit.

Referring to the drawings, the die roll unit is shown to comprise a forward support 5 and a rear support 6 for the upper and lower die roll spindles 7 and 8. Inasmuch as the upper and lower die roll spindles are of the same construction, only the lower spindle 8 will be described.

The spindle 8 has mounted thereon a die roll 9, and each end of the spindle is reduced as shown at 10, the reduced portion having a groove 11 adjacent its junction with the main portion of the spindle to provide a shoulder 12. The reduced ends of the spindle are journalled in double row roller bearings 13 in supports 5 and 6, the bearings 13 also serving as thrust bearings against the shoulders 12, this arrangement definitely establishing the position of the spindle between the supports 5 and 6. The groove 11 causes the thrusts on the bearings to be either parallel with the longitudinal axis of the spindle or at right angles thereto.

Support 5 is detachably mounted by bolts 14 and may be readily removed to enable the spindles 7 and 8 to be withdrawn from the bearings 13.

Driving shafts 15 and 16 for the spindles 7 and 8, respectively, are mounted in roller bearings 17 in support 6 and in a third support 18. The shafts are driven by suitable gearing 19, and are detachably connected to the spindles by keys 20. The keys are fixed to the drive shafts by means of bolts 21, and the spindles are provided with recesses 22 to accommodate the heads 23 of the bolts. The keys 20 serve to detachably connect the spindles to the drive shafts, and also to act as a safety device to prevent overloading of the machine. When the machine is overloaded, the keys will shear first and disconnect the drive shafts and the spindles before any damage can be done to the gearing and other parts of the machine.

From the above description it will be seen that I have provided a simple and convenient spindle arrangement which enables the ready removal of the spindles in a metal forming machine. All that is necessary to remove the spindles is to unfasten the bolts 14 and slide the forward support 5 sufficiently forward to enable the spindle to be withdrawn from the bearings in the rear support 6 and disconnect it from the drive shaft. For a machine having thirty die roll units a complete removal of the spindles may be accomplished in about two hours, while heretofore, such an operation required several days of labor.

The foregoing disclosure is to be regarded as descriptive and illustrative only, and not as re-

strictive or limitative of the invention, of which obviously an embodiment may be constructed including many modifications without departing from the general scope herein indicated and denoted in the appended claim.

Having thus described my invention what I claim as new and desire to secure by Letters Patent, is:

In a metal forming machine, a forward support and a rear support, bearings mounted in said supports, a spindle having reduced end portions journalled in said bearings, circumferential grooves at the junctions of the reduced portions and the main body of the spindle to cause thrusts on the bearings to be either parallel to the longitudinal axis of the spindle or at right angles thereto, a drive shaft rotatably mounted on the rear support and in alignment with the spindle, and means for detachably connecting the spindle to the drive shaft.

ALBERT RAFTER.