April 27, 1926. 1,582,639

J. K. CULLEN

METAL WORKING MACHINE

Filed Feb. 5, 1923

Fig. 1.

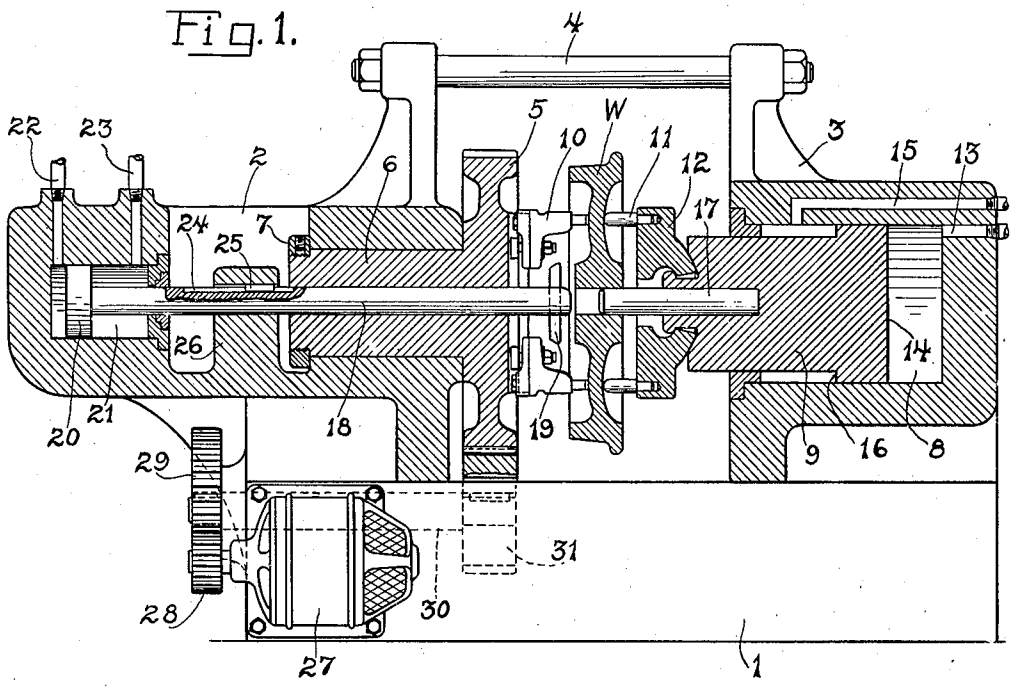
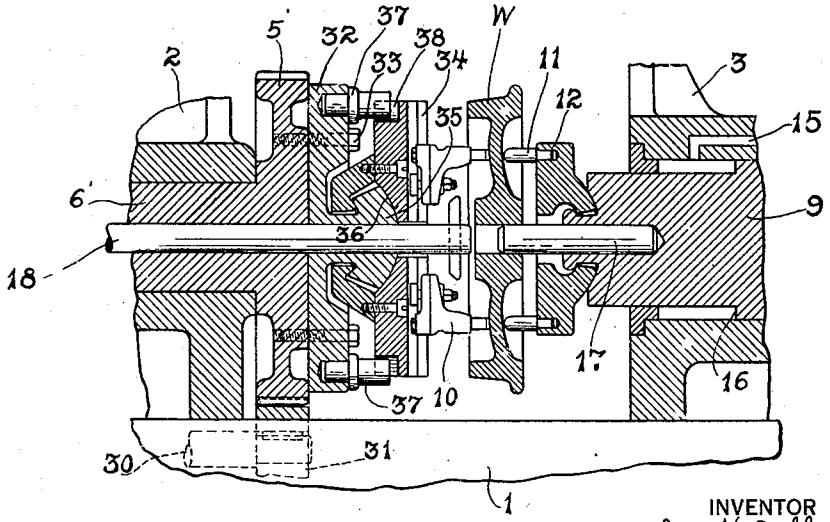


Fig. 2.



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UNITED STATES PATENT OFFICE.

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METAL-WORKING MACHINE.

Application filed February 5, 1923. Serial No. 617,153.

To all whom it may concern:

Be it known that I, JAMES K. CULLEN, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Metal-Working Machines, of which the following is a specification.

This invention relates to metal working machines and particularly to a machine for facing off the hubs of car wheels. Briefly, such a machine comprises a headstock and a tailstock having means thereon for centering and supporting a car wheel while a tool operates on the hub thereof, means of course being provided for causing a relative rotation between the tool and work. The primary object of the invention is to provide an improved machine of this type. As shown in the drawing, the means for feeding both the tool and the work engaging means is preferably fluid pressure operated although it will be understood that the invention is not to be so limited by such illustration.

A further object of the invention is to provide work centering means and adjustable work engaging means in combination with the machine, the latter of such means being preferably floatingly mounted whereby to readily adapt itself to the contour of the work piece.

With the above and other objects in view, my invention consists in the features of construction and operation set forth in the following specification and illustrated in the accompanying drawing. In such drawing annexed hereto and forming a part of this specification, I have shown certain embodiments of my invention but it will be understood that the invention can be otherwise embodied and that the drawing is not to be construed as defining or limiting the scope of the invention, the claims appended to this specification being relied upon for that purpose.

Referring to the figures of the drawing:

Figure 1 is a vertical sectional view of a hub facing machine for car wheels embodying my invention.

Fig. 2 is a fragmentary view showing a modification of the same.

Referring first to Fig. 1 of the drawing, 1 indicates the base of the machine supporting a headstock 2 and a tailstock 3 thereon, the headstock and tailstock preferably being tied together by a rod 4. Rotatably mounted in the headstock is a gear 5 which, as illustrated in Fig. 1, comprises the face plate of the machine. This gear is illustrated as being an integral part of a hub 6 rotatably mounted in the headstock and held therein by a nut 7. Mounted coaxially of the face plate and for longitudinal sliding movement within a cylinder 8 in the tailstock is a spindle 9.

The face plate or gear 5 is provided with a plurality of work engaging and driving elements 10 thereon and the spindle 9 is likewise provided with a plurality of work engaging elements 11, such elements 11 preferably being mounted on a member 12 supported for free angular movement on the spindle. Such mounting of the member 12 permits the work engaging elements thereon to automatically adjust themselves to the contour of the work piece as will hereinafter appear.

As illustrated, the spindle 9 is operated by fluid pressure within its cylinder 8, the spindle being moved forwardly by fluid pressure admitted through a duct 13 and acting against the entire rear face 14 of the spindle, and the spindle being moved rearwardly by fluid pressure admitted through a duct 15 and acting against an annular surface 16 of the spindle. The spindle 9 also supports a work centering pin 17 extending forwardly of the spindle and of the member 12 thereon, such pin being coaxial with the axis of rotation of the face plate.

A cutter bar 18 is mounted within the hub of the gear 5 at the axis of rotation thereof, the cutter bar also being coaxial with the centering pin 12 and carrying a facing tool 19 at its forward end. The bar is adapted to be fed longitudinally by fluid pressure by means of a piston 20 secured to the end thereof and operating within a cylinder 21. Fluid pressure admitted to the cylinder through a duct 22 is adapted to force the piston and bar forwardly toward the work and fluid pressure admitted to the cylinder through a duct 23 is adapted to draw the piston and bar backwardly. An intermediate portion of the bar is splined at 24 and such spline is engaged by a key 25 seated in

a bearing 26. The bar is therefore free for longitudinal movement but cannot rotate.

The face plate or gear 5 is illustrated as driven from a motor 27 mounted on the base of the machine. A pinion 28 on the motor shaft meshes with a gear 29 on one end of a shaft 30 having a pinion 31 at its other end meshing with gear 5.

The operation of the machine shown in Fig. 1 and above described is as follows: Fluid pressure is first admitted to the forward faces of the spindle 9 and piston 20 respectively through ducts 15 and 23. The spindle and cutter bar are thereby drawn backwardly away from the work piece W illustrated in Fig. 1. The work piece or wheel W to be operated upon is then placed between the face plate 5 and the member 12 on the spindle 9 in a position to have the center hole in the wheel engaged by the centering pin 17 of the spindle. Fluid pressure is then admitted through the duct 13 to force the spindle 9 forwardly and grip the wheel between the work engaging elements 11 and the work engaging and driving elements 10, as illustrated in Fig. 1. As heretofore stated, the member 12 is mounted for free floating angular movement on the spindle 9. The member 12 will therefore automatically adjust itself to a position to firmly contact each of its work engaging elements 11 with the work piece and to firmly contact the work piece with each of the work driving elements 10. With the work piece thus held between the work engaging elements in a centered position on the centering pin 17, the same is rotated from the motor 27. Fluid pressure is now admitted to the cylinder 21 through the duct 22 whereby the cutter bar is forced forwardly to engage its tool 19 with the work piece wheel W and face off the hub thereof.

The mechanism shown in Fig. 2 is the same as that shown in Fig. 1 and above described except that the work driving elements 10 are also supported in a floating manner to adjust themselves to the contour of the work piece as above described in reference to the work engaging elements 10. A gear 5′ is rotatably mounted on a hub 6′ in the headstock and is driven from the pinion 31. A face plate 32 is secured to the gear by means of bolts 33. A member 34 is floatingly mounted on a projecting portion 35 of the face plate, such members having arc-shaped inter-engaging bearing faces 36 as illustrated. The member 34 is driven from the face plate by pins 37 in the latter engaging notches 38 in the member. In operation, the spindle 9 is brought forward to engage the work between the elements 10 and 11 as above described. The work piece wheel W is centered on the centering pin 17 and since both members 12 and 34 are floatingly mounted, the work engaging elements 10 and 11 readily adjust themselves to the contour of the work piece and firmly engage the same therebetween.

What I claim is:

1. In a machine of the class described, the combination of a base, a headstock and a tailstock thereon, a face plate rotatably mounted on the headstock, work driving means on the face plate, opposed work engaging and centering means supported by the tailstock, the said work driving and engaging means being relatively angularly adjustable whereby to uniformly engage the work piece therebetween, a cutter bar extending axially of the face plate, means including fluid pressure operated means for causing a relative approaching and work engaging movement between the work driving and engaging means and for feeding the bar axially toward the work piece, and means for rotating the face plate and the said work piece.

2. In a machine of the class described, the combination of a base, a headstock and a tailstock thereon, a face plate rotatably mounted on the headstock, work engaging means including a plurality of work driving elements on the face plate, opposed work engaging means including a plurality of work engaging elements on the tailstock, one of said means being floatingly mounted whereby the same may readily adjust itself to the contour of the work to be engaged, means for forcing the tailstock work engaging means toward the face plate whereby to grip the work between the work engaging and driving elements, a cutter bar extending axially of the face plate, means for feeding the bar axially toward the work piece, and means for rotating the face plate and the said work piece.

3. In a machine of the class described, the combination of a base, a headstock and a tailstock thereon, a face plate rotatably mounted on the headstock, work engaging means including a plurality of work driving elements on the face plate, a longitudinally movable spindle in the tailstock, work engaging means including a plurality of work engaging elements on the spindle, one of the said means being floatingly mounted whereby the same may readily adjust itself to the contour of the work to be engaged, fluid pressure operated means for forcing the spindle toward the face plate whereby to grip the work between the work engaging and driving elements, a cutter bar extending axially of the face plate, means for feeding the bar axially toward the work piece, and means for rotating the face plate and the said work piece.

4. In a machine of the class described, the combination of a base, a headstock and a tailstock thereon, a face plate rotatably mounted on the headstock, work engaging

means including a plurality of work driving elements on the face plate, a longitudinally movable spindle in the tailstock, a work centering pin in the spindle, work engaging means including a plurality of work engaging elements on the spindle, one of the said means being floatingly mounted whereby the same may readily adjust itself to the contour of the work to be engaged, fluid pressure means for forcing the spindle toward the face plate whereby to grip the work between the work engaging and driving means, a cutter bar extending axially of the face plate and in axial alignment with the centering pin, means for feeding the bar axially toward the work piece, and means for rotating the face plate and the said work piece.

5. In a machine of the class described, the combination of a base, a headstock and a tailstock thereon, a face plate mounted on the headstock, work engaging means on the face plate, opposed work engaging means on the tailstock, one of the said means being floatingly mounted whereby the same may readily adjust itself to the contour of the work to be engaged, a cutter bar extending axially of the face plate, means including fluid pressure operated means for causing a relative approaching and work engaging movement between the said work engaging means and for feeding the bar axially toward the work piece, and means for causing a relative rotation between the face plate and cutter bar.

6. In a machine of the class described, the combination of a base, a headstock and a tailstock thereon, a face plate mounted on the headstock, work engaging means on the face plate, opposed work engaging and centering means on the tailstock, one of the said work engaging means being floatingly mounted whereby the same may readily adjust itself to the contour of the work to be engaged, means for forcing the work engaging and centering means toward the face plate whereby to grip the work in a centered position between the work engaging means, a cutter bar extending axially of the face plate, means for feeding the bar axially toward the work piece, and means for causing a relative rotation between the face plate and the cutter bar.

7. In a machine of the class described, the combination of a base, a headstock and a tailstock thereon, a face plate mounted on the headstock, work engaging means on the face plate, opposed work engaging means on the tailstock coaxial with the longitudinal axis of the face plate, one of the said means being mounted for angular floating movement about the said axis whereby the same may readily adjust itself to the contour of the work to be engaged, means for causing a relative approaching and work engaging movement between the said work engaging means, a cutter bar extending axially of the face plate, means for feeding the bar axially toward the work piece, and means for causing a relative rotation between the face plate and cutter bar.

8. In a machine of the class described, the combination of a base, a headstock and a tailstock thereon, a face plate rotatably mounted on the headstock for free angular adjustment about its axis of rotation, work driving means on the face plate, opposed work engaging means on the tailstock, fluid pressure operated means for forcing the work engaging means toward the face plate whereby to grip a work piece between the work engaging and driving means, a cutter bar extending axially of the face plate, means for feeding the bar axially toward the work piece, and means for rotating the face plate and the said work piece.

9. In a machine of the class described, the combination of a base, a headstock and a tailstock thereon, a face plate rotatably mounted on the headstock, work driving means on the face plate, opposed work engaging means on the tailstock, the said work driving and engaging means both being freely angularly adjustable about the axis of rotation of the face plate, means for forcing the work engaging means toward the face plate whereby to grip a work piece between the work engaging and driving means, a cutter bar extending axially of the face plate, means for feeding the bar axially toward the work piece, and means for rotating the face plate and the said work piece.

10. In a machine of the class described, the combination of a base, a headstock and a tailstock thereon, a face plate rotatably mounted on the headstock, work driving means on the face plate, opposed work engaging means on the tailstock, the said work engaging means being freely angularly adjustable about the axis of rotation of the face plate, fluid pressure operated means for forcing the work engaging means toward the face plate whereby to grip a work piece between the work engaging and driving means, a cutter bar extending axially of the face plate, means for feeding the bar axially toward the work piece, and means for rotating the face plate and the said work piece.

11. In a machine of the class described, the combination of a base, a headstock and a tailstock thereon, a face plate rotatably mounted on the headstock, work driving means on the face plate, a longitudinally movable spindle in the tailstock, work engaging means on the spindle, fluid pressure operated means for forcing the spindle toward the face plate whereby to grip the work between the work driving and engag-

ing means, a cutter bar extending axially of the face plate, fluid pressure operated means for feeding the bar axially toward the work piece, and means for rotating the face plate and the said work piece.

12. In a machine of the class described, the combination of a base, a headstock and a tailstock thereon, a gear rotatably mounted on the headstock, work driving means on the gear, a longitudinally movable spindle in the tailstock, work engaging means on the spindle, one of the said means being floatingly mounted whereby the same may readily adjust itself to the contour of the work to be engaged, fluid pressure operated means for forcing the spindle toward the face plate whereby to grip the work piece between the work engaging and driving means, a cutter bar extending axially through the gear, means for feeding the bar axially toward the work piece, and means including a motor and a gear engaging the gear on the headstock for rotating the work driving means and the work engaged thereby.

In testimony whereof, I hereto affix my signature.

JAMES K. CULLEN.