Nov. 22, 1927. 1,650,582

S. T. NELSON

FORGING MACHINE

Original Filed Jan. 23, 1922 2 Sheets-Sheet 1

Fig. 1.

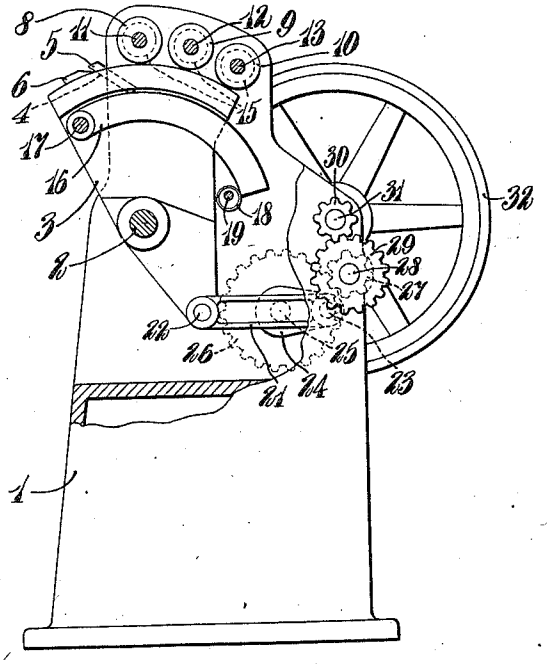
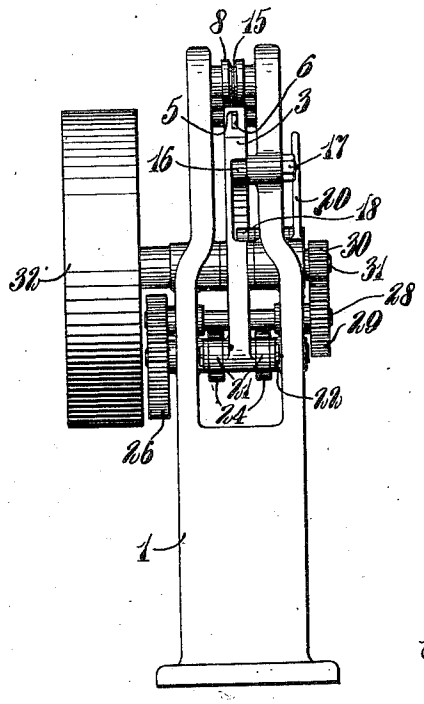


Fig. 2.



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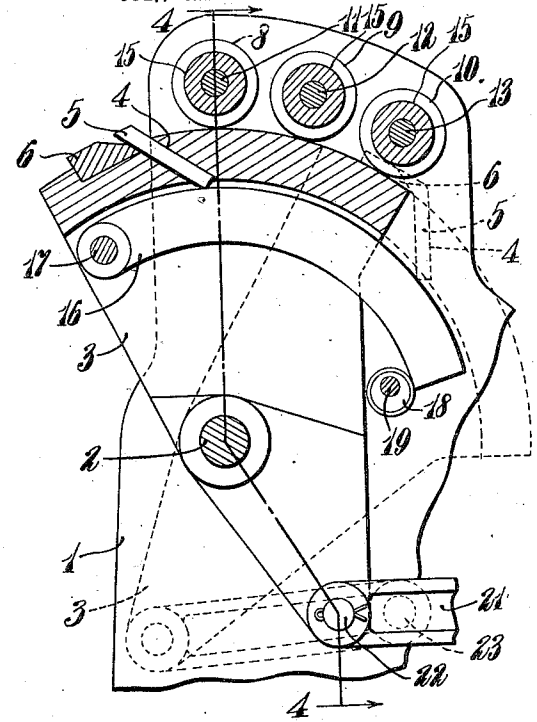


Fig. 3.

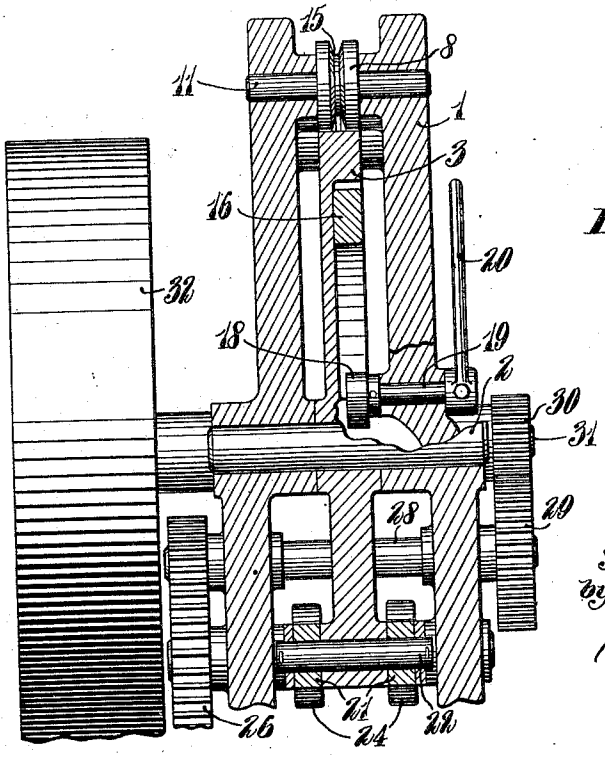


Fig. 4.

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Patented Nov. 22, 1927. 1,650,582

UNITED STATES PATENT OFFICE.

SVEN T. NELSON, OF MICHIGAN CITY, INDIANA, ASSIGNOR TO SULLIVAN MACHINERY COMPANY, A CORPORATION OF MASSACHUSETTS.

FORGING MACHINE.

Application filed January 23, 1922, Serial No. 531,208. Renewed July 18, 1927.

My invention relates to forging machines, and more particularly to forging machines designed to shape blanks into cutter bits for coal mining machines of the chain type.

An object of my invention is to provide an improved forging machine. Another object of my invention is to provide an improved forging machine in which a blank may be advantageously shaped to the desired form and returned to a position for ready removal. A further object of my invention is to provide an improved forging machine having improved means for varying the shape of the finished blank. Other objects and advantages of my invention will hereinafter more fully appear.

In the accompanying drawings I have shown for purposes of illustration one form which my invention may assume in practice.

In these drawings,—

Fig. 1 is a view partially in side elevation and partially with parts broken away to the central plane of the machine, showing an illustrative embodiment of my invention.

Fig. 2 is a front elevation of such a machine.

Fig. 3 is a view on an enlarged scale and with parts shown in elevation, but mainly on a central vertical plane through the machine, certain parts being shown in dotted lines in a different position.

Fig. 4 is a section on the line 4—4 of Fig. 3 with parts broken away to show details of construction.

In the embodiment of my invention which I have shown for purposes of illustration in the accompanying drawings and which I shall now describe, the same is mounted upon a heavy frame 1. In this frame is supported somewhat above the center thereof, a transversely extending rock shaft 2 upon which there is mounted an oscillating blank carrying member 3 which is of considerable weight and is provided with a slot or socket 4 in which a blank 5 to be sharpened may be inserted and with a die 6 arranged adjacent the socket 4 in such manner as to support and form, in a manner hereinafter more fully apparent, a blank during the forging operation.

Adjacent the top of the frame 1 there are arranged a series of rotatable dies 8, 9 and 10 which are mounted on transverse shafts 11, 12 and 13 whose axes lie in a surface of revolution whose directrix coincides with the axis of the shaft 2. It will accordingly be apparent that a die fixedly carried in the slot 4 would be impinged by the die 8 and if sufficiently flattened would not touch the dies 9 and 10 unless moved before it reaches them. From Figs. 2 and 4 it will be noted that the dies 8, 9 and 10 are provided with peripheral grooves 15 of a cross section to receive the die 6 and to fit the desired end section of a finished blank.

For the purpose of causing the dies 8, 9 and 10 to successively more and more nearly perfectly finish a blank, a guide member 16 is pivoted as at 17 on the frame 1 and is shaped on a curvature corresponding with an arc whose radius is equal to the distance between the axis of the shaft 2 and the uppermost surface of the guide 16 adjacent the pin 17. This guide is designed to support the lower end of a blank 5 disposed in the socket or slot 4 and by causing the blank to be progressively protruded as the member 3 oscillates on its forming stroke serves to bring about the functioning of the dies 9 and 10. For the purpose of adjusting the member 16 to accomplish the protrusion of the blank to different degrees, I have mounted an eccentric or cam 18 upon a transverse shaft 19 extending through one wall of the frame 1 and adjustable by means of a lever 20. It will be evident that as the eccentric 18 is turned so that its greatest eccentricity comes between the shaft 19 and the adjacent surface of the guide 16 the bit will be progressively further protruded.

For the purpose of oscillating the carrier member 3, I connect a connecting rod 21 to a pin 22 at the lower end thereof and this connecting rod is driven by a crank pin 23 on a crank 24 formed on a shaft 25, which shaft is provided with a driving pinion 26 which meshes with a pinion 27 secured to a shaft 28 and the latter is driven by a pinion 29 which is in turn driven from a pinion 30 upon a shaft 31 which supports the driving pulley 32. It will be apparent that the pulley 32 may be driven by a belt or in any other suitable manner from any source of power.

The mode of operation of this device will be readily apparent. A heated blank will be inserted in the slot or socket 4 when the parts are in the position shown in Fig. 1. This heated blank will then be caused to move under the several dies, 8, 9 and 10, and

will be formed between these dies and the die 6 to the proper shape. If more material is required to fill up the full contour of the end of the blank, the shaft 19 may be rotated by the handle 20 to cause the guide member 16 to force out the blank as may be necessary. The finished blank may be removed by means of tongs or in any other suitable manner when the parts are again at rest in the position shown in Fig. 1.

While I have in this application specifically described one form which my invention may assume in practice, it will be understood that this form of the same is shown for purposes of illustration and that the invention may be modified and embodied in various other forms without departing from its spirit or the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent is:

1. In a forging machine, a plurality of grooved dies, a complemental die formed to extend into the grooves in said other dies, and oscillatory means carrying said complemental die and moving the same successively into the grooves in said other dies.

2. In a forging machine, a plurality of relatively stationary grooved dies, a complemental die formed to extend into the grooves in said other dies, and oscillatory means carrying said complemental die and moving the same successively into the grooves in said other dies.

3. In a forging machine, a plurality of grooved dies rotatable upon fixed axes, a complemental die formed to extend into the grooves in said other dies, and means carrying said complemental die and moving the same successively into the grooves in said other dies and for thereafter returning, through the same path, to its initial position said complemental die.

4. In a forging machine, a plurality of grooved roller dies rotatable about fixed axes, complemental die means formed to extend into the grooves in said roller dies, and means for causing said die means to extend successively into the grooves in said dies and for thereafter moving said die means in a reverse direction through said grooves.

5. In a forging machine, a blank carrier adapted to move a blank in opposite directions along a given path, a series of relatively stationary dies disposed for successive engagement by a blank moving in said carrier, and means for adjusting said blank to vary its engagement with said stationary dies.

6. In a forging machine, a blank carrier adapted to move a blank in opposite directions along a given path, a series of relatively stationary dies disposed for successive engagement by a blank moving in said carrier, and stationary means for adjusting said blank to vary its engagement with said stationary dies.

7. In a forging machine, an oscillatable blank carrier, a plurality of rotatable dies disposed with their axes of rotation in a surface of revolution whose directrix coincides with the axis of oscillation of said blank carrier, arcuate blank guiding means disposable concentrically with the surface of revolution including said die axes, and means for moving one end of said guiding means to move it out of concentricity with said surface.

8. In a forging machine, an oscillatable blank carrier, a plurality of rotatable dies disposed with their axes of rotation in a surface of revolution whose directrix coincides with the axis of oscillation of said oscillating blank carrier, arcuate blank guiding means disposable concentrically with said surface of revolution including said die axes, and means for moving one end of said guiding means to move it out of concentricity with said surface including a cam manually adjustable and engaging said guiding means.

9. In a cutter bit forging machine, a blank support, and means for adjusting a bit blank relative thereto including a plurality of angularly movable members each having stationary pivoting points.

10. In a forging machine, a blank support, and blank adjusting means including a plurality of angularly movable members, said members being movable relative to each other.

11. In a forging machine, a grooved die, a cooperating raised die, and oscillating blank carrying means adapted to cooperate with said dies.

12. In a forging machine, a grooved die, a cooperating raised die, oscillating blank carrying means adapted to cooperate with said dies, and means for adjusting blanks carried thereby.

13. In a forging machine, cooperating interfitting grooved and raised dies, and a blank carrier comprising a segment oscillatable in opposite directions.

14. In a forging machine, a support, blank supporting means mounted on said support and movable relative thereto, blank adjusting means carried by said support including a movable blank engaging member, and a relatively movable member engaging the same to cause movement thereof.

15. The combination comprising a movable blank supporting member, means for feeding blanks carried thereby including a pivoted member, and means for moving one end of said member about said pivot to feed said blanks including a controlling element having a relatively fixed position.

16. The combination comprising a support, a blank supporting member mounted thereon and movable relative thereto, means

for adjusting blanks carried by said supporting member including a member engaging said blanks and only pivotally adjustable, and means for moving one end of said pivoted member about its pivot to adjust said blanks.

17. In a cutter bit forging machine, a plurality of dies, a blank support cooperating therewith whereby the bit portion may be formed, and means for causing relative oscillatory movement between said dies and support.

18. In a forging machine, a support, a plurality of dies carried thereby, a blank support mounted on said support and movable relative thereto, means for causing relative oscillatory movement between said dies and said blank support, and blank adjusting means operatively connected to said first mentioned support.

19. In a forging machine, a die, a movable blank carrier, and means for feeding a blank along its longitudinal axis including a manually operable shaft angularly disposed to the path of movement of said carrier.

20. In a forging machine comprising a support, a blank carrier mounted thereon and movable relative thereto, and means operable during a forging operation for automatically feeding a blank carried by said carrier including a relatively stationary blank support and a movable member adapted to have a plurality of operating positions with respect thereto in each of which it imparts a different position to said blank support.

21. A forging machine comprising a blank carrier, and means operable during a forging operation for automatically feeding blanks carried thereby, said means including an adjusting cam adjustable during a forging operation.

22. A forging machine comprising a support, a blank carrier mounted thereon and movable relative thereto, and means operable during a forging operation for automatically feeding the blanks carried by said carrier, said means including relatively movable members so related that adjustment of one effects adjustment of the other.

23. A forging machine comprising a support, a blank carrier mounted thereon and movable relative thereto, and means operable during a forging operation for automatically feeding the blanks carried by said carrier, said means including a member movable during a forging operation on a blank carried by said carrier.

24. A forging machine comprising a blank carrier, and means operable during a forging operation for automatically feeding blanks carried thereby, said means including a rotatable cam and a member normally engaging the same.

25. A forging machine comprising a support, a blank carrier mounted thereon and movable relative thereto, and means operable during a forging operation for automatically feeding the blanks carried by said carrier, said means including a rotatable cam and a member having sliding engagement therewith.

26. A forging machine comprising a support, a blank carrier mounted thereon and movable relative thereto, and means operable during a forging operation for automatically feeding the blanks carried by said carrier comprising a movable member and a cooperating member rotatable about a relatively fixed axis and adjustable by movement of said first mentioned member.

27. A forging machine comprising a support, a blank carrier mounted thereon and movable relative thereto, and means engageable with a blank carried by said carrier for feeding the same during a forging operation comprising a pivoted arcuate blank engaging member and a rotatable cam operating therewith.

28. A forging machine comprising a blank carrier oscillatable about an axis, die means disposed to one side of said axis to perform a forging operation on a blank in said carrier, and means for effecting relative oscillatory movement between said dies and blank carrier, said last means being disposed on the opposite side of said axis.

29. In a cutter bit forging machine, a die having a groove adapted to form the sides of the cutting portion of the bit, a projecting die against which the front cutting surface of the bit is formed, and oscillatory means for effecting a relation of said dies in which said projecting die extends into the groove in said other die.

30. In a cutter bit forging machine, a roller die having a circumferentially extending groove for forming the sides of the cutting portion of the bit, a projecting die against which the front cutting surface of the bit is formed, and oscillatory means for effecting a relation of said dies in which said projecting die extends into the groove in said roller die.

31. In a cutter bit forging machine, a roller die rotatable about a relatively fixed axis and having a circumferentially extending groove for forming the sides of a cutting portion of a bit, a movable projecting die against which the front cutting surface of the bit is formed, and oscillatory means carrying said projecting die for effecting a relation of said dies in which said projecting die extends into the groove in said roller die.

32. In a forging machine, a grooved die, a complemental die formed to extend into the groove in said other die, and oscillatory means carrying said complemental die for

effecting the relation of said dies in which said complemental die extends into the groove in said other die.

33. In a forging machine, a rotatable grooved roller die, a complemental die formed to extend into the groove in said roller die, and oscillatory means for effecting a relation of said dies in which said complemental die is moved to extend into the groove in said other die.

34. In a forging machine, a grooved roller die rotatable about a relatively fixed axis, a projecting die formed to extend into the groove in said roller die, and means including an oscillatory member carrying said projecting die for effecting a relation of said dies in which said projecting die extends into the groove of said roller die.

35. In a cutter bit forging machine, a die for forming the sides of the cutter bit, a complemental die against which the front surface of the bit is formed, and oscillatory blank carrying means adapted to cooperate with said dies.

In testimony whereof I affix my signature.

SVEN T. NELSON.