

Jan. 11, 1927.

S. T. NELSON

1,614,040

FORGING MACHINE

Filed Jan. 23, 1922

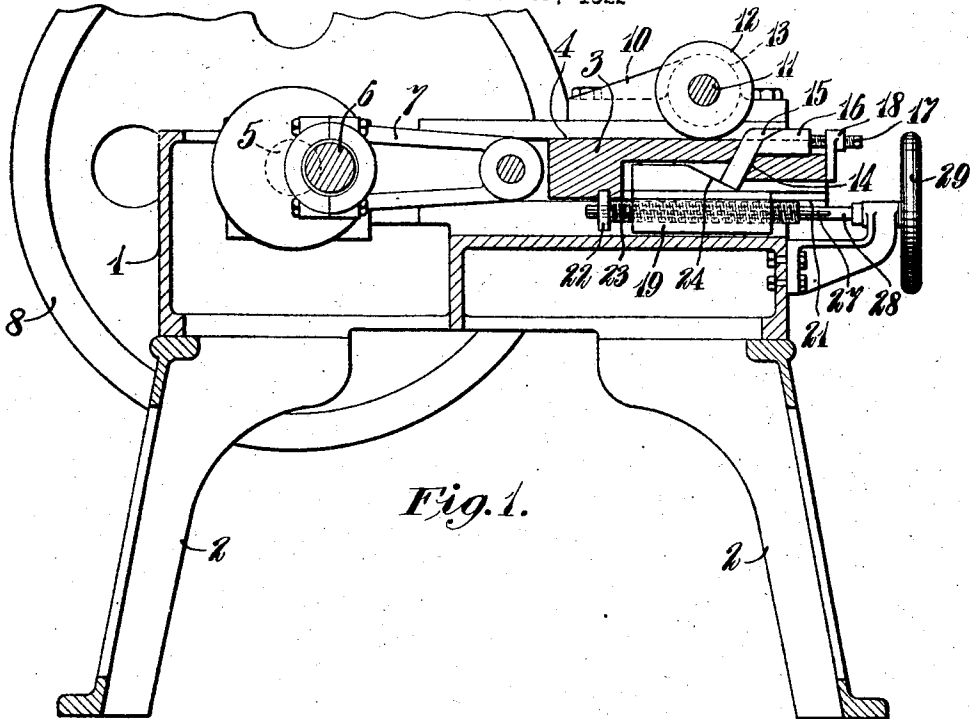


Fig. 1.

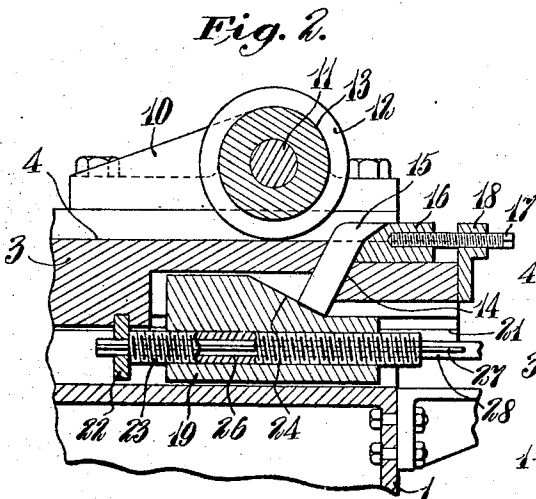


Fig. 2.

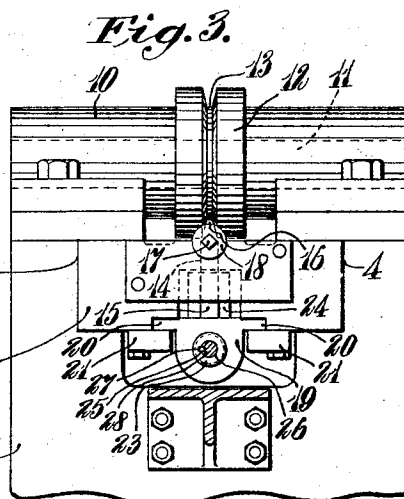


Fig. 3.

Inventor:
Sven T. Nelson.

by *Wm. L. Loebe*
Att'y.

UNITED STATES PATENT OFFICE.

SVEN T. NELSON, OF CHICAGO, ILLINOIS, ASSIGNOR TO SULLIVAN MACHINERY COMPANY, A CORPORATION OF MASSACHUSETTS.

FORGING MACHINE.

Application filed January 23, 1922. Serial No. 531,207.

My invention relates to forging machines, and more particularly to forging machines of the type adapted for use in the sharpening of cutter bits for chain type coal mining machines.

An object of my invention is to provide an improved forging machine. Another object of my invention is to provide an improved forging machine having improved adjusting means whereby the blanks may be very speedily handled. A further object of my invention is to provide an improved forging machine having suitable adjustment for wear. 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 central vertical section through the illustrative embodiment of my invention.

Fig. 2 is a view in section similar to Fig. 1 of a portion of the illustrative form of my improved mechanism on an enlarged scale.

Fig. 3 is a front elevation with parts broken away showing details of construction.

In the embodiment of my invention which I have selected for purposes of illustration there will be noted a forging machine comprising a main frame 1 supported upon suitable leg members 2 and comprising a reciprocable cross head or ram 3 movable in guides 4 and reciprocated by means of a crank shaft 5 whose crank pin 6 is connected by a connecting rod 7 to the cross head 3. A suitable driving pulley 8 of large size, whereby it may serve as a fly wheel and store and give up energy at appropriate times, is fixed to the crank shaft 5. Mounted upon the top of the guides is a suitable heavy casting 10 which provides bearings for a shaft 11 upon which a rotatable die 12 is mounted, this die being formed as shown in Fig. 3, with a peripheral groove 13 of a section corresponding to the desired shape of the end of the bits or blanks which are to be treated thereby. It will be evident that the die 12 is free to rotate but held against longitudinal or lateral movement by its mounting. Carried by the ram or crosshead 3 and adjacent a slot 14 which is shaped to receive a blank 15 is an adjustable die member 16 of a shape to substantially fill the groove 13 and to sustain the projecting end of a blank during forging. An adjusting screw

17 cooperating with a stationary member 18 secured to the ram permits the adjustment of the die 16 as wear occurs.

The cross head 3 is cut away at its lower side to form a socket in which a wedge 19 is adjustably mounted, the wedge being provided as indicated in Fig. 3 with lateral guiding gibbs 20 which cooperate with guides 21 bolted to the bottom of the cross head. Depending from the crosshead 3 is an abutment 22 which cooperates with an adjusting screw 23 threadedly engaged with the wedge. This screw is operative on rotation to adjust the wedge 19 longitudinally in the cross head 3 in such manner as to cause a blank 15 engaged by the inclined portion 24 to be protruded further above the upper surface of the cross head 3. It will be obvious that instead of simply employing an abutment as shown at 22 the screw 23 may be connected against longitudinal movement in either direction by a sleeve passing through the abutment and a collar arranged at the other side thereof, if it is desired to have the movement of the wedge member toward the left positive as well as its movement toward the right.

Various operating means for the screw 23 may be employed and I have herein shown for purposes of illustration a key-way 25 formed along hollow bore 26 in the screw and with this key-way a spline 27 on a stationary shaft 28, which is rotatable by a hand wheel 29 (see Fig. 1) which is held against longitudinal movement, cooperates. It will be obvious that as the hand wheel 29 is rotated the spline 27 cooperating with the key-way 25 will rotate the screw 23 and so either positively feed the member 19 forward while permitting it to be moved backward with the construction shown, or feeding it in opposite directions positively if the sleeve and collar connected to the abutment 22 is employed. It will also be obvious that instead of using the particular operating means for the screw shown, it would be possible to attach a shaft to the screw and provide a key-way in the shaft which would cooperate with a key on the wheel 29 as the shaft reciprocated through the wheel. I prefer, however, to employ the construction illustrated herein as there is no danger to the workman from an alternately retracted and projected member.

From the foregoing description of my in-

vention, its mode of operation will be readily apparent. A blank is inserted in the slot 14 and by turning the hand wheel 29 the screw 23 is caused to move the wedge 19 longitudinally of the ram 3 to project the blank 15 sufficiently above the top of the ram to be lightly struck by the die 12 as the ram reciprocates. The dies 12 and 16 cooperate with the protruded blank 15 to shape it to the desired contour.

While I have in this application specifically described one form which my invention may assume in practice, it will be understood that this form 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 bit forging machine, a die rotating on a stationary axis, a ram reciprocating in a path substantially tangential to a circle concentric with said die, and a blank supporting means including a die carried by said ram, said last die including means adapted to support the bit face.

2. In a forging machine, a die rotating on a stationary axis, a ram reciprocating in a linear path substantially tangential to a circle concentric with said die, a blank supporting means including a die, and blank adjusting means carried by said ram.

3. In a forging machine, a die rotating on a stationary axis, a ram reciprocating in a linear path substantially tangential to a circle concentric with said die, an adjustable blank supporting means including a die, and an adjustable blank supporting means carried by said ram having a plurality of operative positions.

4. In a bit forging machine, a rotatable die supported on a stationary axis, a ram guided for rectilinear movement, a blank supporting means including a die carried by said ram, said die being adapted to support a bit face, and means for moving said ram and blank supporting die in a path to cause them to cooperate with said first mentioned die.

5. In a forging machine, a rotatable die supported upon a stationary axis, a ram, an adjustable die thereon, means for supporting a blank in contiguity with said last mentioned die, means for adjusting said supporting means in a plurality of operative positions, and means for reciprocating said ram in a linear path.

6. In a forging machine, a rotatable die supported upon a stationary axis, a ram, an adjustable die thereon, means for supporting a blank in contiguity with said last mentioned die, means for adjusting said supporting means carried by said ram, and cooperating means carried by a stationary part

of said forging machine for adjusting said adjusting means.

7. In a forging machine, forging die and blank carrier members, means for causing relative movement between said members, and adjusting means for a blank including a member carried by a member of said first mentioned members which is necessarily movable during forging.

8. In a forging machine, a forging die, a blank support, means whereby a blank in said support may be operated upon by said die, and positive adjusting means for said blank operable at will and including members necessarily always relatively moving during the forging operation.

9. In a forging machine, a forging die, a blank support, means whereby a blank in said support may be operated upon by said die, and positive adjusting means for said blank operable at will and including stationary and movable members, said latter member always being in motion during the actual forging operation.

10. In combination, a normally movable blank support carrying a member movable with and relative thereto, and means for moving said member including relatively movable members, one of said last members being adapted to be operative or inoperative during movement of said support.

11. In combination, a blank support, means for necessarily always moving said support whenever a blank supported thereby is operated upon, and means for at will feeding and adjusting a blank carried by said support, said means including members angularly and linearly movable relative to each other and movable in different planes.

12. In combination, a normally movable blank support and means for at will feeding and adjusting a blank carried by said support and during forging thereof, said means including members adapted to have relative movement, one of said members having means adapted to abut the end of the shank of a bit blank.

13. In combination, a blank support always movable when operative, means for moving said support, blank adjusting means including members slidable relative to each other during normal forging operations, and means for actuating the same including members angularly and linearly movable relative to each other.

14. In a forging machine, a blank support including a plurality of blank engaging members, one being always continuously movable in a direction transverse of the blank axis during a forging operation and the other movable during forging positively to effect longitudinal movement of the blank.

15. In a forging machine, a blank support including a plurality of blank engaging members, one being always continu-

ously movable in a direction transverse of the blank axis during forging operations and the other movable with the first and also relative thereto to effect longitudinal movement of the blank, said latter member comprising a wedge.

16. In a forging machine, a normally movable blank support including a plurality of blank engaging members, one movable in a direction transverse of the blank axis and engaging one end of the blank and the other comprising a wedge movable to effect longitudinal movement of the blank and engaging the opposite end of the blank.

17. In a forging machine, a movable carrier, blank supporting means carried thereby, and means connected to said blank supporting means for effecting positive adjustment of the latter during movement of said carrier.

18. In a forging machine, a movable carrier, blank supporting means carried thereby, and means connected to said blank supporting means for effecting positive adjustment of the latter during movement of said carrier including a member adapted to have a normally fixed relation relative to said carrier.

19. In a forging machine, a movable carrier, blank supporting means carried thereby, and means connected to said blank supporting means for effecting positive adjustment of the latter during movement of said carrier including a member adapted to have movement relative to said carrier.

20. In a forging machine, a movable carrier, blank supporting means carried thereby, and means connected to said blank supporting means for effecting positive adjustment of the latter during movement of said carrier including a member normally having a fixed relation with respect thereto but adjustable thereon.

21. In a forging machine, a movable carrier, blank supporting means carried thereby, and means connected to said blank supporting means for effecting positive adjustment of the latter during movement of said carrier including a member normally having a fixed relation to said carrier during movement thereof.

22. In a forging machine, a carrier movable in a substantially straight path, blank supporting means carried thereby, and means connected to said blank supporting means for effecting adjustment of the latter during movement of said carrier.

23. In a forging machine, a movable carrier, blank supporting means including a member movable with said carrier, and means connected to said blank supporting means for effecting positive adjustment of the latter during movement of said carrier.

24. In a forging machine, a carrier movable in a substantially straight path, a blank

supporting means including a member movable with said carrier, and means connected to said blank supporting means for effecting adjustment of the latter during movement of said carrier.

25. In a forging machine having a blank carrier movable in a substantially straight path to effect all forging operations, means for at will positively adjusting relative thereto a blank carried thereby including a relatively stationary member.

26. In a forging machine, blank supporting means, and means connected to said blank supporting means for effecting adjustment of the latter including telescopic members.

27. In a forging machine, blank supporting means, and means connected to said blank supporting means for effecting adjustment of the latter including telescopic members, one of which comprises a screw.

28. In a forging machine, a blank support, and means for adjusting a blank carried thereby including slidably telescopic members, one of which is longitudinally fixed.

29. In a forging machine, a blank support, and means for adjusting a blank carried thereby including slidably telescopic members, one of which is longitudinally fixed but rotatable.

30. In a forging machine, a blank support, and means for adjusting a blank including telescopic members, one of which is longitudinally and rotatably movable.

31. In a forging machine having a blank carrier movable alternately in opposite directions in a substantially straight path, means for supporting a blank with its longitudinal axis angularly disposed to the path of movement, and relatively stationary roller die means having portions adapted to form opposite sides of the cutting portion of a cutter bit.

32. A forging machine having a blank carrier movable in a substantially straight path throughout its entire movement, relatively stationary freely rotatable die means having portions adapted to form opposite sides of the cutting portion of a cutter bit, and a raised die movable with said carrier to form the cutting face of said bit.

33. In a forging machine having a blank carrier movable in a substantially straight path throughout its entire movement, a raised die carried thereby and whose cross sectional area is substantially the same as that of the cutting portion of a bit formed thereon, and a relatively stationary roller die having a groove into which said raised die projects to cooperate therewith to form the sides of said cutting portion.

34. In a cutter bit forging machine, a member reciprocating in a linear path, means thereon for positively carrying a bit

blank in each direction of movement thereof, and cooperating die means for forging the bit portion as it reciprocates.

35. In a cutter bit forging machine, a member reciprocating in a linear path, means thereon for positively carrying a bit blank in each direction of movement, and means for supporting said blank so that the longitudinal axis thereof is angularly disposed to the path of movement.

36. In a cutter bit forging machine, a forming die comprising a roller rotatable on a fixed axis and having a groove in the periphery thereof, and a rectilinearly movable

raised die formed to cooperate with the groove in said roller die to shape the cutting portion of the bit.

37. In a cutter bit forging machine, a forming die having a groove which substantially conforms to the cutting portion of the bit, a raised die formed to cooperate with the groove in said die to shape the cutting portion of the bit, and means for effecting rectilinear movement of said raised die relative to said grooved forming die.

In testimony whereof I affix my signature.

SVEN T. NELSON