Oct. 9, 1951 A. P. SCHELLER 2,570,386

BLOWPIPE ROD FEED MECHANISM

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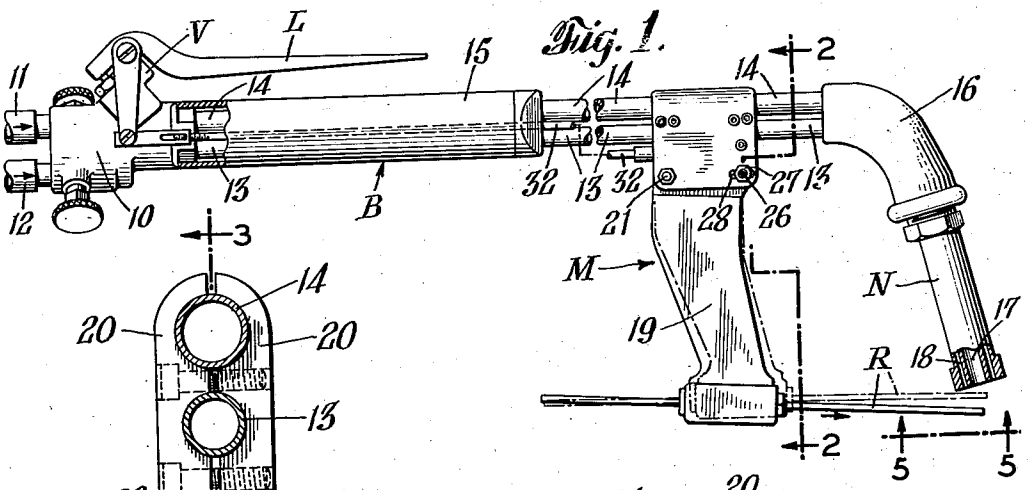


Fig. 1.

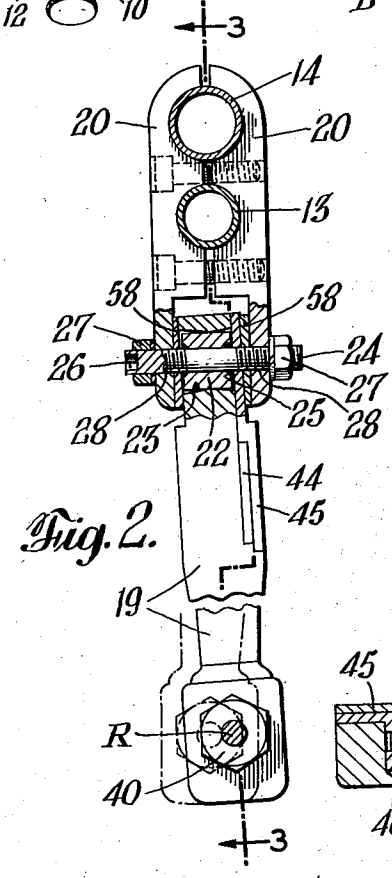


Fig. 2.

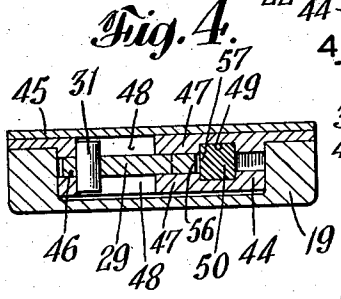


Fig. 4.

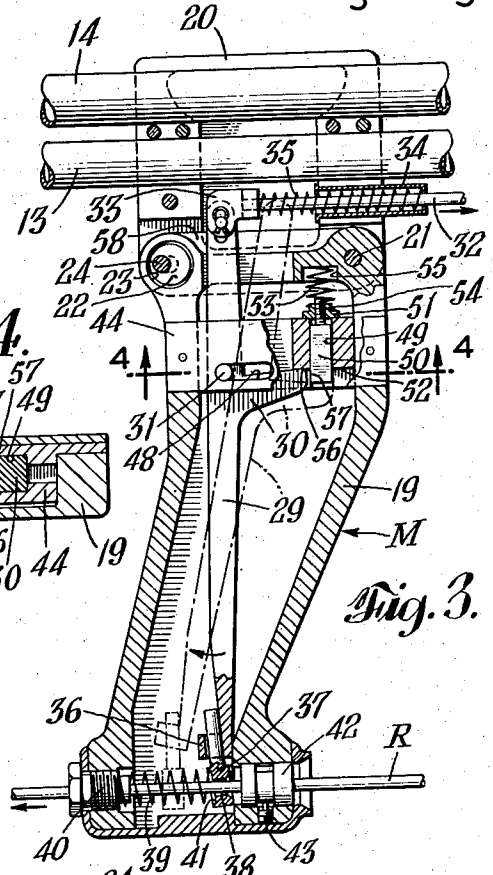


Fig. 3.

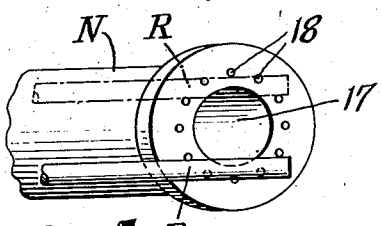


Fig. 5.

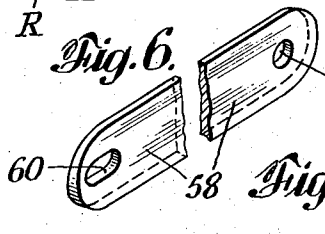


Fig. 6.

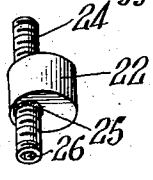


Fig. 7.

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BLOWPIPE ROD FEED MECHANISM

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8 Claims. (Cl. 158—27.4)

1

This invention relates to scarfing or cutting blowpipes and more particularly to an improved rod feed mechanism associated with such blowpipes for quickly starting a scarfing or cutting operation.

The use of a rod feed mechanism on a scarfing or cutting blowpipe has resulted in a reduction of the time required to preheat a metal body prior to the application of a cutting oxygen jet to the preheated surface thereof in order to initiate a scarfing or cutting operation. It is often desirable in these operations to vary the length of the preheat flame depending on the thickness of the metal body being worked. Since the starting rod-to-nozzle distance is generally fixed on the devices of the prior art, the forward end of the starting rod may not always be introduced into the hottest zone of the preheating flame particularly when the flame length is varied. When the starting rod is fed beyond the effective preheating zone, excessive time is required to heat the rod sufficiently. A similar situation arises when the nozzles, which are subject to considerable abuse and wear during scarfing operations, are refaced from time to time. Such refacing operations gradually reduce the overall length of the nozzles so that the flames emitted from the shortened nozzles do not effectively heat the starting rod which is no longer being fed into the hottest part of the flame.

In a large diameter scarfing nozzle having a large central circular cutting oxygen outlet, it was found that in spite of the large number of preheating gas outlets located along a large circle around the large oxygen outlet, the starting rod was insufficiently heated in the normal preheating time. For example, when the starting rod is disposed adjacent the nozzle in the usual position so as to intersect the extended axis of the oxygen outlet, it is generally preheated by the flames produced by heating gas discharged from the outlets nearest the plane that includes the axes of the rod and the nozzle. In a smaller diameter scarfing nozzle practically all of the preheating flames contribute to the heating of the rod. However, in a large diameter scarfing nozzle only a relatively few of the many preheating flames reach the rod and then only at the front and rear portions of the nozzle, thereby leaving that part of the rod opposite the center area of the cutting oxygen outlet insufficiently heated.

Accordingly, the objects of the present invention are: to provide a blowpipe having an adjustable rod feed mechanism of light weight and

2

simple construction; to provide vertical adjusting means for varying the starting rod-to-nozzle distance; to provide means associated with the rod feed mechanism for varying the length of rod moved during a feeding stroke of the mechanism; to provide means for adjusting the rod feed mechanism so that the starting rod contained therein is laterally displaced to the left or right from the center-line of the nozzle; and to provide a blowpipe equally suitable for left as well as right handed operators.

The invention will be more particularly described in conjunction with the accompanying drawing in which:

Fig. 1 is a side view, with parts broken away, of a deseaming blowpipe embodying the principles of the invention;

Fig. 2 is an end view, partly in section, taken along line 2—2 of Fig. 1;

Fig. 3 is an elevational view, partly in section, taken along line 3—3 of Fig. 2;

Fig. 4 is a sectional view taken along line 4—4 of Fig. 3;

Fig. 5 is a bottom view taken along line 5—5 of Fig. 1, showing offset positions of the rod with respect to the cutting oxygen outlet;

Fig. 6 is a perspective view of a shim for offsetting the rod feed mechanism; and

Fig. 7 is a perspective view of a cam bushing associated with the rod feed mechanism.

Referring to the drawings, the form of apparatus disclosed therein comprises an oxy-acetylene blowpipe B upon which is mounted an improved starting rod feed mechanism M near the forward portion thereof adapted to feed incremental lengths of a fusible and oxidizable metal rod R into the preheating jets discharged by the nozzle N of blowpipe B. The feeding mechanism M is connected to, or otherwise associated with, a manually-operable lever L which is a common operating handle for the cutting oxygen control valve V and the starting rod feed mechanism M, and is adapted to feed an increment of rod into the preheat flames of the blowpipe and thereafter to open the cutting oxygen valve V on said blowpipe B. The feeding mechanism M is provided with suitable means for adjusting the starting rod-to-nozzle distance by raising or lowering the forward end of the starting rod R and is further provided with means such as a pair of wedge-like shims for horizontally displacing the starting rod either to the left or to the right side of the normal centerline of the nozzle. Also provided in the rod feed mechanism is an adjustable means for

varying the length of the starting rod fed during a rod feeding operation.

Referring more particularly to Fig. 1 of the drawing, blowpipe B comprises a valve body 10 mounted toward the rearmost end of the blowpipe and adapted to support oxygen and acetylene connections. Oxygen and acetylene inlet connections 11 and 12 respectively are attached to the body 10 and direct the incoming gases into chambers within the body 10 wherein a portion of the oxygen is combined with the acetylene and discharged into a mixed-gas conveying conduit 13 and the remainder of the oxygen is conducted to the valve V from which it is discharged into a cutting oxygen conveying conduit 14. The valve V is normally closed by a spring which is compressible by the lever L to open valve V after an increment of the rod R has been fed in front of the outlet end of the nozzle N, as specifically disclosed in my application Serial No. 670,622, filed May 17, 1946. Manually operable shut-off valves are provided on the body 10 upstream of valve V for controlling the flow of preheat oxygen and acetylene respectively. The rear portions of the conduits 13 and 14 are surrounded by a tubular handle 15 while the front portions thereof are secured to the rear end of a blowpipe head 16. The nozzle N is detachably secured to the opposite end of the head 16 and is provided with the usual longitudinal gas passages terminating in a central cutting oxygen outlet 17 and concentrically arranged preheat gas outlets 18.

The rod feeding attachment M comprises a casing 19 attached to a pair of split conduit clamps 20 fitted over and rigidly but removably secured to the conduits 13 and 14 near the front end of the blowpipe between the nozzle head 16 and the handle 15. As more clearly shown in Figs. 2 to 7, the upper portion of the casing 19 is pivotally attached to the lower portions of the conduit clamps 20 by a bolt 21 and by a laterally adjustable, cylindrically shaped eccentric cam 22 which fits loosely in a hole 23 provided in the casing 19. A threaded spindle 24 is eccentrically fitted into the cam 22 and fixed therein with silver solder 25. The opposite ends of the spindle 24 are journalled in the clamps 20 and one end of the spindle 24 is provided with a socket 26 to receive a suitable tool for turning the spindle and cam about the axis of the spindle 24 when the unit is secured in position by nuts 27. When the cam 22 is rotated about its eccentric axis, the spindle 24 slides laterally in two diametrically opposite horizontal slots 28 provided in the clamps 20 while simultaneously the periphery of the cam bears upon the inner surface of the hole 23 located in the upper portion of the casing 19, thereby causing such casing to pivot about the bolt 21. By this arrangement the front portion of the casing may be raised or lowered thus enabling the forward end of the rod to be located at any desired critical postion in front of the nozzle.

The casing 19 contains a one piece operating lever 29 having a lever arm 30 integral therewith intermediate its ends and a pivot pin 31 press fitted into the operating lever 29 adjacent the lever arm 30. The upper end of the operating lever is connected to a pull rod 32 by a clevis and pin arrangement 33. A portion of the pull rod 32 is surrounded by a sleeve 34 which is secured to the clamps 20 and houses a compression spring 35 which, in cooperation with the valve closing spring of valve V, urges the pull rod forwardly and resiliently holds the lever L in an initial inoperative position.

The lower end of the operating lever 29 is provided with an eye 36 which loosely receives the stem of a rod gripper 37. The rod gripper 37 is provided with a funnel-shaped hole 38 through which the rod R extends. When the lever 29 is rotated clockwise about the pivot 31 thereon, the rod gripper 37 advances the rod R and simultaneously compresses a spring 39 which surrounds the rod. One end of the spring 39 is positioned and supported by the reduced portion of a guide screw bushing 40 while the other end is positioned and supported by a recess 41 provided in the rod gripper 37.

The travel of the rod R through the lower portion of the casing is guided at the front end by the guide screw bushing 40 threaded into the casing and at the rear end by a friction pin guide member 42 axially alined with bushing 40, slidably mounted in an opening provided therefor in casing 19 and securely held in place by a set screw 43.

The upper portion of the casing 19 contains a guide block 44 secured thereto by a cover plate 45. The guide block 44 is provided with a vertical slot 46 through which extends the operating lever 29. Each of the two side walls 47 of guide block 44 is provided with a horizontal slot 48 which slots are diametrically opposite each other and open into the vertical slot 46. The guide block 44 is further provided with a vertical hole 49 through which is suspended a bar cam 50 having a reduced upper portion. By means of a lock nut 51 threaded over the reduced upper portion of the bar cam 50 the lower portion of the bar cam is adjustably positioned to extend an effective length below a bottom surface 52 of the guide block. As will be subsequently pointed out, the effective length of the bar cam 50 determines the length of rod that is fed toward the nozzle during a complete feeding stroke of lever 29.

The upward movement of the bar cam 50 is resiliently opposed by a compression spring 53 one end of which is positioned over the nut 51 by an upwardly extending shank 54 while the other ends is positioned by a suitable recess 55 in the ceiling of the casing.

When the pull rod 32 is slightly actuated in the direction indicated by the arrow in Fig. 3 by depressing the lever L, the end edge 56 of the lever arm 30 slides along the bottom surface 52 of guide block 44 a negligible distance until it engages a side face 57 of the bar cam 50 which serves as a fulcrum surface for the end of lever arm 30 during the feeding operation. Further actuation of the pull rod 32 causes the operating lever 29 to pivot clockwise about the fixed pivot pin 31 slidably disposed in the horizontal slots 48 disposed diametrically opposite each other in the side walls 47 of the guide block 44. At the same time that the operating lever is pivoting, the rod gripper 37 is feeding the rod toward the nozzle and the end edge 56 of the lever arm 30 is sliding downwardly along the fulcrum surface 57 of cam 50 until such edge finally reaches the bottom end of the cam. At this point, the desired length of the starting rod has been advanced, whereupon further depressing the lever L turns on the cutting oxygen stream and causes the lever arm 30 to ride off of the bottom end of fulcrum surface 57 and, under the influence of the loaded compression spring 39, to slide under the bottom end of the cam 50 while the pivot pin 31 is carried to the right in the slot 48.

When the lever L is released, the loaded spring 35 urges the upper end of the operating lever 29 forward to its initial position. During this movement the top surface of the lever arm 30 moves across the bottom surface of the cam 50 urging the latter upwardly against the spring 63 until the edge 56 of the arm 30 clears the bottom edge of cam 50. At this point, the loaded spring 53 causes the cam 50 to drop into its normal position and the operating lever 29 is returned to its initial position ready for feeding.

By adjusting lock nut 51 the length of the fulcrum surface 57 of cam 50 may be varied to cause the operating lever to feed a smaller or greater length of starting rod in one stroke.

To offset the starting rod R from the centerline of the nozzle, there is provided a pair of wedge-shaped spacing shims 58 as shown in Fig. 6. Each shim 58 has a hole 59 near one end to fit the pivot bolt 21 and a slot 60 near its other end to receive an end of the spindle 24. When inserted between the clamps 20 and the casing 19 as shown in Fig. 2, with the thick edge of one shim and the thin edge of the other shim adjacent the top surface and on opposite sides of the casing 19, the vertical axis of the casing is angularly displaced from the normal vertical position thereby laterally displacing the starting rod from the centerline of the nozzle and thereby exposing such starting rod to a greater number of preheating flames as shown in Fig. 5. Since the spacing shims 58 may be interchanged thereby causing the casing to be angularly displaced to the left, the starting rod would then be exposed to the preheating flames from the opposite side of the nozzle as shown by the dotted position in Fig. 5. This simple means for setting the feeding axis of the starting rod either to the right or to the left of a plane through the axes of the nozzle N and the conduits 13 and 14 not only provides for greater rod preheating efficiency but also accommodates this more efficient arrangement for use by either right-handed or left-handed operators of such scarfing blowpipes.

What is claimed is:

1. In a rod feeding attachment for a blowpipe, a casing; and rod feeding means carried by said casing and comprising a rod gripper movable in opposite directions but only operable to grip and feed the rod when moved in one of said directions, a lever for moving said gripper in both of said directions, means for operating said lever, and fulcrum means carried by said casing comprising a slide-bearing eccentric with the turning center of the lever, such slide-bearing being adapted to release the lever when the latter has been turned a certain degree, to provide a fulcrum for said lever only while the latter is operating to move said gripper to feed said rod.

2. In a rod feeding attachment as claimed in claim 1, an arm between the ends of said lever, said fulcrum means comprising an element having a fulcrum surface along which said arm is slidable during the feeding stroke of said lever and said rod gripper.

3. In a rod feeding attachment as claimed in claim 2, means for adjusting said element to vary the length of the fulcrum surface along which said arm is slidable during said feeding stroke.

4. A blowpipe for cutting or scarfing metal comprising, in combination, a nozzle having an oxygen outlet and a series of preheat gas outlets spaced around said oxygen outlet; a device for controlling the discharge of oxygen through said oxygen outlet; and an attachment connected to said device for positioning the end of a rod in the region adjacent said outlets, said attachment comprising a rod gripper adapted to move to and fro and an operating lever for actuating said gripper; a pivot pin connected to said lever intermediate its ends, said lever being adapted to pivot about said pin to cause said gripper to advance the rod when said device is actuated; and means having an adjustable lever-contacting surface constituting a fulcrum for said lever only during the feeding operation, said lever returning said gripper to its initial position when said lever disengages from said fulcrum surface.

5. A rod feeding attachment for a blowpipe comprising, in combination, an operating lever provided with a pivot pin intermediate its ends, a rod gripper slidably engaging one end of said operating lever and a pull rod connected to the other end of said operating lever; a lever guide block supporting said operating lever at its pivot point and adjustable means having a fulcrum surface cooperating with said operating lever for regulating the length of rod feed when movement of said pull rod causes said operating lever to pivot about its pivot pin thereby causing said gripper to advance said starting rod.

6. A rod feeding attachment for a blowpipe comprising, in combination, an operating lever provided with a pivot pin intermediate its ends, a lever arm connected to said lever, a rod gripper slidably engaging one end of said operating lever and a pull rod connected to the other end of said operating lever; a lever guide block provided with slots in the side walls thereof for slidably receiving said pivot pin and an adjustable bar cam mounted on said guide block having its lower portion extending below a bottom surface of said guide block so that when said operating lever is pivoted about said pivot pin, said lever arm slidably engages said lower portion until the desired length of rod has been fed.

7. In a rod feeding attachment for a blowpipe having parallel conduits, the combination comprising a pair of clamps secured to said conduits, said clamps having transversely alined holes near one lower corner thereof and corresponding longitudinal slots near the other lower corner, a rod-feeding casing having an upper portion, said casing portion having a hole corresponding to said alined holes in the clamps, and also having an enlarged hole located between such slots, a bolt extending through said alined holes and providing a pivot about which the casing can be adjusted, a cam positioned in said enlarged hole in the upper portion of the casing, a spindle mounted eccentrically in the cam and having the opposite end portion thereof extending through the slots in the clamps, such end portions of the spindle being threaded and one having a socket to receive a suitable tool for turning the spindle and cam to adjust the casing about the bolt as a pivot, and nuts threaded on the end portions of the spindle for securing the parts in adjusted position.

8. In a rod feeding attachment for a blowpipe having parallel conduits, the combination comprising a pair of clamps secured to said conduits, said clamps having transversely alined holes near one lower corner thereof and corresponding longitudinal slots near the other lower corner, wedge-shaped shims having corresponding holes and slots disposed on the inner sides of said clamp, a rod-feeding casing having an upper portion fitting between said shims, said casing

portion having a hole corresponding to said alined holes in the clamps and shims, and also having an enlarged hole located between such slots, a bolt extending through said alined holes and providing a pivot about which the casing can be adjusted, a cam positioned in said enlarged hole in the upper portion of the casing, a spindle mounted eccentrically in the cam and having the opposite end portion thereof extending through the slots in the shims and clamps, such end portions of the spindle being threaded and one having a socket to receive a suitable tool for turning the spindle and cam to adjust the casing about the bolt as a pivot, and nuts threaded on the end portions of the spindle for securing the parts in adjusted position.

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