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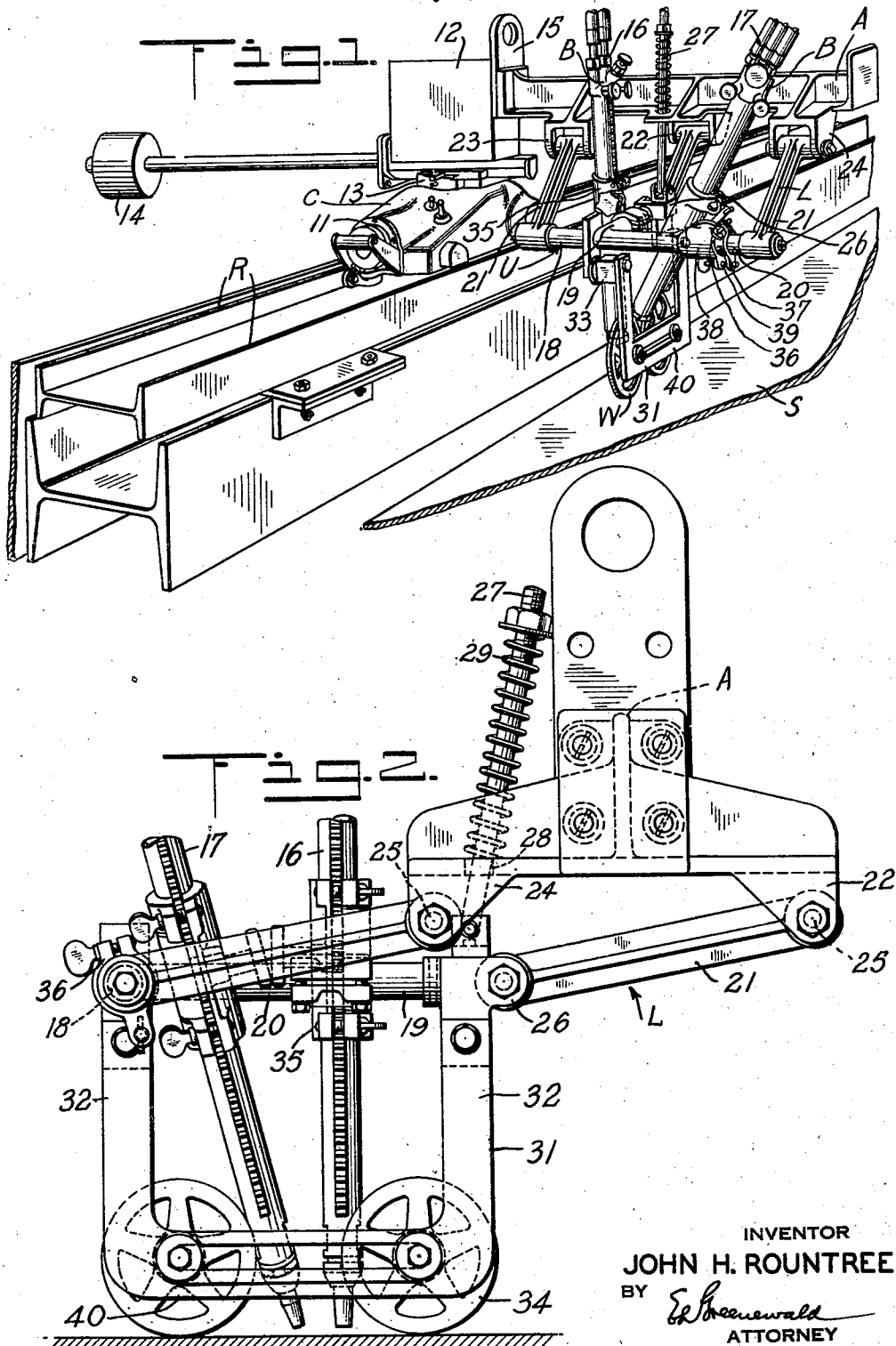
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2,293,853

TOOL SUPPORTING AND GUIDING APPARATUS

Filed May 3, 1939

3 Sheets-Sheet 1



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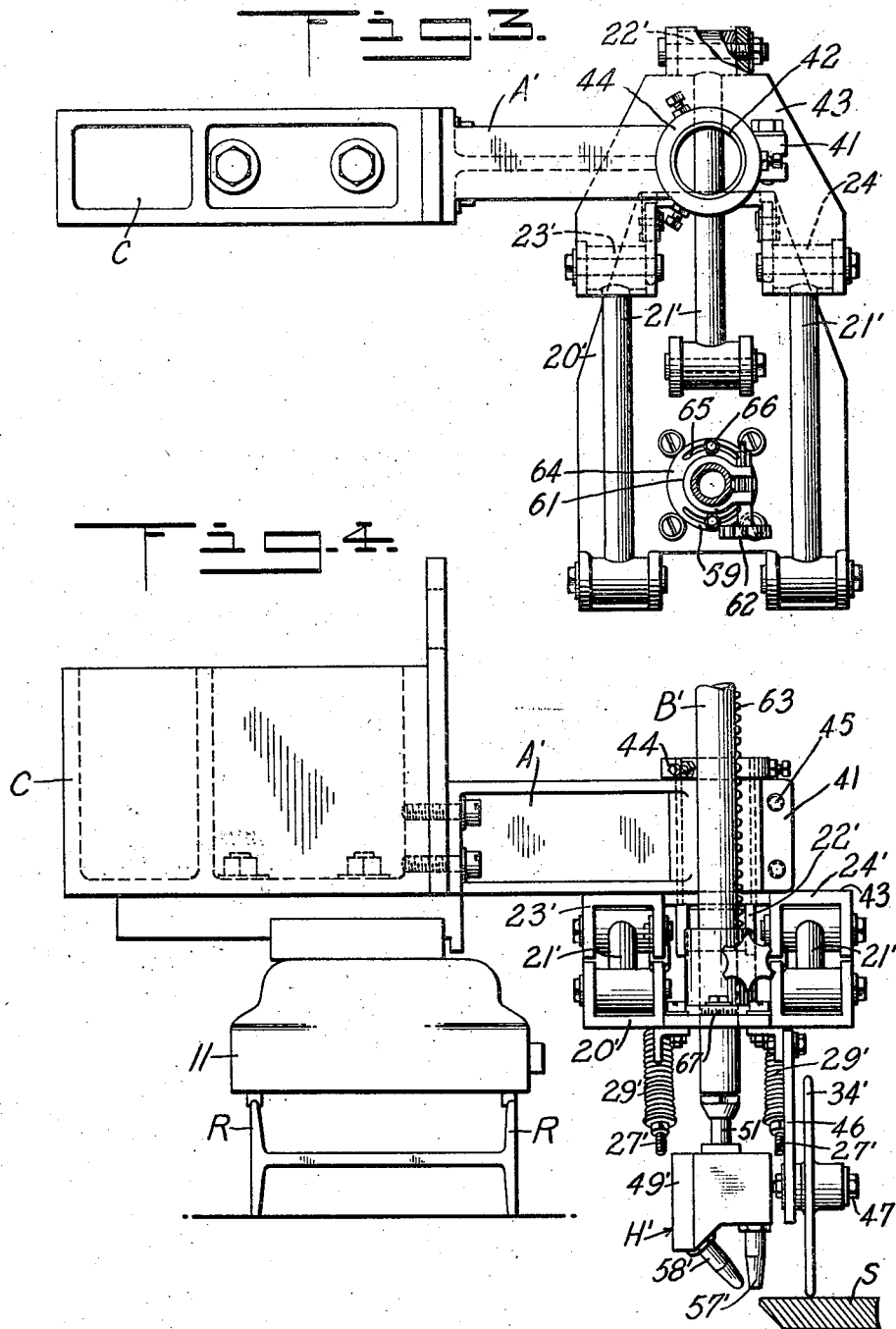
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3 Sheets-Sheet 2



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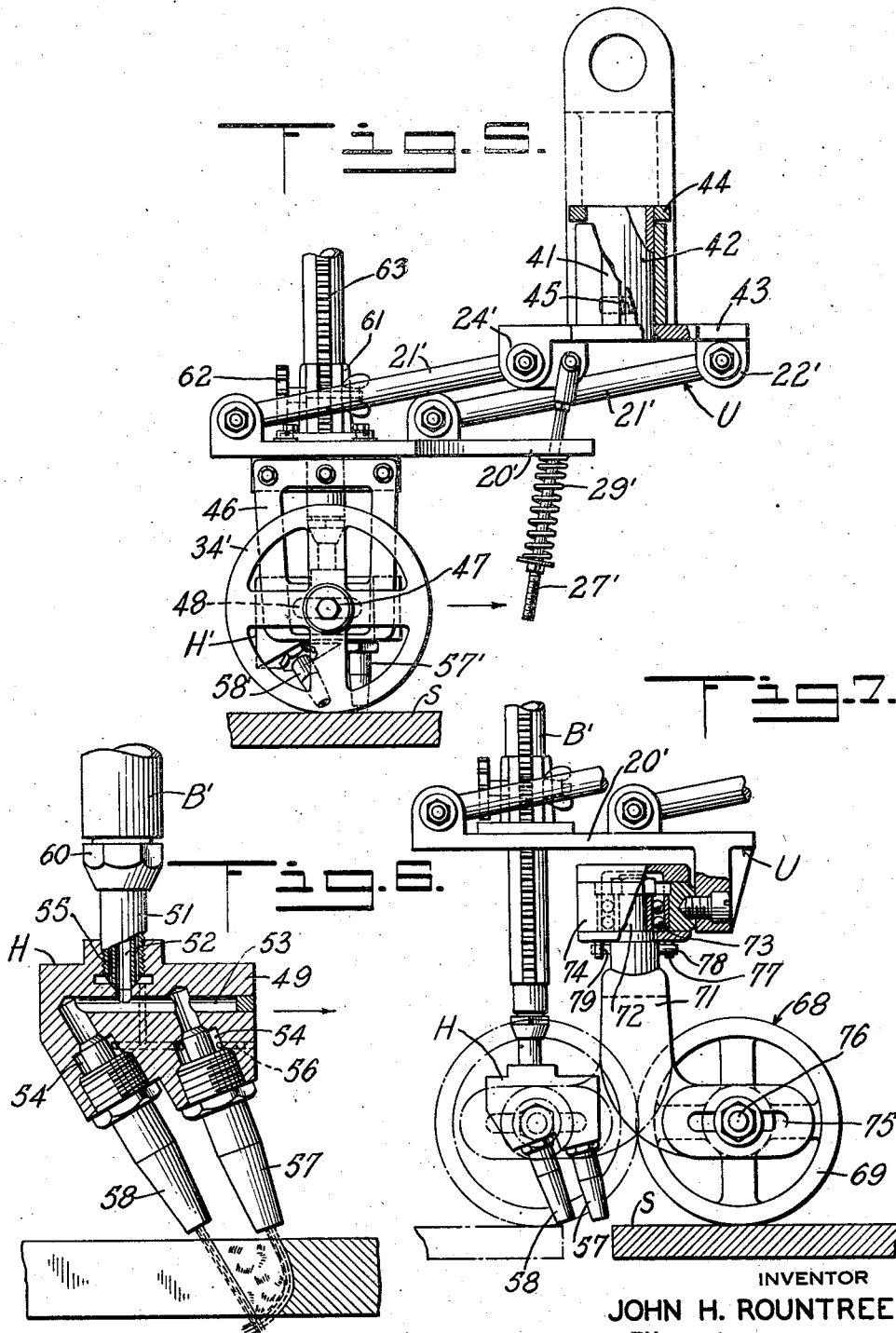
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3 Sheets-Sheet 3



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2,293,853

TOOL SUPPORTING AND GUIDING
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Application May 3, 1939, Serial No. 271,475

16 Claims. (Cl. 266—23)

This invention relates to tool supporting and guiding apparatus and more particularly to plate riding devices adapted to propel flame-severing and flame-beveling blowpipes along and in uniform spaced relation to a work surface.

Steel plates and other structural members as furnished by steel mills often are not absolutely flat, but have undulations and other irregularities in the surface of the metal which remain, even when the metal is laid upon a flat support. It is often desirable to propel a blowpipe or other tool along such a metal surface and to maintain the tool in uniform relation thereto. The present invention is specifically directed to means for applying one or more flame-cutting jets, as for example, flame-severing or flame-beveling jets, along a predetermined path with respect to a relatively large steel plate or similar work surface.

Large steel plates, of the character mentioned, may have a deviation from flatness as much as substantially two inches without departing from standard specifications, which deviation may increase considerably during a flame-cutting or similar process as a result of further distortion produced by stresses during heating. Ordinarily, when cutting large plates, use is made of a carriage which is supported and propelled along a level track or template simulating the path to be followed by the blowpipe. An arm or other supporting means secured to the carriage maintains the blowpipe or other tool in operative relation to the metal plate or other work surface and imparts the motion of the carriage to the blowpipe means or other tool. It is apparent that if a blowpipe or other tool is passed over the surface of such an irregular plate while being rigidly secured to an independently supported carriage, the vertical spacing between the metal plate and the tool would vary in accord with the irregularities in the work surface.

With ordinary flame-cutting, a certain moderate amount of relative motion between the discharge end of the blowpipe and the metal plate may be tolerated. With other operations, as when projecting a flame-cutting jet diagonally against the work surface, so as to form a beveled or scarfed edge, the spacing between the nozzle and the work, and the lateral displacement of the jet must be maintained within relatively small tolerances, for example, tolerances within 0.030". The requirements are especially exacting when relatively long plates are flame severed and trimmed or beveled successively to form a straight scarfed edge adapted to be disposed in

adjoining relation to a similar edge for the deposit of weld metal. A process for performing such successive cutting operations, for example, flame severing and trimming or flame severing and beveling is disclosed in Patent 2,184,562, dated December 26, 1939. When performing these operations, the slightest variation of the blowpipe holder transversely of the path in either a vertical or sidewise direction, produces a corresponding change in the shape of the edge being formed. If such changes exceed narrow limits, the edges no longer abut properly for an ensuing welding operation.

Accordingly, the principal objects of the present invention are to provide tool-supporting and guiding apparatus overcoming the defects previously enumerated; to provide a novel blowpipe-supporting frame with improved means for securing the frame to a propelling carriage so that the frame may ride or float at a constant distance above the work surface; to provide means for swiveling a blowpipe-supporting frame with respect to the propelling carriage; to provide improved wheel supporting means for maintaining the blowpipe-supporting frame at a uniform distance above the work surface; to provide improved cutting heads specifically adapted to project a plurality of cutting jets; and to provide means whereby the cutting heads may be adjustably positioned and maintained in predetermined normal relation with respect to a work surface. These and other objects of the present invention will become more readily apparent from the following description and from the accompanying drawings disclosing several forms of apparatus embodying principles of the invention. In the drawings;

Fig. 1 is a perspective view of one form of apparatus incorporating principles of the present invention and comprising a plate-riding device adapted to support flame-severing and flame-beveling blowpipes;

Fig. 2 is a side elevational view of the apparatus disclosed in Fig. 1;

Figs. 3, 4, and 5 are top-plan, rear, and side elevational views of a modified form of construction;

Fig. 6 is a vertical cross-sectional view of a cutting head adapted to be employed with the improved plate-riding device, and

Fig. 7 is a detailed elevational view of a modified form of wheel support for the blowpipe undercarriage.

Although the invention may be adapted to support various types of tools such as, for example,

scribers, crayons, gouging implements, and the like, the invention, for convenience, has been illustrated herein in conjunction with blowpipe means adapted to project one or more gaseous jets upon a work surface. Although welding blowpipes may be used, the invention is disclosed in connection with cutting blowpipes adapted to project a series of cutting jets, for example, of the type adapted to form square and/or beveled edges in a ferrous metal plate.

With particular reference to Fig. 1, the invention broadly comprises a carriage C adapted to be supported and propelled along a predetermined path as, for example, rails R. An arm or support A is rigidly secured to the carriage C and extends outwardly over a work surface S. A blowpipe-supporting frame or undercarriage U floats or rides along the surface S, the undercarriage being supported by wheel means W in rolling engagement with the work surface. Blowpipe means B secured to the undercarriage U may thus be maintained at a uniform distance above the work surface S, being free to rise and fall in accord with irregularities in the work surface. The longitudinal motion of the carriage C is imparted to the undercarriage U by means of links L which maintain the undercarriage against side-wise displacement while permitting vertical motion of the undercarriage relative to the carriage C and arm A. Various modifications of this general combination are disclosed throughout the application and will become apparent from the following detailed description.

In Figs. 1 and 2, one form of apparatus incorporating principles of the invention comprises the self-propelled carriage C, consisting generally of a light-weight portable machine 11, for example, of the type disclosed in Patent No. 2,183,605, which was granted on December 19, 1939. The machine 11 is provided with a superstructure 12 transversely adjustable with respect to the machine 11 as by means of a slideway 13. The arm A extends outwardly from the carriage C as a cantilever beam, being sufficiently strong and rigid to secure the floating blowpipe-supporting frame U against undesirable side-wise movement with respect to the work surface S. A counterweight 14 may be provided, if necessary, to counterbalance the arm A and the weight of the structure supported thereby. A lug 15 provides means whereby the entire apparatus may be lifted and transported from one location to another as by means of a crane. Although any form of carriage may be employed for supporting the arm A in overhanging relation to the work surface S, the herein disclosed machine 11 is specifically adapted for motion along straight or substantially straight lines and accordingly is provided with a pair of rails R comprising the flanges of a standard I beam, which is supported in a level position adjacent to the work surface in any convenient manner.

The tool support or undercarriage U is herein disclosed as a generally horizontal platform or frame adapted to support blowpipe means B comprising, for example, a severing blowpipe 16 and a bevel-cutting blowpipe 17. In the form of construction disclosed in Figs. 1 and 2, the blowpipe-supporting frame comprises a platform 20 formed of a first member 18 which extends substantially parallel with the arm A, and a second member 19 secured to the first member as by welding so as to be located horizontally substantially at right angles to the first member. The platform 20 is supported for vertical move-

ment with respect to the arm A without sidewise displacement as the platform rises and falls in accord with irregularities in the work surface. As indicated in Figs. 1 and 2, such supporting means comprises link means L preferably consisting of three separate links 21 extending in parallel relationship between the arm A and the platform 20. The arm A is provided with an equal number of clevises 22, 23, and 24, preferably located in a horizontal plane. One clevis 22 is positioned adjacent to one side of the arm A, for example, the leading edge, and desirably at an intermediate point along the length of the arm. Clevises 23 and 24 are located adjacent to the opposite side of the arm, for example, the trailing edge, at points spaced along the length of the arm, for example, at points equally spaced from the clevis 22. The links 21 are pivotally secured at one end to the respective clevises 22, 23, and 24, and extend in a parallel relation therefrom, preferably in a downward and rearward direction, for pivotal connection at the lower end with the platform 20. A clevis pin 25 extends between the arms of each clevis, two of the pins being in the same straight line and the third being parallel to them. Each pin forms a close-fitting journal on which the upper end of each of the links is mounted. As shown in Fig. 1, the links depending from clevises 23 and 24 may be journaled directly to the member 18, and a suitable yoke 26 may be provided at the forward end of the member 19 to receive the link 21 extending from the clevis 22.

A load-sustaining rod 27 is pivoted at its lower end to the platform 20, while the upper end extends through an aperture 28 formed in an extension of the arm A. A compression spring 29 is held on the rod 27 so as to exert a lifting force on the undercarriage U, thus removing some of the weight of the undercarriage from the work surface S. The spring 29 further provides for more gentle lowering of the undercarriage, for example, when the device passes over the end of the work surface.

Some form of surface-engaging means is provided to maintain the platform and its associated tool or tools at a uniform distance from the work surface. For this purpose, use is preferably made of wheel means adapted to support the platform 20 in rolling engagement with the work surface. As shown in Figs. 1 and 2, the apparatus disclosed comprises a wheel-mounting yoke 31, the upwardly extending arms 32 of which connect in any convenient manner with the platform 20. Spacer blocks 33 may be interposed between the yoke 31 and the point of attachment on the platform 20. Other equivalent construction may be provided to permit transverse adjustment of the yoke 31 with respect to the platform 20, in order to permit laterally positioning the wheels, as close as possible to the bevel-cutting or similar blowpipe 17. The lower horizontal portion 40 of the yoke is slotted to receive one or more wheels 34, the position of which may be adjusted with respect to the slot. The purpose of providing means for adjusting the position of the wheels in longitudinal and transverse directions is to enable the rolling support to engage the work surface at a point as close as conveniently possible to the delivery end of the blowpipes.

Suitable clamps 35 and 36 are provided for securing the respective blowpipes 16 and 17 in position on the platform 20, which clamps preferably are adjustably positioned upon the members 18 and 19 to shift the blowpipes selectively

in a horizontal plane. The clamps are of conventional design, such as permit swiveling motion and pivotal motion of the blowpipes about one or more axes so as to permit adjusting the blowpipes to any desired position. The clamp 36 comprises a body portion 37 rigidly clamped to the member 18 and a telescoping portion 38, secured to the blowpipe and adjustable along the member 18 as by means of an adjustment screw 39, threaded to the portion 37, as shown in Fig. 1. After initially securing the portion 37 in its approximate position, the size of the bevel to be cut by the blowpipe 17 may be adjusted accurately by means of the transverse adjustment screw 39. Although there is less need on the square-cutting blowpipe 16 for an adjustable clamp 36 of the type shown in connection with the beveling blowpipe 17, such a clamp may be used if desired.

It will be observed from the foregoing description that the construction provides a very rigid support for the blowpipe means so far as lateral or sidewise motion is concerned, but at the same time permits free movement of the undercarriage in a vertical plane. Rigidity is enhanced by disposing the three clevises 22, 23, and 24, in a horizontal plane. The links are widely spaced and are accurately fitted within their respective pivotal mountings so as to minimize lost motion. The wheel support is rigidly mounted to the platform 20, and much of the weight of the undercarriage is absorbed by the spring 27, thus enhancing the freedom of motion of the undercarriage as it floats or rides on the work surface S. The precision of a straight cut is dependent largely upon the accuracy with which the sections of the rails R may be assembled to form a long straight path, and not upon side motion in the undercarriage. This is overcome largely by using a single long I-beam where possible.

A modified form of apparatus embodying features of the present invention is disclosed in Figs. 3, 4, and 5 wherein parts corresponding with those described in connection with Figs. 1 and 2 are designated by like reference characters. The carriage C comprises a self-propelled machine 11 supported for rolling engagement with rails R as shown in Fig. 4. An arm A' is rigidly secured to the superstructure of the carriage in a manner similar to that described in connection with Figs. 1 and 2. The arm A' terminates in a vertically disposed bearing or clamp 41 for swivelly receiving a tubular spindle 42 extending upwardly from a link-supporting plate 43. A collar 44 is rigidly secured to the top of the spindle 42 to prevent the plate 43 and spindle 42 from falling from the clamp 41 when clamping screws 45 are loosened.

A platform 20' is suspended from the plate 43 by means of three links 21' pivotally secured to clevises 22', 23', and 24', which clevises are arranged at the apices of a substantially equilateral triangle. The links depend in parallel relation from the plate 43 and are pivoted at their lower ends to the plate 20'. The upper and lower pivotal mountings of the links 21' thus are respectively located in a horizontal plane. The platform 20' preferably comprises a flat plate held in horizontal position by means of the links 21'. The platform 20' is supported with respect to the work surface by means of a single relatively large wheel 34' which may be adjustably positioned upon a wheel support 46 extending downwardly from the platform 20'. The wheel axle

comprises a bolt 47, adjustable with respect to the support 46 by movement within a slot 48. One or more load-sustaining rods 27', provided with compression springs 29', assist in supporting the platform 20' and in avoiding unnecessary shock to the parts of the undercarriage U as when the wheel 34 rolls off the end of the work surface S. The bearing 41 permits 180° rotation of the undercarriage after one pass, to position the parts for a return pass along an adjoining plate, or along another side of the same plate.

It will be noted that the links 21' are relatively compactly located and that the arm A' is considerably shorter than the arm A disclosed in Figs. 1 and 2. The resulting saving in space is more fully utilized by the use of an improved type of cutting head H which may be secured directly to the discharge end of a conventional cutting blowpipe. One such form of improved cutting head which is disclosed in Figs. 6 and 7, comprises a casing 49 having connecting means 51 secured to the discharge end of a cutting blowpipe B' as by a coupling nut 60. The oxidizing cutting gas passes through a central conduit 52 in the connecting means 51, which conduit communicates with a manifold 53 adapted to distribute the cutting gas to a plurality of nozzle-receiving cavities 54. A preheating-gas conduit 55 extends through the connecting means 51 and communicates with a manifold 56 which is adapted to distribute preheating mixture from the blowpipe to the respective cavities 54. A plurality of inclined generally parallel nozzles 57 and 58 are mounted within the respective cavities 54 in fluid communication with the supply of cutting oxygen and preheating mixture. The cutting head H disclosed in Fig. 6, when positioned so that the nozzles are inclined in the direction of travel, may be employed for obtaining high-speed cutting in the manner disclosed in the previously mentioned Patent 2,184,562. The cutting jet from the leading nozzle 57 forms a severing cut through the metal body, while the irregular edges of the kerf are trimmed or smoothed by the cutting jet issuing from the nozzle 58, which latter nozzle is preferably offset a slight degree in a lateral direction from the leading nozzle 57. By means of a cutting head H of the type shown in Fig. 6, a considerable saving in space is effected and the respective jets can be manipulated and controlled with considerably more ease than can a plurality of separate blowpipes.

Although the cutting head shown in Fig. 6 is specifically adapted for a flame-cutting and trimming operation, the same design principles may be incorporated in a similar cutting head H' adapted to perform a cutting and beveling operation. Fig. 4 discloses such a head wherein use is made of a casing 49' having connecting means 51' of the type shown in Fig. 6 for securing the head H' to the discharge end of a cutting blowpipe B'. The internal connections and conduits are identical with those shown in Fig. 6, with the exception that the nozzles are disposed in a slightly different fashion. Use is preferably made of a leading nozzle 57', the axis of which is substantially parallel to that of the connecting means 51' and to the axis of the blowpipe B', so that when the blowpipe B' is disposed in a vertical position, the nozzle 57' is adapted to form the squaring off or vertical face of a beveled edge. A trailing nozzle 58' is disposed in an inclined position, sloping downwardly in a forward

and a lateral direction so as to form the inclined face of the undercut beveled edge. As shown in Fig. 5, the nozzle 58' is so inclined and spaced from the nozzle 57' that the jets issuing from the respective nozzles will not intersect. The use of a bevel-cutting head or adaptor H', as shown in Figs. 4 and 5, permits the wheel 34' to be located directly adjacent to both nozzles, thus assisting in maintaining the nozzles precisely in uniform spaced relation to the work surface S. Furthermore, by employing a wheel 34' of fairly large diameter, it is possible to locate the spaced nozzles 57' and 58' so that all portions thereof, and especially the discharge ends, are located within the axially projected circumference of the wheel. In this manner the wheel periphery offers a large degree of protection to the nozzles, saving them from undesirable contact with the work surface, for example, at the start or end of a cutting operation.

The blowpipe B' shown in Figs. 3, 4, and 5, projects vertically through the platform 20' being secured firmly with respect thereto by means of an adjustable mounting 59. The mounting 59 comprises a tubular body 61 fitted with conventional blowpipe elevating mechanism 62 adapted to engage a rack 63 extending longitudinally of the blowpipe B'. A flange 64 rests against the platform 20' and is provided with a plurality of circular slots 65 through which project machine screws or similar fastening means 66. By loosening the screws 66, the blowpipe B' and the mounting 59 may be adjustably swiveled and held in any desired position so as to align the cutting head H' accurately with respect to the edge to be formed without disturbing the coupling nut 60. Suitable indicia 67 may be provided on the flange 64 as shown in Fig. 4, to permit accurate adjustment of the parts. By swiveling the blowpipe B' about its axis, the head H' is rotated, effecting a change in the depth of the bevel face at the normal spacing of the nozzles above the work. Accordingly, it is possible to cut various depths of angular faces on the beveled edge with a single bevel-cutting head H', because swiveling the head raises and lowers the level at which the bevel jet enters the edge, and accordingly varies the shape of the bevel both by varying the angle of the bevel face, and the depth of the vertical face or nose. Swiveling of the cutting head H' does not affect the angle of the jet forming the vertical face of the scarfed edge, because the nozzle 57' is parallel to the axis about which the blowpipe is swiveled.

A modified form of wheel-supporting means is disclosed in Fig. 7. A caster 68, comprising a wheel 69 and clevis 71, is pivotally mounted to a portion of the undercarriage U, as for example, to the blowpipe-supporting frame disclosed in either Fig. 1 or 5. A pintle 72 extending upwardly from the clevis 71 is mounted to turn freely about a vertical axis as by means of a ball bearing 73 housed within a support 74 which, in turn, is secured in a suitable manner to the platform 20' of the undercarriage U. The clevis 71 is provided with a slot 75 to adjustably receive the axle 76 of the wheel 69. By shifting the caster to the leading position at the start of a cutting operation, as shown by full lines in Fig. 7, the point of rolling contact between the wheel 69 and the work surface S is located forward of the cutting nozzles 57 and 58, thus providing for proper positioning of the nozzles with respect to the initial edge of the

plate S at the start of the operation. As the cut progresses, the caster naturally pivots to the trailing position indicated in broken lines, at which time the wheel preferably comes directly adjacent to both cutting nozzles and accurately maintains them at a uniform distance from the work surface. Throughout the cutting operation the point of rolling contact is either directly adjacent to the nozzles or slightly behind them, so that full support is provided for the nozzles right up to the final stage of the cutting.

Since the wheel 69 preferably is located closely adjacent to the head H in the operating position, it is desirable, when the caster pivots from the leading position to the trailing position, that it move in an arcuate path away from the nozzles so as not to abut against the head H. This is effected by the use of a stop 77 depending from the support 74, and a pin 78 extending from the clevis 71 adapted to abut against the stop 77 to prevent the caster from swiveling in the direction of the cutting head H. Preferably the stop 77 is located so as to maintain the caster 68 slightly to one side of the dead center position, so that as the apparatus is set in motion the caster is urged to pivot in an arcuate path away from the head H. A second stop 79 may be located opposite the stop 77 to prevent the caster from being moved against the head H when the caster is in the trailing position, slight clearance normally being provided between the pin 78 and the stop 79.

By providing slightly greater spacing in a transverse direction between the blowpipe means and the caster 68, the stops 77 and 79 may be eliminated thereby allowing the caster to swivel through a complete or substantially complete circle. Such an arrangement in conjunction with the pivotal mounting means between the carriage and undercarriage as shown in Fig. 5, provides for allowing the cutting head to follow slightly irregular paths of predetermined contour even though the carriage C is propelled along a straight line. Under these conditions the blowpipe means is maintained at a constant height above the work surface even though the path to be followed is an irregular contour.

As shown in Fig. 4, the nozzles 57' and 58' are located close enough together, transversely of the line of cut, that the nozzle 57' forms the vertical face at the top portion of the edge, while the nozzle 58' forms an undercut bevel face at the bottom portion of the edge. By providing greater spacing between the two nozzles, or using the present nozzle on a thinner plate the nozzle 58' may form a top bevel face on the adjoining section of metal, while the nozzle 57' forms the usual relatively small vertical face at the bottom portion of the same adjoining section.

Various other modifications of the invention may be made without departing from the scope of the invention or sacrificing its advantages.

I claim:

1. Apparatus for supporting and guiding a blowpipe comprising an arm adapted to be detachably connected to a movable carriage, said arm being movable by said carriage above a generally horizontal work surface along a desired path of travel, said arm extending in a generally horizontal direction transversely of said path of travel; a blowpipe-supporting platform located substantially horizontally beneath said arm; pivotal links extending between said horizontal platform and said arm adapted to maintain said plat-

form horizontal during relative vertical movement between said arm and said platform; surface-engaging means depending from said platform for maintaining said platform at a uniform distance from said work surface; and blowpipe mounting means adjustably supported on said platform and being adapted to shift the position of the discharge portion of said blowpipe along said horizontal platform.

2. Apparatus as claimed in claim 1 wherein said arm comprises a cantilever and wherein said links are located in spaced relation along said arm.

3. Blowpipe supporting and guiding apparatus comprising a carriage; means for propelling said carriage along a predetermined path; a horizontal arm extending from said carriage over a work surface; a platform extending longitudinally and transversely of said path in a horizontal plane below said arm; blowpipe supporting means adjustably mounted on said platform; a link pivotally secured at one end to one side of said arm at an intermediate point along the length of said arm and pivotally secured at its other end to said platform; a pair of spaced links pivotally secured adjacent to the opposite side of said arm at points spaced along the length thereof, said links extending parallel to said first mentioned link and having their opposite ends secured to said platform, said links being pivotally connected to said arm at points forming the apices of a substantially equilateral triangle; and means depending from said platform and adapted to engage said surface to raise and lower said platform in accord with irregularities in said surface to maintain said platform at a uniform distance from said surface.

4. Apparatus for supporting and guiding metal severing and beveling blowpipes, comprising a carriage adapted to be propelled along a path; an arm projecting from said carriage over a work surface; a blowpipe-supporting frame comprising a first member extending substantially parallel with said arm, and a second member secured to and extending horizontally substantially at right angles from said first member; links pivotally secured adjacent to the free ends of said members, said links extending in parallel relation from said ends to said arm and being pivotally secured to said arm; means for attaching metal-severing and metal-beveling blowpipes to said respective members; and means depending from said blowpipe-supporting frame and adapted to engage said work surface to raise and lower said frame in accord with irregularities of said surface, to thereby maintain the delivery end of said blowpipes at a uniform distance from said surface.

5. Apparatus as claimed in claim 4 wherein the respective means for attaching said blowpipes are adapted to be adjustably positioned with respect to said frame.

6. Apparatus as claimed in claim 4 wherein such depending means comprises a support; a plurality of wheels rotatably mounted on said support upon parallel spaced axes; and means for adjustably positioning said wheels on said support to vary the location of said wheels with respect to such blowpipe-attaching means.

7. Apparatus as claimed in claim 4 wherein such depending means comprises a yoke, said yoke having arms secured at the top portion to said frame; wheels rotatably mounted on said yoke with parallel spaced axes; and means for securing at least one of said wheels in adjustable spaced relation to said yoke.

8. Apparatus for supporting and guiding a blowpipe, comprising an arm adapted to be connected at one end to a self-propelled carriage, said arm being movable by said carriage above a generally horizontal work surface along a desired path of travel, said arm extending in a generally horizontal direction transversely of said path of travel; and an undercarriage comprising a link-supporting member swivelly mounted on the free end of said arm for movement about a vertical axis, a blowpipe-supporting platform located in a horizontal plane beneath said member, spaced parallel equal-length links pivotally connecting said member and said platform about axes located respectively in spaced parallel planes to maintain said platform in a horizontal plane during relative vertical movement between said platform and said member, and a wheel adapted to roll on said work surface and to support said platform in uniform spaced relation to said work surface, said undercarriage being free to swivel completely about a vertical axis beneath said arm.

9. Apparatus as claimed in claim 8 including locking means adapted to lock said undercarriage in predetermined swiveled relation to said arm.

10. In a plate riding device having a floating blowpipe-supporting frame, and means for propelling said frame relatively to a path over the top surface of a metal body, the combination comprising means for securing a blowpipe means on said frame in position to project a gaseous jet against said surface from at least one nozzle on said blowpipe means; and wheel means secured to said frame for rolling engagement with said surface to maintain the discharge portion of said nozzle at a uniform distance from said surface, said wheel means comprising a caster pivotal in an orbit about a vertical axis, said axis being so located with respect to said blowpipe means that the point of rolling contact of said caster on said surface is located substantially forward of said nozzle when said caster is in the leading position at the start of a propelling operation whereby said caster may support said frame when said nozzle is initially located over an edge of said surface, said axis being so located that said point of rolling contact is directly adjacent to said nozzle when said caster pivots to a trailing position during forward movement of said frame relative to said path.

11. In a plate riding device having a floating blowpipe-supporting frame, and means for propelling said frame relatively to a path over the top surface of a metal body, the combination comprising means for securing blowpipe means on said frame in position to project a gaseous jet against said surface from at least one nozzle on said blowpipe means; wheel means secured to said frame for rolling engagement with said surface to maintain the discharge portion of said nozzle at a uniform distance from said surface, said wheel means comprising a caster pivotal in an orbit about a vertical axis, said axis being so located with respect to said blowpipe means that the point of rolling contact of said caster on said surface is located substantially forward of said nozzle when said caster is in the leading position, and adjacent to said nozzle when said caster is in the trailing position; and stop means adapted to locate said caster away from a dead-center position, thereby causing said caster to swivel from the leading position to the trailing position in an arcuate path extending in such a direction as to preclude interference with said nozzle.

12. Metal-cutting apparatus comprising, in combination, a plate-riding device including a vertically floating blowpipe-supporting platform comprising a plate disposed in a substantially horizontal plane; a carriage for propelling said platform along a path over a surface of a metal body; parallel equal-length links pivotally connecting said carriage with said platform, said links being pivoted about axes spaced longitudinally of said path, said axes being located respectively in substantially horizontal planes so as to maintain said platform in a horizontal position during relative vertical movement between said platform and said carriage; a blowpipe adjustably positioned on said platform and extending downward toward said surface; a cutting head secured to the discharge end of said blowpipe, said cutting head being provided with a plurality of spaced cutting nozzles adapted to direct flame-cutting jets against said surface at spaced points along the line of cut; and at least one wheel depending from said platform and adapted to support said floating platform in rolling engagement with said surface, to maintain said nozzles in uniform spaced relation to said surface.

13. Metal-cutting apparatus as claimed in claim 12, wherein one of said cutting nozzles is a vertical severing nozzle, and the other of said cutting nozzles is an inclined beveling nozzle in non-intersecting relation to said vertical severing nozzle; and including means for varying the shape of the bevel formed with said beveling nozzle, comprising a swiveled connection between said blowpipe and said platform adapted to provide pivotal movement of said blowpipe about its axis, to thereby adjust the angle and spacing of said beveling nozzle to the line of cut, and accordingly the shape of the bevel formed by said beveling nozzle.

14. A flame-cutting head adapted to be advanced along a path on a work surface comprising a casing; connecting means for securing said casing to the discharge end of a cutting blowpipe, said casing being provided with a plurality of spaced nozzle seating means in tandem along said path having axes inclined relative to said connecting means in closely adjoining laterally spaced substantially vertical planes; nozzles secured to said seating means and adapted to project flame-severing and trimming jets respectively in tandem relation in a forwardly-inclined direction along said path; and conduits within said casing adapted to conduct preheating mixture

and cutting oxygen from said connecting means to said nozzles.

15. A flame-cutting-and-beveling head movable by a support along a predetermined path on the horizontal surface of a workpiece comprising a casing; connecting means adapted to secure said casing to the discharge end of a vertically disposed cutting blowpipe mounted on said support; a plurality of spaced nozzles projecting from said casing, at least one of said nozzles being adapted to deliver a first jet substantially parallel with the axis of said blowpipe to form a vertical edge on a workpiece, and another of said nozzles being adapted to deliver a second jet inclined toward but in non-intersecting relation to said first jet to form a beveled edge on said workpiece; and conduits extending through said connecting means to said nozzles, to provide said nozzles with flame-cutting gases from the discharge end of said blowpipe, said head being adjustable relative to said support about a vertical axis offset from both of said nozzles to control the shape of such beveled edge and the location of said vertical edge according to the pivotal position of said head relative to said support.

16. Flame-cutting-and-beveling apparatus adapted to be propelled along a path of travel on the surface of a ferrous metal workpiece, comprising a head having seats adapted to receive a pair of cutting nozzles extending in fixed spaced relation from said head, and having inlet means adapted to connect said nozzles with sources of cutting oxygen and combustible preheating gas respectively; a first of said nozzles being adapted when in operating position to project a jet of cutting oxygen perpendicularly against said plate, the second of said nozzles being inclined relatively to said first nozzle and being adapted to project a second jet of cutting oxygen toward but in non-intersecting relation to said first-mentioned jet, said second jet being adapted when in operating position to cut diagonally through said plate along said path of travel; and means adapted to support said head for movement along said path of travel and for adjustable pivoting movement of said head relative to said path about an axis offset from each of said nozzles but extending in the same direction as the axis of said first nozzle, to thereby control the location and shape of the faces formed by said respective jets.

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