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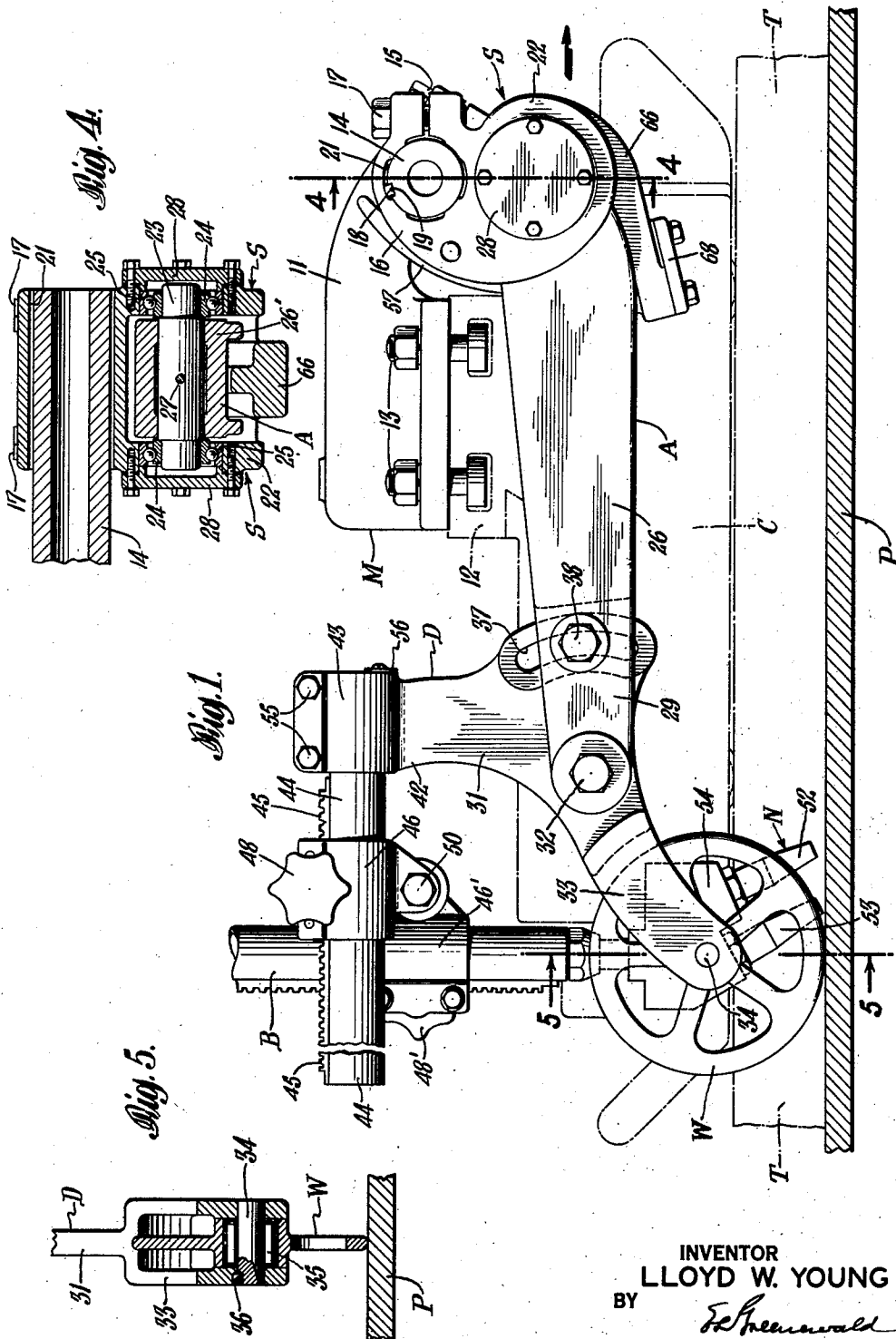
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PLATE-RIDING DEVICE

Filed July 9, 1940

2 Sheets-Sheet 1



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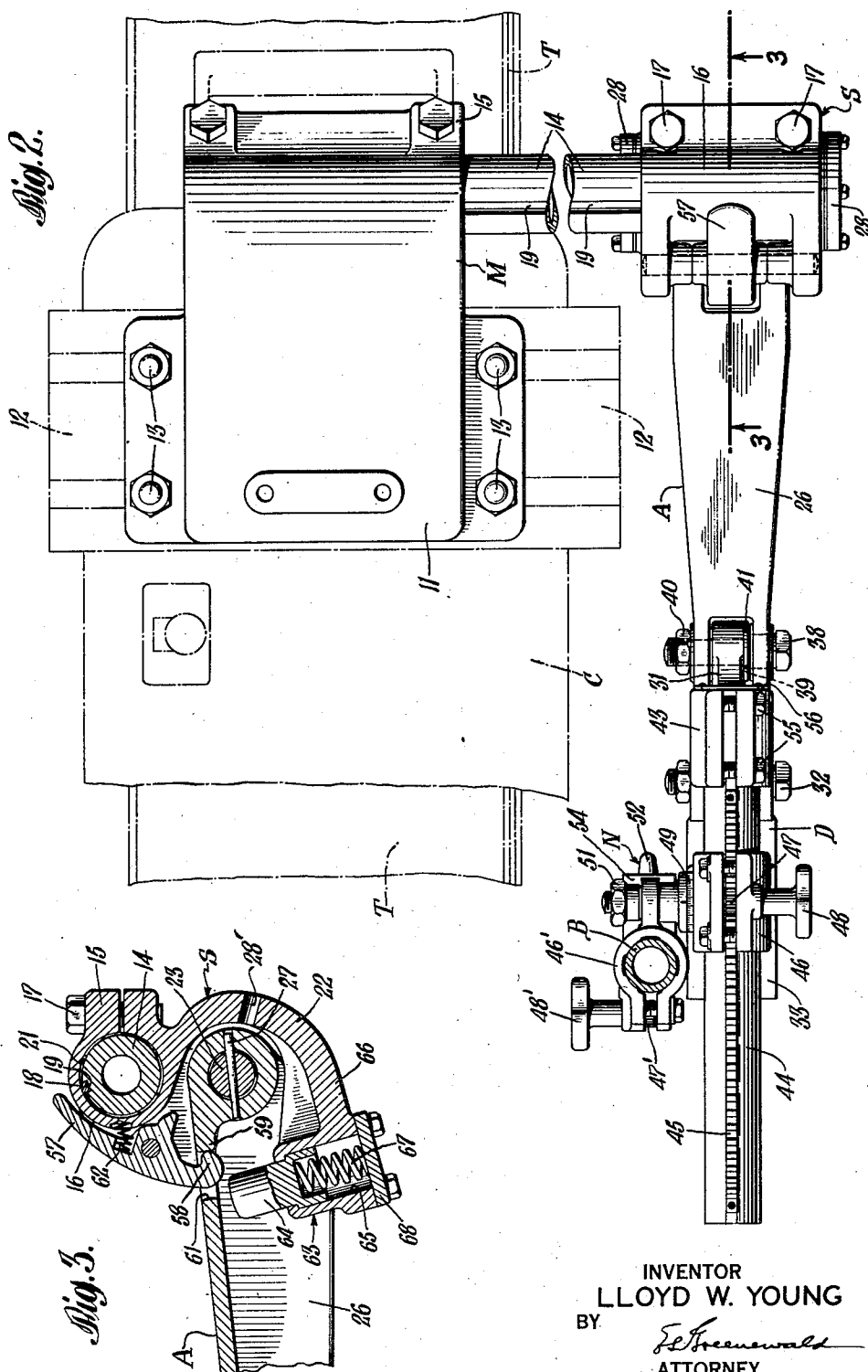
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UNITED STATES PATENT OFFICE

2,297,343

PLATE-RIDING DEVICE

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9 Claims. (Cl. 266—23)

This invention relates to tool-supporting and guiding means and more particularly to a plate-riding device adapted to roll along the surface of a ferrous metal plate to maintain one or more flame-cutting blowpipe nozzles in uniform spaced relation to the work surface.

It is common practice to flame-sever long steel plates and other structural members, to prepare the same for assembly or for subsequent welding operations. A plate commonly is cut and beveled in a single operation by concurrently projecting flame-cutting and flame-beveling jets downwardly against and progressively along the desired path of travel. Both jets, and especially the beveling jet, must be maintained at a uniform distance above the work surface, as the slightest variation in the spacing of the blowpipe nozzles from the surface produces a corresponding change in the shape of the edge being formed. It has been found in practice that by supporting the blowpipe means on a device that rides or rolls directly on the work-plate, undulations or other irregularities in the surface of the work-plate do not materially alter the spacing of the parts, and the resulting edge is straight and uniform.

The principal objects of the present invention are to provide a simplified plate-riding device adapted for propulsion along the surface of a work-plate to support one or more blowpipe nozzles in uniform spaced relation to the surface; to provide a plate-riding device comprising a single wheel-supported arm adapted to be connected to a self-propelled carriage; to provide in such a device a slideway for adjustably supporting flame-severing blow-pipe means, with means for adjusting the angular position of the slideway relative to the surface of the work-plate; and to provide means for supporting the plate-riding device in one or more predetermined positions when the device no longer rides on the work surface.

These and other objects of the present invention will become apparent from the following description and from the accompanying drawings.

In the drawings, Figs. 1 and 2 are side elevational and plan views respectively of the improved plate-riding device, attached to a propelling carriage illustrated in broken lines;

Fig. 3 is a vertical sectional view through the pivotal support taken on the line 3—3 of Fig. 2;

Fig. 4 is a vertical sectional view through the pivotal support taken on the line 4—4 of Fig. 1; and

Fig. 5 is a vertical sectional view through the supporting wheel taken on the line 5—5 of Fig. 1.

Generally speaking, the invention comprises a mounting means M secured to the top of a self-propelled carriage C, for example, of the general type shown in U. S. Patent No. 2,183,605, and adapted to travel along a track T. A support S, spaced laterally from the mounting means M, pivotally supports the forward end of a trailing arm A. A wheel W is rotatably mounted at the opposite or trailing end of the arm A for rolling engagement with the surface of a work-plate P. A blowpipe B may be adjustably secured to the arm A adjacent to the wheel W, both blowpipe and wheel preferably being mounted directly on a bracket D, pivotally adjustable with respect to the arm A.

The mounting means M comprises a substantially massive and rigid block 11 secured to the top of a slotted cross arm 12 of the carriage C as by means of bolts 13. The carriage C preferably comprises a conventional portable cutting machine and normally travels on track T in a forward direction, that is, toward the right, in the direction of the arrow when observing Fig. 1. A tubular bar 14 extends laterally from a clamp 15 at the forward end of the mounting means M. The support S comprises a tubular slide 16, bored to receive the tubular bar 14. The slide 16 is movable along the bar 14 and may be held in predetermined positions by clamping screws 17. A spline 18, and a keyway 19 extending along the bar 14 cooperate with a longitudinal groove 21 formed in the bore of the slide 16 to limit relative swivelling movement between the slide 16 and the bar 14, when the screws 17 are loosened. A generally cylindrical or drum-like housing 22 depends from the slide 16 and serves as a pivotal mounting for the forward end of the arm A. A shaft 23 located below and extending substantially parallel with the bar 14 is journaled within bearings 24 located within bores 25 on opposite sides of the housing 22. Cover plates 28 protect the bearings 24 and the exposed ends of the shaft 23.

The arm A comprises a tapering member 26 of channel cross section having a transverse tubular portion 26' at its forward end, bored to engage the shaft 23, the two parts being locked together by a taper pin 27 inserted through an aperture 28' in the housing 22. Accordingly, the arm A is secured tightly to the shaft 23 and is free to pivot about the bearings 24 in a vertical plane extending substantially perpendicular to

the axis of the bar 14. The rearward or trailing end of the arm A is provided with a forked portion 29 within which a wheel mounting bracket 31 is pivotally secured. A pivot bolt 32 extends horizontally between the tines of the forked portion 29, allowing the bracket 31 to pivot relatively to the arm A in a vertical plane extending generally along the path of movement. The bracket 31 terminates in a clevis 33 through which a pin 34 extends transversely for rotatably supporting the wheel W. Roller bearings 35, or the like, preferably are provided to diminish friction, and the pin 34 may be locked in position by means of a set screw 36.

The bracket 31 is provided with an arcuate slot 37 through which a locking bolt 38 passes. The bolt 38 is provided with an annular shoulder 39. A washer 41 resting on the shoulder 39 bears against the bracket 31 urging it firmly against the opposite side of the forked portion 29 when nut 40 is tightened to thereby adjustably position the bracket 31 in predetermined angular relation to main portion of the arm A.

The bracket 31 is provided with an upward extension 42 which terminates at its upper end in a generally tubular clamp 43 for supporting a slideway 44. The slideway 44 comprises a metal tube having a diameter preferably equal to the diameter of the blowpipe B. A rack 45 of the type conventionally employed with blowpipes extends longitudinally along the top of the slideway 44. A pair of perpendicularly disposed blowpipe-supporting brackets 46 and 46' are mounted for relative slidable movement with respect to the slideway and blowpipe, respectively. Pinions 47 and 47', rotated by thumb wheels 48 and 48' operatively engage the racks extending along the slideway and blowpipe, respectively, to provide positive longitudinal sliding motion between the parts. A pivot bolt 50 and nut 51 hold the brackets 46 and 46' in adjustable pivotal relation. A protractor scale 49 allows the angular relationship between the respective brackets to be adjusted accurately when nut 51 is loosened.

The blowpipe B may be provided with any conventional type of nozzle or nozzle means N. The plate-riding device is ordinarily adapted specifically for use with one or more flame-cutting nozzles which are propelled at a suitable speed over the plate P along the line of cut. As shown in Fig. 1 use may be made of a plurality of forwardly inclined nozzles 52 and 53 suitably supported by a manifold 54 which supplies the nozzles with cutting oxygen and combustible preheating mixture from the blowpipe B. The nozzles may be spaced along the line of cut and may be staggered slightly transversely of the line of cut in order to perform flame-severing and trimming operations successively, as described and claimed in Patent 2,184,562, dated December 26, 1939. Obviously, the nozzle means N may comprise other flame-cutting means such as cutting and beveling nozzles, or the means N may comprise any other type of related metallurgical tool.

The trailing arm A thus pivots at its forward end about the bearings 24 in a vertical plane extending along the path of travel, as the trailing end rolls along the plate P, so as to rise and fall in accordance with undulations or other irregularities in the surface thereof. Accordingly, the nozzle means N is maintained at a constant predetermined distance above the surface of the plate P to produce a uniform cut in the plate P.

As a typical example of operation, a plate P is suitably supported in a horizontal plane and the

track member T, comprising a channel, or the like, is rested on the plate parallel with the desired path of travel. The clamping screws 17 are loosened to allow shifting of the support S along the bar 14 to align the blowpipe B, roughly with respect to the line of cut. More accurate positioning may be obtained by laterally shifting the cross-arm 12. The screws 17 are tightened and the arm A allowed to rest in a generally horizontal position with the wheel W on the plate. The nut 40 is then loosened to allow the bracket 31 to be pivoted relatively to the arm A in a vertical plane until the slideway 44 is horizontal. The nut 40 is then tightened to hold the parts in position. In this way the parts may be initially adjusted so that longitudinal movement of the bracket 46 along the slideway 44 may be effected to adjust the nozzle means N to a desired starting point without varying the vertical spacing of the nozzles 52 and 53 from the plate after they are once located by turning thumbwheel 48'. The entire blowpipe assembly may be pivoted in a transverse plane, as for bevel cutting, by swiveling the slideway 44 within the clamp 43, and the parts may be held in selected position by clamping nuts 55. An index plate 56 may be provided on the clamp 43 to assist in properly orienting the parts.

The pivotal relation between the bracket 31 and the arm A is determined at the start of an operation to locate the blowpipe and its support for individual operating conditions. Once this relationship has been established it is maintained throughout the operation.

Latching and cushioning means are provided adjacent to the forward or leading end of the arm A to inhibit excessive downward pivotal movement of the arm A, as when the free end thereof lacks support. As best seen in Fig. 3, such means may comprise a latch 57 pivoted to the support S and having a catch 58 at its lower end for engagement with a boss 59 in the web of the channel forming the arm A. Normally, the catch partially extends through an opening 61 in the arm A adjacent to the boss 59. If the arm is lifted to substantially a horizontal position, a spring 62 urges the catch 58 into engagement with the boss 59 thereby to lock the arm against downward movement. The latch 57 is employed primarily for holding the parts in fixed relation before and after a cutting operation, or when the entire assembly is shifted from one place to another.

A cushioning means 63 is also provided to gradually retard a sudden downward movement of the arm, such as might occur when the wheel W rolls over the end of the plate P. Unless provision were made to retard gradually the downward movement of the arm, damage might result to the parts. The cushioning means 63 comprises a spring-loaded plunger 64 slidable within a cavity 65 at the rearward end of a projection 66 extending from housing 22 of the support S. The plunger 64 is urged upwardly by a compression spring 67 held in position by a detachable plate 68. It will be apparent that after limited downward movement of the arm A, the top or web portion thereof engages the plunger 64 urging it downwardly so as to compress the spring 67. The spring 67 is sufficiently strong to withstand the weight of the arm and its associated parts, and brings the downwardly moving arm to a gradual stop.

The invention may be modified in many respects without departing from the scope thereof or sacrificing any of the advantages.

I claim:

1. A plate-riding device for attachment to propelling means and movable therewith in substantially a straight path over a generally horizontal work-plate, comprising a support adapted to be mounted on said propelling means; a single arm movable with said propelling means and pivoted at one end to said support for swinging movement in a vertical plane; a plate-engaging member at the opposite end of and directly beneath said arm; and tool-mounting means adjacent to said opposite end, said tool-mounting means comprising a blowpipe holder movable relatively to said arm, and means for sliding said holder generally in the direction of the length of said arm to position said holder properly along said path at the beginning of an operation.

2. A plate-riding device for attachment to propelling means movable in substantially a straight path over a generally horizontal work-plate, comprising a support adapted to be mounted on said propelling means; a generally horizontal arm pivoted at one end to said support for swinging movement in a vertical plane extending along said path; a plate-engaging wheel rotatably mounted adjacent to the opposite or freely-swinging end of said arm for supporting said opposite end of said arm in rolling engagement with said work-plate; blowpipe mounting means comprising a slideway extending generally in the direction of said arm and secured to said arm adjacent to said opposite end for pivotal movement relative to said arm in a vertical plane extending generally along said path; and means for locating said slideway in substantially parallel relation to said work-plate.

3. A plate-riding device for attachment to propelling means movable in substantially a straight path over a horizontal work-plate, comprising a support adapted to be mounted on said propelling means; an arm pivoted at one end to said support for movement in a vertical plane extending along said path and adapted to extend above and substantially parallel to said plate; a clevis adjustably attached to the opposite end of said arm for pivotal movement in said vertical plane relative to said arm; a wheel rotatably mounted within said clevis; and blowpipe mounting means comprising a slideway extending substantially parallel to said arm secured to and pivotally adjustable with said clevis.

4. A plate-riding device for attachment to propelling means movable in substantially a straight path over a generally horizontal work-plate, comprising a support adapted to be mounted on said propelling means; an arm pivotally mounted at one end to said support, said arm extending substantially horizontally therefrom and being free to swing in a vertical plane; a wheel-supporting member attached in pivotally adjustable relation to said arm adjacent to the opposite end thereof, said member being adapted to pivot relatively to said arm in a vertical plane extending along said path; a wheel rotatably mounted to said member for engagement with said work-plate; and blowpipe mounting means secured to said member, and being pivotally adjustable therewith.

5. A plate-riding device adapted to be supported by a carriage for movement over a substantially horizontal work-plate, comprising a substantially horizontal bar adapted to extend laterally from said carriage; a support mounted on said bar; an arm pivoted at one end to said support for movement in a vertical plane substantially normal to said bar; a wheel-support-

ing member pivotally mounted to said arm at the opposite end of said arm for movement in a vertical plane; a wheel rotatably mounted to said member for rolling engagement with said work-plate; a slideway extending substantially horizontally from said member; means for adjustably positioning said slideway pivotally with respect to said arm; and a tool holder slidable along said slideway.

6. A plate-riding device adapted to be attached to a carriage for movement in substantially a straight path over a horizontal work-plate, comprising a bar adapted to extend laterally from said carriage; a support rigidly secured to said bar; a trailing arm pivoted at its forward end to said support for swinging motion in a vertical plane normal to said bar; a wheel-supporting member pivotally attached to said arm for movement in a vertical plane; a wheel rotatably mounted to said member for rolling engagement with said work-plate; a slideway extending from said member; means for adjustably positioning said member pivotally with respect to said arm to locate said slideway substantially parallel with said work-plate; and a blowpipe holder slidable along said slideway.

7. A plate-riding device adapted to be attached to a self-propelled carriage for movement over a horizontal work-plate, comprising a bar adapted to extend from said carriage transversely with respect to the carriage movement; a support attached to said bar; a shaft extending generally parallel to said bar and mounted on said support; an arm mounted at one end on said shaft for pivotal movement in a vertical plane about the axis of said shaft; a wheel-supporting member pivotally attached to the opposite end of said arm for swinging movement in a vertical plane relative to said arm; a wheel rotatably mounted to said member for rolling engagement with said work-plate; a slideway attached to and extending over said member; a blowpipe bracket slidably supported by said slideway; and means for adjustably positioning said member relatively to said arm to locate said slideway at a predetermined angle relative to said arm.

8. A plate-riding device adapted to be attached to a self-propelled carriage for movement over a horizontal work-plate, comprising a bar adapted to extend from said carriage transversely with respect to the carriage movement; a support secured to said bar; a shaft extending generally parallel to said bar and being journaled to said support; an arm secured at one end to said shaft, said arm extending substantially normally to said bar and being free to swing in a vertical plane, said arm having a fork at its opposite end; a wheel-mounting member pivotally secured within said fork to swing in a vertical plane relative to said arm; means for holding said member in adjusted pivotal position; a wheel rotatably supported by said member for rolling engagement with said work-plate; a slideway secured to said member; a blowpipe bracket slidable on said slideway; a latch extending from said support and adapted to engage said arm to limit the swinging movement of said arm; and resilient means operable between said support and said arm to resiliently engage said arm to retard the downward swinging motion of said arm when said arm is released from said latch.

9. A plate-riding device for attachment to propelling means movable in substantially a straight path over a generally horizontal work-plate, comprising a support adapted to be mounted on said

propelling means; a generally horizontal arm pivoted at one end to said support for swinging movement in a vertical plane, and having an aperture therein adjacent to said end; a plate-engaging member mounted adjacent to the opposite end of said arm for supporting said opposite end in engagement with said plate; a latch extending from said support through said aper-

ture; resilient means operative to urge said latch into locking engagement with said arm, said latch being adapted to hold said arm in fixed position relative to said support whenever said arm pivots to above a predetermined position; and tool-supporting means on said arm.

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