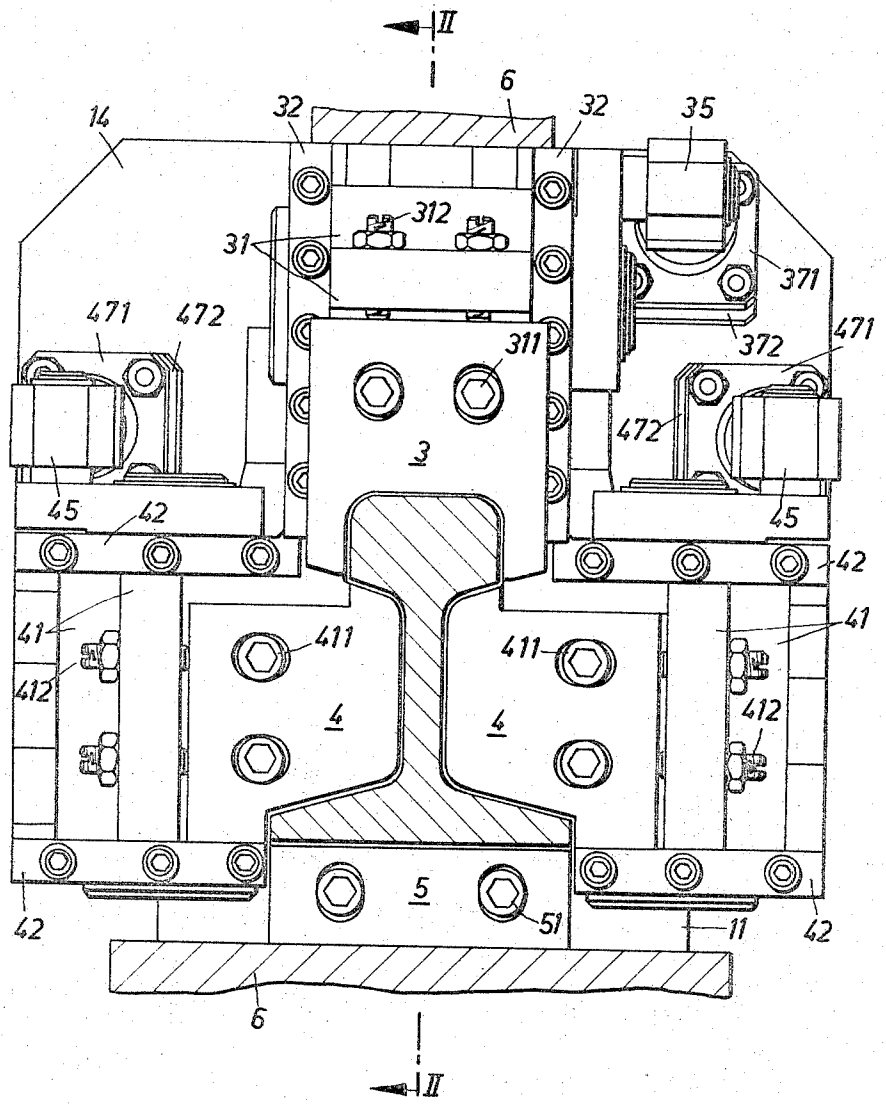
Aug. 22, 1967 E. WELTER 3,336,839

ARRANGEMENT FOR REMOVING BURRS FROM WELDS

Filed July 8, 1965 4 Sheets-Sheet 1

Fig. 1



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ARRANGEMENT FOR REMOVING BURRS FROM WELDS

Filed July 8, 1965 4 Sheets-Sheet 2

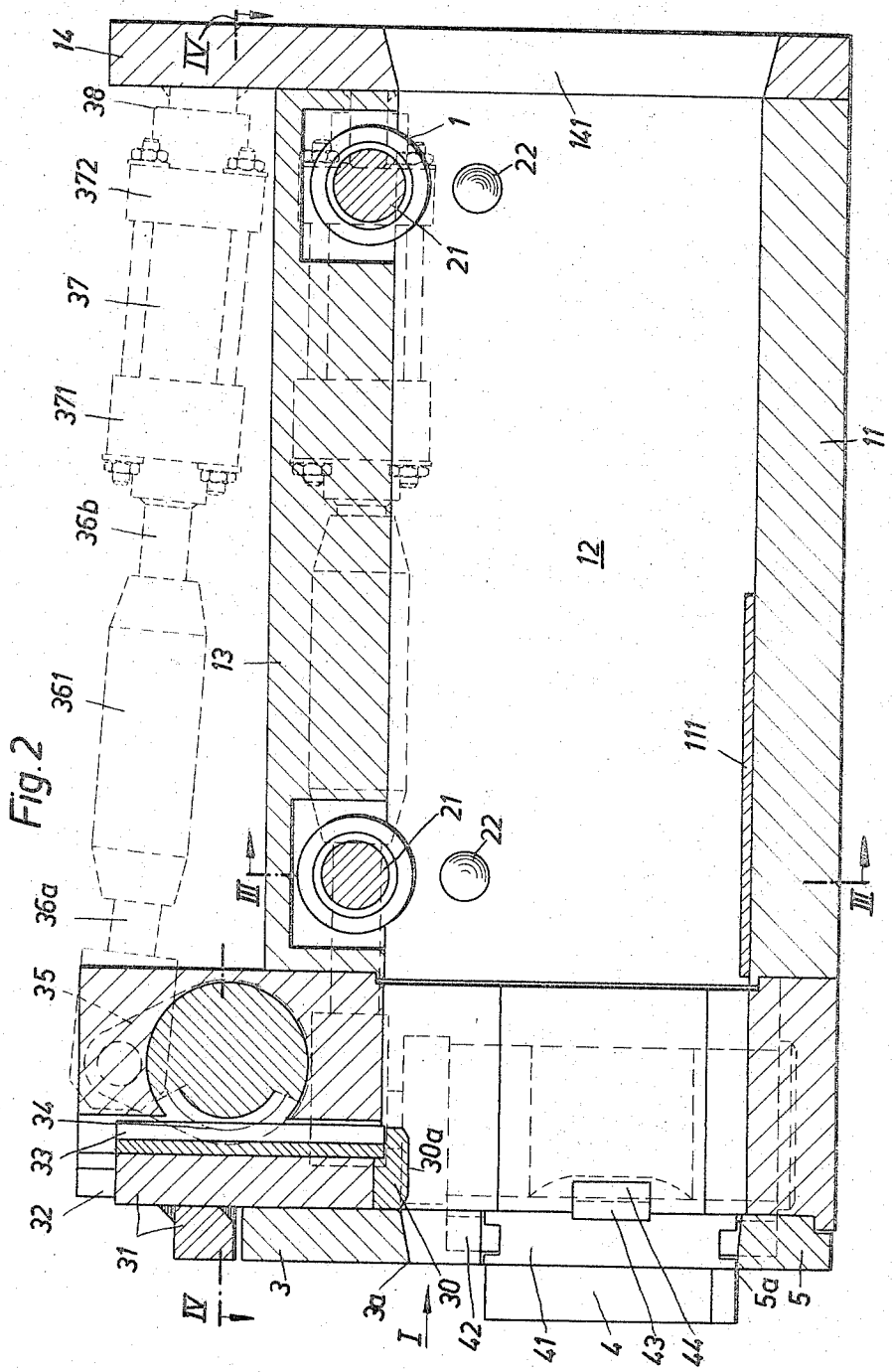


Fig. 2

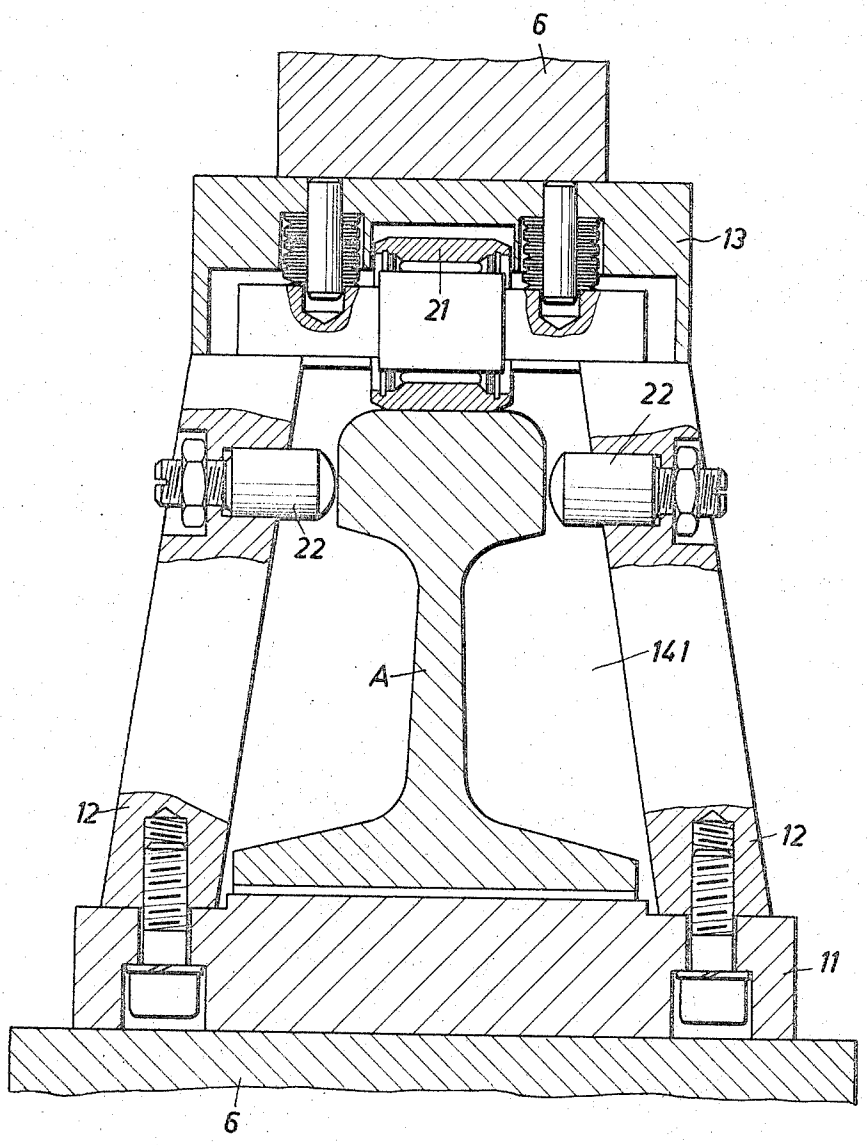
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Fig.3



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ARRANGEMENT FOR REMOVING BURRS FROM WELDS

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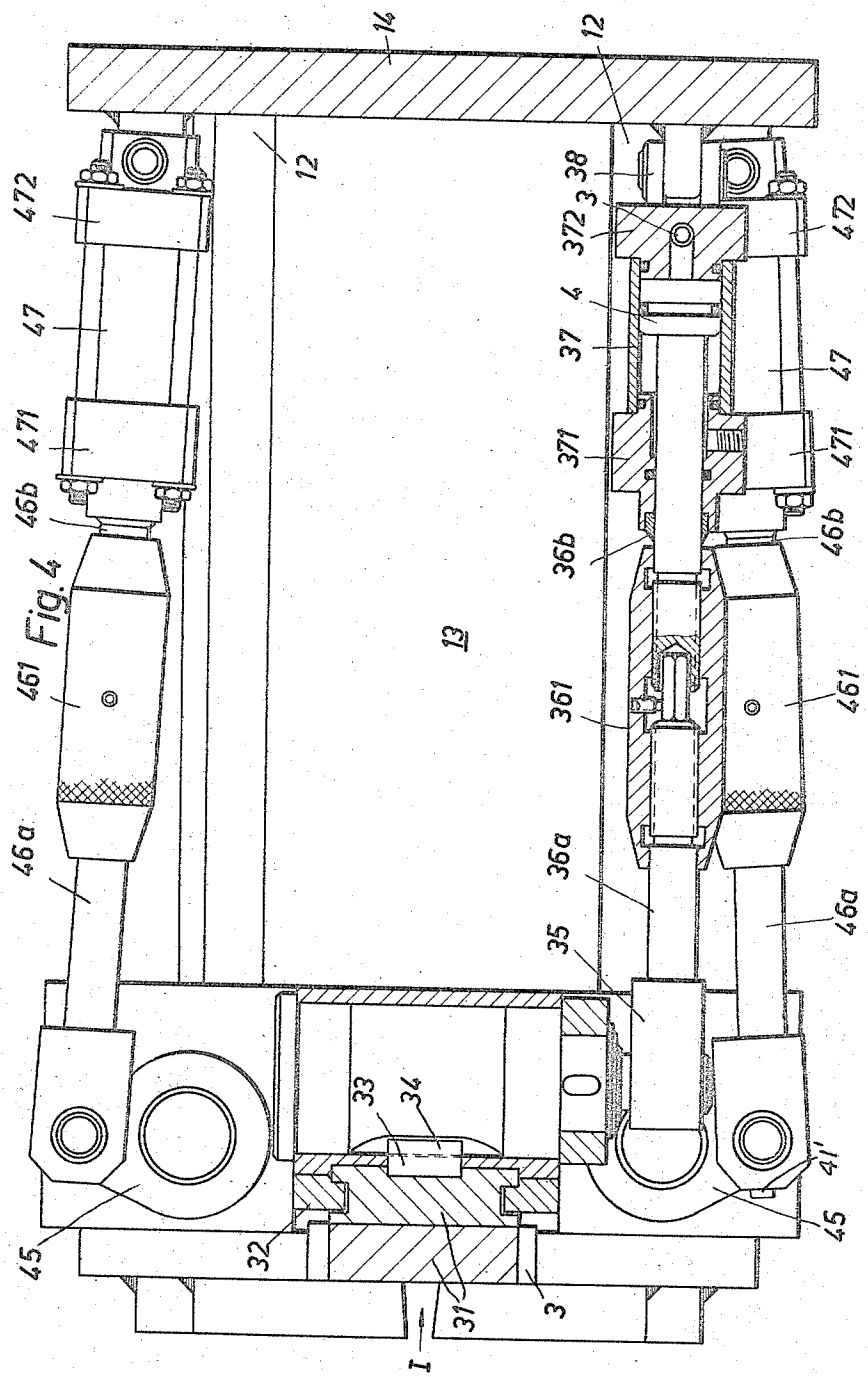


Fig. 4

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3,336,839

ARRANGEMENT FOR REMOVING BURRS FROM WELDS

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6 Claims. (Cl. 90—24)

The invention relates to apparatus for removing weld burrs from butt-welded material in bar form and of constant cross-section and will be described further, by way of example, with reference to the accompanying drawings which illustrate a preferred embodiment of the apparatus.

In the drawings:

FIG. 1 is a view in end elevation of the apparatus corresponding to the arrows I in FIGS. 2 and 4;

FIG. 2 is a view in section on line II—II of FIG. 1;

FIG. 3 is a view in section on line III—III of FIG. 2; and

FIG. 4 is a view in section on line IV—IV of FIG. 2.

The apparatus shown comprises a bearing framework having a base-plate **11**, two side walls **12**, a cover plate **13** and a rear end wall **14**. Secured to the baseplate **11** is a slideway **111** forming a guide for the underside of the base of a piece of rail. The rear end wall **14** is formed with an aperture **141** adapted to the cross-section of the space bounded by the baseplate **11**, side walls **12** and cover plate **13**. This cross-section is large enough to receive the sectional shape of the rail A. The rear end wall **14** and the elements secured thereto are not shown in FIG. 3, and the rail A has been omitted in FIG. 2. Two guide rollers **21** are rotatably mounted in the cover plate **13** and project therebelow. Two sliding members **22** are adjustably mounted in each side wall **12**. The elements **21, 22** form guides for guiding the apparatus on the burr-free part of the rail A. Four deburring knives are disposed at the front end of the box **1** and comprise a knife **3** for the top of the rail, two lateral knives **4** for the rail web and the underside of the top of the rail and the top and side surfaces of the rail foot, and a knife **5** for the underside of the rail foot. The knives **3, 4** are each mounted for movement on the frame between an operative position and a withdrawn inoperative position and are each connected to means for moving them forwardly and backwardly between such positions. The knives **3, 4** are shown in this operative positions in FIG. 1. The knife **5** is stationary, being adjustably secured to the baseplate **11** by screwed fasteners **51** in manner such that its cutting edge **5***a* is coplanar with the upper surface of the slideway **111**.

The knife **3** is adjustably mounted on a support member **31** by fixing screws **311** passing through slots in the knife **3** and by adjusting screws **312**. The support member **31** is mounted for movement in guide ledges **32** and has a toothed rack **33** engaged by a quadrant rack **34**. The latter is adapted to be displaced by a crank **35** to which a piston rod **36***a*, **36***b* of a reciprocating unit or ram **37** is connected, the cylinder of the unit **37** being connected by a joint **38** to the rear end wall **14**. The unit **37** has cylinder covers **371, 372**. The piston rod comprises the two rod elements **36***a*, **36***b* so interconnected by a coupling member **361** that the length of the complete piston rod can be adjusted.

A shoe **30** is secured to the support member **31**. By means of the adjusting screws **312**, the knife **3** is so adjusted that its cutting edge **3***a* and the underneath rubbing surface of the shoe **30** touch the rail A simultaneously when the drive system, composed of elements **33, 34, 35, 36***a*, **36***b* and **37**, moves the support member **31** towards the rail A.

The side knives **4** are each correspondingly mounted, by means of fixing screwed fasteners **411** passing through slots in the knives **4** and adjusting screws **412**, each on a respective support member **41**, the members **41** being movable in guides **42** and each having a toothed rack **43** engaged by a quadrant rack **44**. Each rack **44** is driven by a crank **45** to which piston rod **46***a*, **46***b* of a reciprocating unit or ram **47** is connected. Like the piston rod **36***a*, **36***b*, the piston rod elements **46***a*, **46***b* are interconnected by a coupling element **461** so that the length of the complete piston rod can be varied. The cylinders have covers **471, 472**.

Abutments **41'** so limit the movement of the support members **41** from the normal position into the operative position of the knives **4** that the cutting edges of the latter either touch the web of the rail A when in the operative position or are at a reduced distance from such web.

When the knives **3, 4** are advanced from the normal positions to the operative positions or are returned therefrom to the normal positions, the cranks **35, 45** perform less than half a revolution, such movement being outside the dead center positions. The pistons of the units **37, 47** are double acting pistons which are loaded on one side to advance the knives and on the other side to withdraw the same. The lengths of the piston rods **36***a*, **36***b* and **46***a*, **46***b* can be varied to adjust the force retaining the knives **3, 4** in the operative position. The units **37, 47** can be of hydraulic or pneumatic type, and purely mechanical advancing and return devices can be used instead of the devices **33–35**, **36***a*, **36***b*, **37** and **43–45**, **46***a*, **46***b*, **47** hereinbefore described.

The following description illustrates a method of operating the apparatus hereinbefore described in relation to a butt-welding machine for railway rails.

The apparatus is disposed, with the knives **3, 4** in the inoperative position, in the usual upsetting slide or carriage of the welding machine (of which only part is shown, as will later be apparent) so that the knives **3, 4** and **5** are near the machine welding station and one of two rails A which are to be welded together, having been introduced into the machine, extends through the apparatus. When such rail A is introduced into the machine, the guide rollers **21** roll on the rail. After welding, the one or more clamping device of the upsetting carriage is/are released, and the apparatus is moved between the clamping jaws of that clamping device which is nearest the welding station, the apparatus running along the rail with the interposition of the rollers **21**. The apparatus is clamped in this clamping device, whose jaws are shown only in FIGS. 1 and 3 and are therein indicated by the reference numeral **6**. The pistons of the units **37, 47** are operated to bring the knives **3, 4** into their respective operative positions, whereafter the upsetting carriage is moved to advance the apparatus over the weld zone of the rails so that the knives **3, 4, 5** remove the burr, the knives being retained in the operative position by the pressure acting on the pistons of the units **37, 47**. The shoe **30** slides along the top of the rail head, so that the cutting edge of the knife **3** is kept exactly at the height of the top of the rail head during deburring and produces a satisfactory running surface at the deburr weld zone between the rails. After deburring, the knives **3, 5** are returned to their normal positions and the one or more clamping device or jaw of the stationary part of the machine is/are released, whereafter the welded rails, which have been deburred at the weld zones, can be removed from the machine, the rollers **21** running first on one and then on the other rail.

The apparatus, according to the invention, instead of being disposed in the upsetting carriage, can be disposed in the stationary part of the welding machine and can be

clamped in such part after welding, whereafter the upsetting carriage is driven so to move the two rails that the weld zone of the welded-together rails passes between the deburring knives.

I claim:

1. Apparatus for removing weld burrs from butt-welded material in bar form and of constant cross-section comprising:

(a) a frame open at two of its opposite ends for the passage of the material therethrough,

(b) a multiplicity of deburring knives carried by said frame and each being adapted to serve a portion of the material surface,

(c) at least one of the knives of said multiplicity thereof being movable on said frame between operative and withdrawn normal positions,

(d) means for advancing and returning said movable knife between the operative and withdrawn normal positions,

(e) guide means spaced from the cutting edges of the knives of said multiplicity thereof and being adapted for guiding at least a part of said frame carrying at least one of the knives of said multiplicity thereof with respect to the material,

(f) said guide means including mutually cooperating rollers rotatably mounted in and lateral guide means adjustably mounted in said frame.

2. Apparatus for removing weld burrs from butt-welded material in bar form and of constant cross-section comprising:

(a) a frame open on two opposite ends for the material to pass through,

(b) a number of deburring knives borne by the frame and each adapted to part of the periphery of the material,

(c) at least one such knife being movable on the frame between an operative position and a withdrawn normal position,

(d) a reciprocating unit for advancing and returning the movable of the knives between the operative and withdrawn positions,

(e) guide means spaced apart from the cutting edges of the knives and adapted for guiding at least one part of the apparatus carrying at least one of the knives relative to the material,

(f) the reciprocating unit being connected to the crank of a crank drive having a shaft provided with at least one gear wheel engaging with a toothed rack connected to the movable of the knives.

3. Apparatus as set forth in claim 2, characterized in that the crank drive is so adapted that less than one half of a crank revolution corresponds to the maximum of knife advance, the reciprocating unit including a piston rod of adjustable length.

4. Apparatus for removing weld burrs from butt-welded material of bar form and constant cross section comprising:

(a) a frame open at two opposite ends for the passage of material therethrough,

(b) a plurality of deburring knives mounted with respect to said frame,

(c) each of said knives being accommodatable to a part of the material periphery,

(d) at least one of said knives being movable on said frame between operative and withdrawn positions,

(e) means for advancing and returning the movable one of said knives between operative and withdrawn positions,

(f) guide means spaced from the cutting edges of said knives for guiding with respect to each other the material and at least one part of the apparatus carrying at least one of said knives,

(g) abutment means for limiting the movement of one of said knives from the withdrawn to the operative position.

5. Apparatus for removing weld burrs from butt-welded material in bar form and of constant cross-section such as railway rails comprising:

(a) a frame open on two opposite ends for the material to pass therethrough,

(b) a number of deburring knives borne by the frame and each shaped to match part of the cross-section of the material,

(c) at least one of the knives being movable on the frame between an operative position and a withdrawn normal position,

(d) means for advancing and returning the movable knife between the operative and withdrawn positions,

(e) guide means adapted to guide the material and apparatus relative to one another,

(f) the knives being arranged at one end of the frame,

(g) the guide means consisting of two carrying rollers rotatably mounted in the upper part of the frame and lateral sliding members,

(h) at least one of the knives being connected to a shoe adapted to slide on the material and to hold the knife in a working position relative to the material as the apparatus and the material guided therein are moved relative to each other and as the knife is urged to the material by the advancing means.

6. Apparatus for removing weld burrs from butt-welded bars of constant cross-section and adapted for clamped disposition in the upsetting slide of a welding machine and movement relative to the weld zone of the butt-welded bars according to the motivation of the upsetting slide and comprising:

(a) a frame open at its opposite ends for the introduction of the butt-welded bar therethrough and movement relative thereto,

(b) a plurality of deburring knives mounted on said frame with each thereof being so strategically located as to serve a predetermined portion of the surface of the butt-welded bars,

(c) at least one of the deburring knives of said plurality thereof being movable on said frame between operative and non-operative positions,

(d) reciprocating means for advancing and returning the movable one of said knives between the operative and non-operative positions,

(e) guide means mounted in said frame for guiding the apparatus relative to the butt-welded bars and including a pair of rotatable rollers mutually cooperating with a pair of adjustable lateral guides.

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