Dec. 24, 1935. L. H. PARK 2,025,422

INSIDE BURR REMOVER

Filed March 22, 1935 3 Sheets-Sheet 1

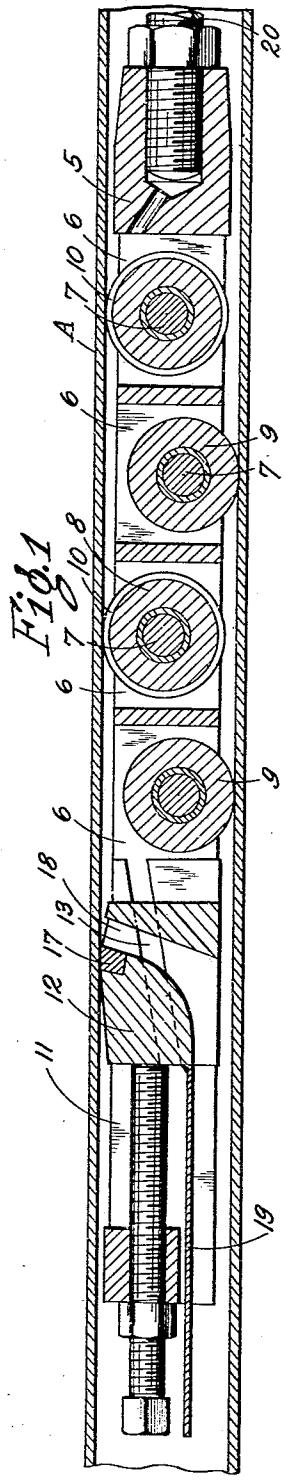


Fig. 1

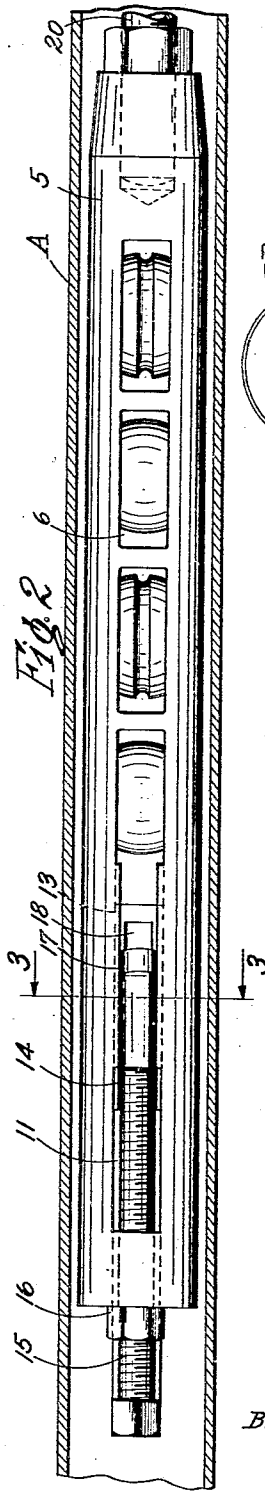


Fig. 2

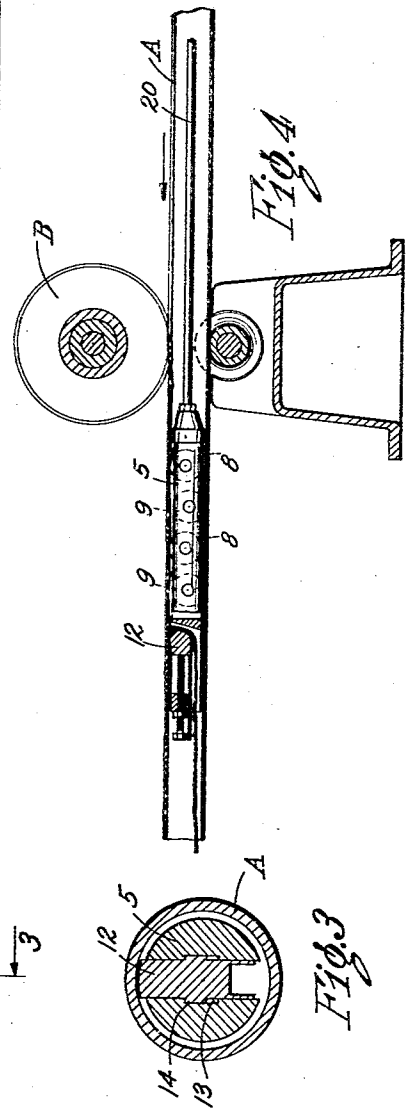


Fig. 4

Fig. 3

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INSIDE BURR REMOVER

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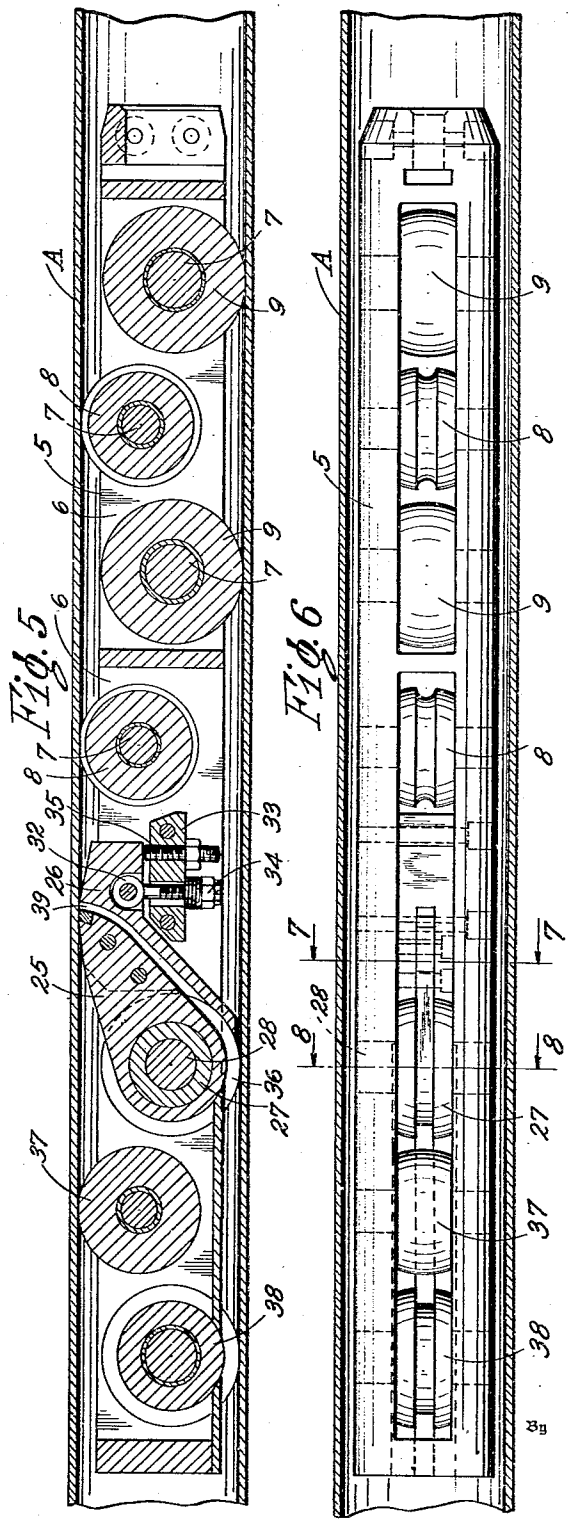


Fig. 5

Fig. 6

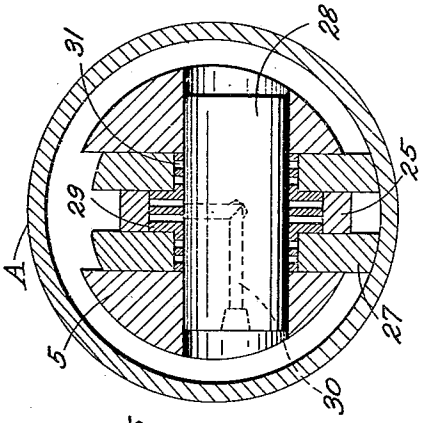


Fig. 8

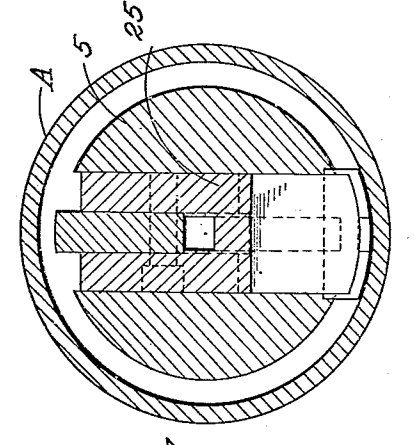


Fig. 7

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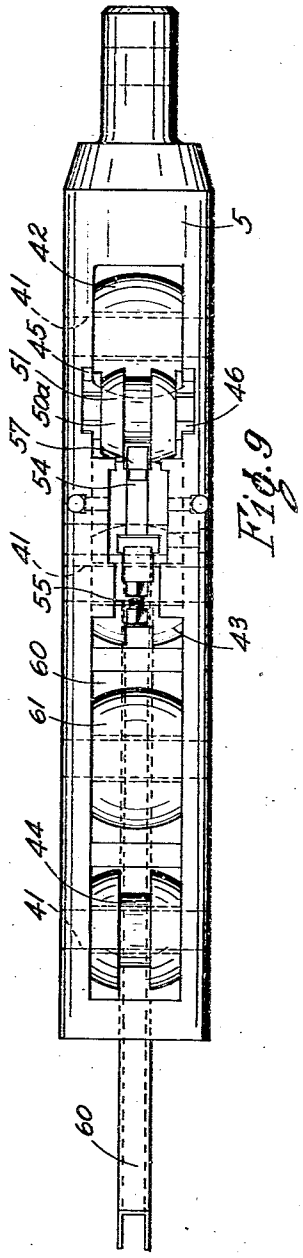


Fig. 9

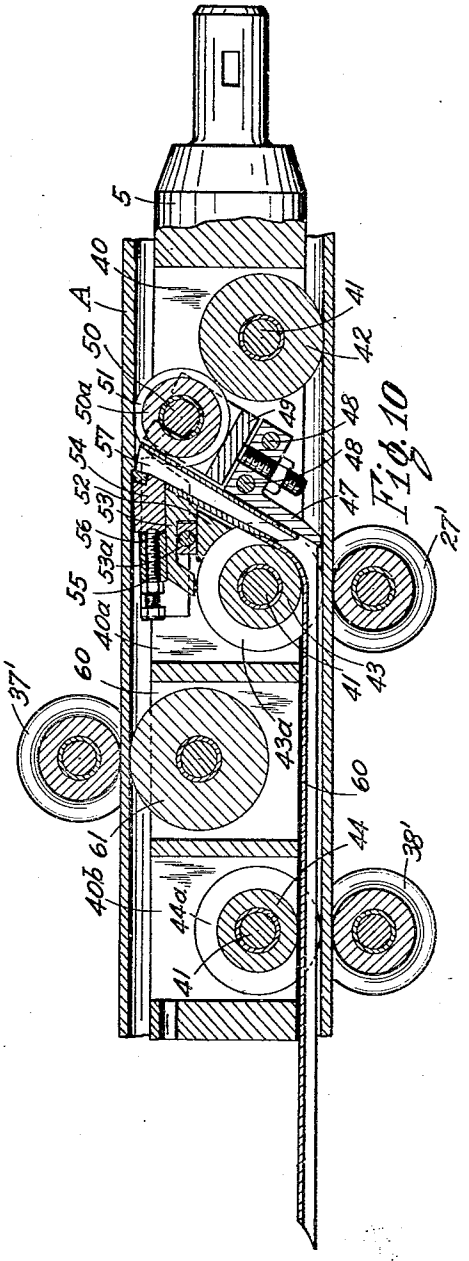


Fig. 10

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Patented Dec. 24, 1935

2,025,422

UNITED STATES PATENT OFFICE

2,025,422

INSIDE BURR REMOVER

Lawrence H. Park, Youngstown, Ohio, assignor to Republic Steel Corporation, Youngstown, Ohio, a corporation of New Jersey

Application March 22, 1935, Serial No. 12,472

10 Claims. (Cl. 90—24)

This invention relates broadly to the manufacture of butt-welded pipe or tubing and is particularly concerned with a device for removing hot plastic burr or flash metal from the interior wall of a pipe or tubing especially of the electric resistance butt welded type.

This invention relates generally to the type of device shown and broadly claimed in the copending application of Herbert C. Rippel, Serial No. 12,471, filed March 22, 1935.

Various forms of devices embodying my invention are illustrated in the accompanying drawings, in which:—

Figure 1 is a central longitudinal sectional view thru a burr-removing device embodying the features of the invention, the device being shown positioned within a pipe or tube;

Fig. 2 is a plan view of the device of Fig. 1;

Fig. 3 is a section taken on the line 3—3, Fig. 2.

Fig. 4 is a diagrammatical sectional elevation of a welding device and a length of pipe positioned therein with the device operatively disposed interiorly of the tubing;

Figs. 5 and 6 are views similar to Figs. 1 and 2 of an alternative form of a burr-removing device;

Figs. 7 and 8 are sections taken, respectively, on the lines 7—7 and 8—8, Fig. 6;

Figs. 9 and 10 are views similar to Figures 1 and 2 illustrating another modified form of burr-removing device having associated with the cutting tool a planishing unit.

Referring to Figs. 1 to 4, inclusive, the improved burr-removing device comprises an elongated supporting frame or plug 5 which is provided with a plurality of spaced slots 6 in which are mounted, on pins 7, upper positioning rolls 8 and lower positioning rolls 9, arranged to contact opposed portions of the interior wall of the pipe A in alternate or staggered relation and maintain the plug, and consequently the tool carried thereby, in accurate cutting position with respect to the seam of the pipe. Each of the rolls 8 is provided with a peripheral groove 10 so that they will straddle the burr metal formed at the welded seam to preclude deformations of the burr metal prior to the engagement thereof with the cutting tool.

Near its rear extremity, the plug 5 is provided with a vertical longitudinally extending slot 11 in which is mounted an adjustable tool holding block 12. In the type of device illustrated in Figs. 1 to 4, inclusive, the side walls of the longitudinally extending slot 11 are formed with inclined key ways 13 which receive laterally projecting ribs or guides 14 formed on the block 12. Threaded through the rear extremity of the plug 5 is an adjusting screw 15 provided with a lock nut 16, the forward end of the screw engaging the tool block 12. A cutting tool 17 is mounted in the block 12, and immediately in advance of this tool, an opening 18 defined by downwardly diverging walls extending rearwardly through the block 12 to the exterior of the plug. A shield 19 is attached to or formed on the block 12 to facilitate the guiding of the severed burr metal. The opening 18 extends downwardly at such an angle that the hot, plastic, burr metal severed by the cutting tool will be directed by the tool into and will pass through the opening, and will not gather up and choke the opening.

The plug 5 is secured to the end of an anchor rod 20 and is supported thereby, in a well known manner, interiorly of the pipe as the latter is subjected to the action of the welding rolls B (Figure 4). That portion of the device which includes the rolls 9 and 10 functions to definitely position the tool with respect to the burr metal and maintain the same relation therebetween at all times.

In view of the foregoing description and the simplicity of construction of the improved burr-removing tool assembly, the operation of the latter will be readily understood. In Fig. 4, I have more or less diagrammatically illustrated its operation in conjunction with a set of welding rolls B. The plug is adjustably supported by the anchor rod 20 in advance of where the metal is shaped into cylindrical form. As the pipe A is advanced in the direction indicated by the arrow, the tool 17 engages the burr metal formed during the welding operation and severs the latter from the interior wall of the pipe, the burr metal passing thru the opening 18 and being discharged from the rear extremity of the plug into the interior of the pipe. The rolls 8 and 9 contacting with opposed walls of the pipe holds the plug in accurate centered position. To adjust the tool 17 to the desired depth of cut, it is only necessary to adjust the screw 15.

In Figs. 5 to 8, inclusive, an alternative type of burr removing device is illustrated, the parts common to the assembly shown in Figs. 1 to 4, inclusive, being indicated by like reference numerals. This type of device is more readily adaptable to the removal of hot burr metal from pipe of larger diameters than the device illustrated in Figs. 1 to 4 inclusive, for example, pipes having a diameter in the neighborhood of seven inches. In this instance the tool holder comprises a pivoted center plate or block 25 which

has secured thereto a bifurcated nose plate 26, the block 25 being journaled on the axis of a stabilizing or backing-up roll 27 which also serves as a positioning roll, the plate and roll being mounted on a trunnion or bearing pin 28 provided with a bushing 29. The bearing pin 28 is preferably provided with an oil passage 30 which communicates with oil grooves 31 formed in the bushing 29, to provide adequate bearing lubrication.

The nose plate is provided with a hold-down or anchor bolt 32. A supporting or anchor block 33 is secured to the plug 5, the bolt 32 passing through this block and being adjustably anchored by means of a nut 34. Threaded into the block 33 is an adjusting screw 35 adapted to contact the nose plate 26.

An opening formed with diverging walls, extends thru the tool holder 39, between the center plate 25 and nose plate 26, and functions in a manner similar to the opening 16 heretofore described in connection with Figs. 1 to 4, inclusive, the hot plastic burr metal severed by the tool 17 passing thru said opening and being guided under grooved roll 27 and out into the pipe, the side portions of the roll being spaced apart by plate 25 and defining a peripheral recess or groove 36 to accommodate this operation.

In this instance, additional positioning rolls 37 and 38 are provided at the rear of the tool holding assembly, the roll 38 being peripherally grooved to permit discharge of the burr metal. The roll 37 is contoured to seat on the inside of the wall of the pipe and serve as a planishing roll to roll down or planish any uneveness on the inside wall of the pipe occasioned by the severing of the burr metal by the cutting tool. The rolls 27 and 38 cooperate with rolls 27' and 38' respectively, engageable with the exterior of the pipe, while roll 37' cooperates with roll 37 to planish or roll down any uneveness on the seam after the burr metal has been removed. (See Figure 10). The operation of this form of the tool is substantially as that above described, the difference residing in the construction of the tool holding means and the tool holding adjustment.

In Figures 9 and 10, inclusive, another alternate type of burr removing device is illustrated, the parts common to the assembly shown in Figures 1 to 4, inclusive, being indicated by like reference numerals. In this instance, the device comprises the plug 5 having a plurality of vertical slots 40, 40a and 40b in which are mounted on pins 41, positioning rolls 42, 43 and 44 engageable with the bottom of the interior wall of the pipe. The rolls 43 and 44 are provided with peripheral grooves in order that the rolls may straddle the severed burr metal as hereinafter described.

The walls of the slot 40 in the forward part of the device are provided with inclined guide ways 45 and 46. These guides are adapted to receive therebetween a supporting block 47 which is rigidly secured within the guide ways by pins 48. Slidably mounted in the guide ways 45 and 46 and adapted to be supported by the block 47 is a bearing block 49 in which is journaled on pin 50, roll 50a. The roll 50a is provided with a peripheral groove 51 which straddles the unsevered interior burr of the pipe prior to the engagement thereof with the cutting tool.

Formed integrally with the plug 5 and spanning the slot 40 is a tool holder supporting rib 52. Mounted on the rib 52 is a tool holder 53 provided with suitable dove tail slots which slidably receive tool 54. A screw actuated wedge member 53a is disposed between the ribs 52 and the tool supporting member 53, movable laterally of the plug, for effecting vertical adjustment of the member 53 to thereby control the depth of cut of the tool. Longitudinal adjustment of tool 54 is effective through the medium of screw 55 threaded through a projection 56 on the member 53. Intermediate the tool holder 53 and the block 47 an opening 57 extends thru the holder at an angle which will permit the smooth and easy flow of the severed burr metal from the vicinity of the cutting tool 54. The grooves 43a and 44a in the rolls 43 and 44 and the guide plate 60 direct the burr metal as it is discharged from the guideway 57 into the interior of the pipe to the rear of the plug 5.

Mounted in slot 60 is a roll 61 which serves to planish that portion of the seam which has been engaged by the cutting tool thereby removing any sharp edges or imperfections in the seam and presenting a smooth interior to the welded pipe at the seam.

Having thus described the present invention so that those skilled in the art may be able to practice the same what is desired to be secured in the Letters Patent is defined in what is claimed.

I claim:

1. A device for removing hot plastic flash metal from welded pipe comprising a plug, a plurality of rollers mounted in said plug and arranged in staggered relation to contact inner side walls of a pipe and position the plug relative thereto, a cutting tool in the plug and adapted to engage the wall of the pipe and sever hot plastic burr metal therefrom, and means to adjust the tool relative to the plug certain of said rolls being formed with peripheral grooves to permit them to straddle the burr metal.

2. A device for removing hot plastic flash metal from the inside wall of a welded pipe comprising a plug, a tool carrier in said plug and having an opening therethru, a cutting tool in said carrier, rotatable means carried by the plug and engageable with the interior wall of the pipe for adjustably positioning the cutting tool with respect to the burr metal to be removed, and means for passing the severed hot plastic burr metal thru said opening and depositing the same within the pipe remote from the point of removal.

3. A tool assembly for removing hot plastic flash metal from the interior wall of a butt-welded traveling length of pipe comprising an elongated slotted supporting frame member constituting a plug, a plurality of positioning rollers journaled in slots in the plug and arranged in spaced relation along the length thereof, certain of said rollers being formed with peripheral grooves to permit them to straddle the welded seam of the pipe, a tool-supporting block slidably mounted in the plug, means to slide the block in the plug, and a cutting tool carried by said block.

4. A device for removing hot plastic flash metal from the inside of a welded pipe comprising an elongated supporting frame, means carried by said frame arranged to contact the inside wall of a pipe and position the frame with respect to the pipe, a cutting tool, supporting means for said tool, means for pivotally mounting the tool in the frame, and means for adjusting said supporting means about said pivot means thereby to adjust the depth of cut of the tool.

5. A device for removing the interior hot, plastic flash metal from a traveling length of welded

pipe, comprising an elongated supporting frame, means carried by said frame arranged to contact the inside wall of the pipe and position the frame with respect to the pipe, a cutting tool, supporting means for said tool, means for pivotally mounting the tool in the frame, means for adjusting said supporting means about said pivot means thereby to adjust the depth of cut of the tool, said tool supporting means having a guide slot associated therewith and arranged to direct severed plastic metal clear of the tool and said supporting means.

6. A device for removing the hot plastic flash metal from a welded pipe, comprising an elongated supporting frame, means carried by said frame arranged to contact the interior wall of the pipe and position the frame with respect to the pipe, a cutting tool, a supporting block for said tool in said frame and having a guide slot through which severed flash may pass, and means cooperating with the frame and block for adjustably anchoring the block in predetermined position in the frame.

7. A device for removing hot plastic flash metal from the inside wall of a welded pipe, comprising an elongated slotted supporting frame, a plurality of rollers journaled in slotted portions of the frame and adapted to contact the inside wall of a pipe and position the frame with respect to the pipe, a tool supporting block having a guide slot formed therein for severed flash, means pivotally mounting one extremity of the block in the frame, a cutting tool removably mounted in the opposite extremity of said block, means for rigidly anchoring said latter extremity to the frame, and means for adjusting said block about its pivot to thereby adjust the depth of cut of the tool.

8. A device for removing hot plastic flash metal from the inside of a welded pipe, comprising an elongated slotted supporting frame, a plurality of positioning rollers arranged in staggered relation in slots of said frame and adapted to contact opposed portions of the interior wall of a pipe and position the frame with respect to the pipe, a tool block journaled at one extremity to the frame on the same axis as one of said rolls and having a guide slot for severed flash formed therein, a cutting tool carried by said block, means for adjustably anchoring the other extremity of said block to the frame, the positioning rolls which contact the wall of the pipe in advance of the cutting tool each being formed with a peripheral groove to permit them to straddle the unsevered flash metal on the wall of the pipe, and the positioning roll or rolls which lie in rear of the tool and contact the opposite side of the pipe each being also formed with a peripheral groove to permit the severed burr metal to pass thereunder clear of the frame.

9. A device for removing hot plastic flash metal from the inside wall of a welded pipe, comprising an elongated slotted supporting frame, means carried by said frame arranged to contact the interior wall of the pipe and position the frame with respect to the pipe, a tool block in the frame, supporting means including cooperating ribs and grooves on the block and frame and inclined at an angle to the longitudinal axis of the frame for supporting the block in the frame, a tool carried by said block, and means for adjusting said block along the inclined supporting means on the frame to thereby adjust the depth of cut of the tool.

10. A device for removing hot plastic flash metal from the inside wall of a welded pipe, comprising an elongated slotted supporting frame, means carried by said frame arranged to contact the interior wall of a pipe and position the frame with respect to the pipe, a tool block in a slotted portion of said frame, a tool carried by said block, there being a guide slot extending therethrough adjacent to said tool to permit plastic severed flash to pass to the opposite side of the frame, laterally inclined ribs on the block slidably fitting into inclined grooves in the frame, and an adjusting screw threaded into the rear extremity of the frame and arranged to engage said block to adjust the latter along the inclined grooves in the frame and thereby adjust the depth of cut of the tool.

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