Dec. 7, 1948. O. R. HALL 2,455,762

PIPE GRINDER

Filed Oct. 16, 1944 3 Sheets-Sheet 1

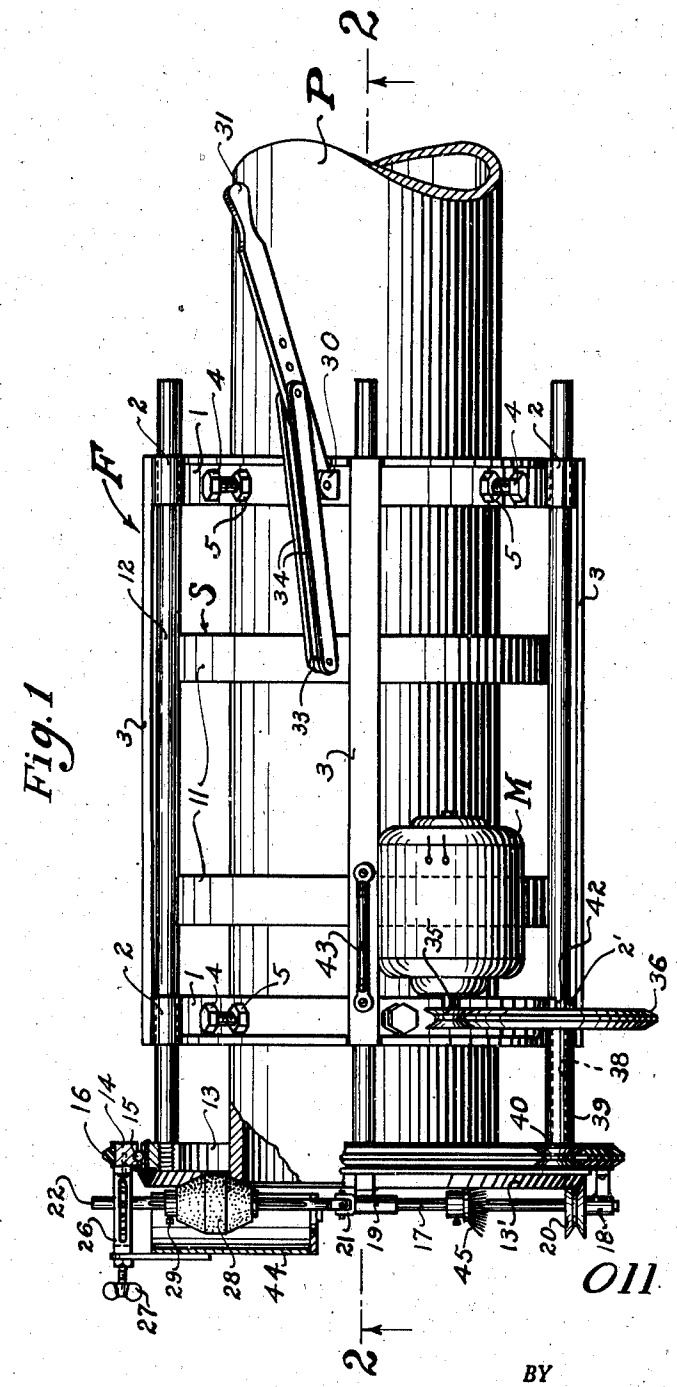


Fig. 1

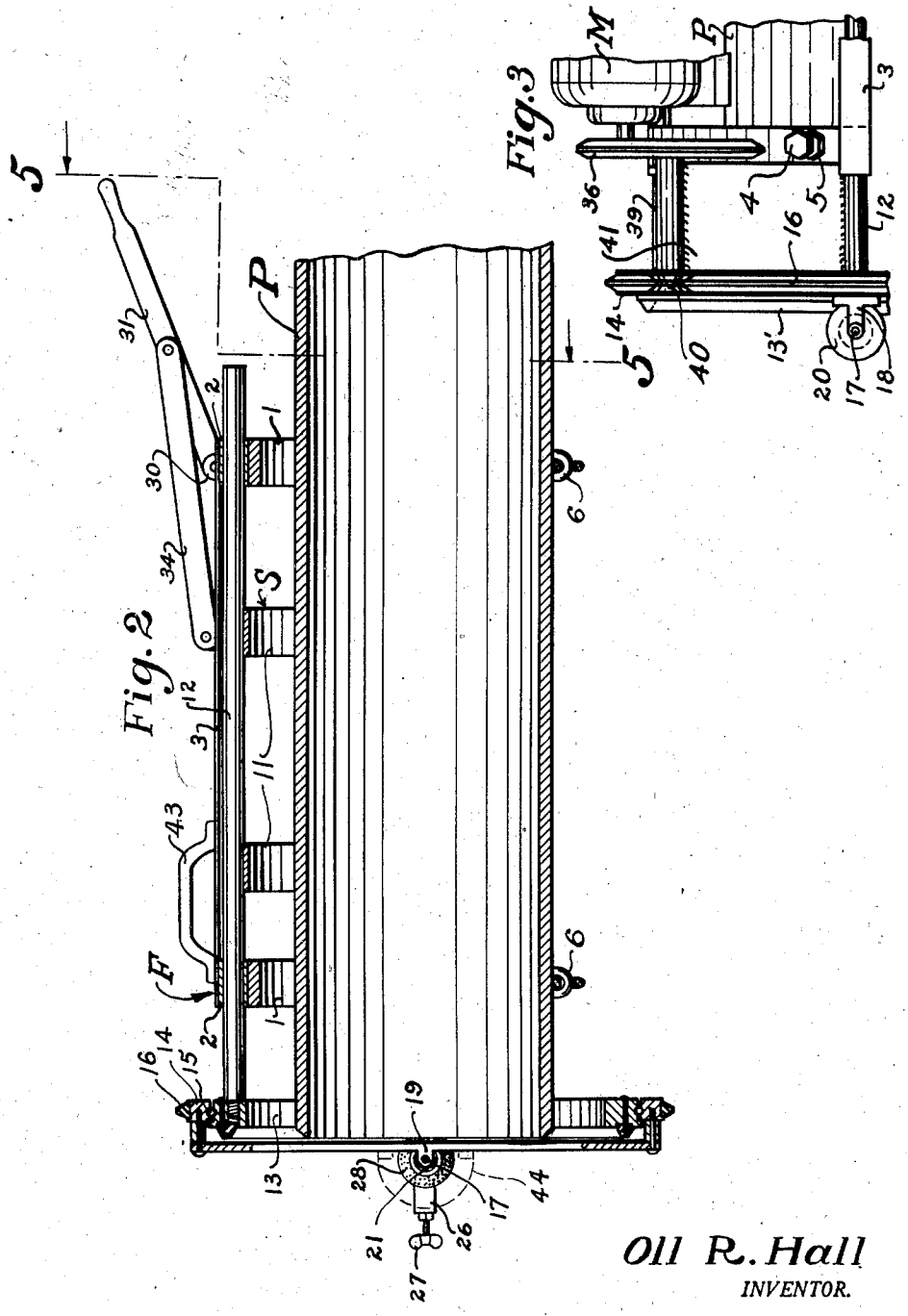
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Filed Oct. 16, 1944 3 Sheets-Sheet 3

Fig. 5

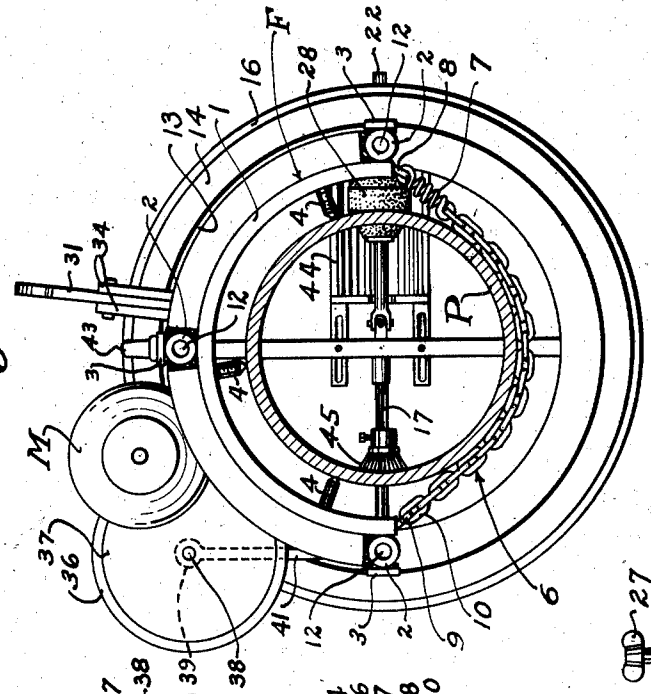


Fig. 7

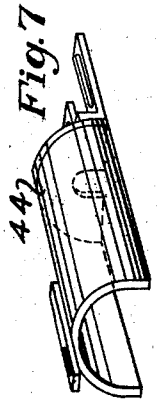


Fig. 6

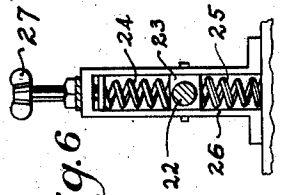
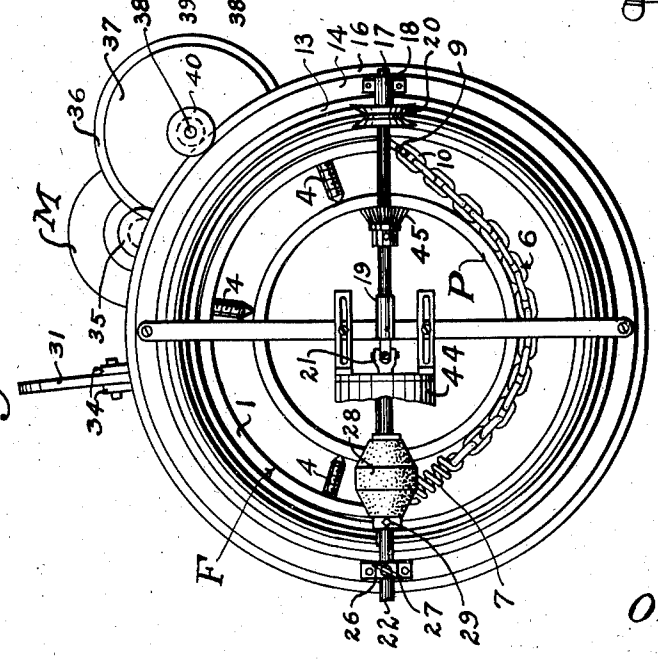


Fig. 4



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PIPE GRINDER

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Application October 16, 1944, Serial No. 558,844

12 Claims. (Cl. 51—241)

1

This invention relates to improvements in pipe grinders and more particularly to grinders for grinding the ends of pipe which are roughened as by cutting with a cutting torch. In cutting and beveling of pipe with a cutting torch, the pipe is left in a roughened condition with scales on the face of the bevel and when it is desired to weld two pieces of pipe together, that have been so cut, it is necessary to remove the scale before an effective job of welding can be accomplished.

Heretofore it has been the practice to do this by hand, which is a laborious and time consuming process, and it is difficult to do a satisfactory scaling and surfacing job by hand.

The present invention, when used on the roughened ends of pipe, efficiently and quickly grinds them so as to give a uniform standard of work.

The primary object of this invention is to provide a grinder for grinding the ends of pipe smooth without the necessity of having to take the pipe into a machine shop.

Another object of this invention is to provide a portable grinder for grinding smooth and beveling the ends of pipe.

While the drawings illustrate a preferred embodiment of this invention, it is to be understood that modifications may be made within the scope of the invention as claimed without departing from the spirit thereof.

In the drawings:

Fig. 1 is a top plan view of the invention as installed on a piece of pipe, with parts broken away and parts shown in section to show details of construction.

Fig. 2 is a sectional elevational view taken on the line 2—2 of Fig. 1.

Fig. 3 is a fragmentary elevational view of the motor and the driving means connected thereto.

Fig. 4 is an end view of the invention as applied to a piece of pipe.

Fig. 5 is a sectional view taken on the line 5—5 of Fig. 2 and looking in the direction indicated by the arrows.

Fig. 6 is an enlarged end view of the outer adjustable bearing member of the grinder shaft, with parts shown in section.

Fig. 7 is a perspective view of the grinder guard removed from the machine.

The grinding machine comprises a stationary frame generally designated by the letter F, and which is composed of arcuate members 1 at either end thereof which are substantially semi-circular. Secured to each of the arcuate frame members 1, at spaced intervals therearound are sleeves 2, with pairs of said sleeves in axial alignment. A

2

longitudinal bar 3 is secured to each of the sleeves in axial alignment, so as to hold the arcuate members 1 in spaced longitudinal alignment. Set screws 4 threadably engage arcuate members 1 so as to space said arcuate members from pipe P. Lock nuts 5 hold set screws 4 in adjusted position.

A chain 6 is secured to a spring 7 which interconnects with an eye 8 on arcuate member 1 and a hook 9 is positioned on the opposite end of arcuate member 1 to engage a link 10 of the chain 6, when said chain is adjusted about pipe P.

A slidable frame designated generally by the letter S is positioned to slide relative to stationary frame F. The slidable frame S is composed of arcuate members 11 which are secured to longitudinal rods 12. Arcuate members 11 are spaced intermediate arcuate members 1 of the stationary frame. The longitudinal rods 12 pass through sleeves 2 and are slidable therein.

An annular ring 13 is secured to the outer end of slidable rods 12, as is best seen in Figs. 1 and 2. A friction member 13', preferably having a V cross section, is positioned on a side of annular ring 13 and extends axially outward. It is preferable to have this surface made of material formed from rubber and fabric composition, similar in construction to a V-belt. This may be embedded in a shallow recess in a side of ring 13 and riveted or cemented or otherwise secured thereto. The outer periphery of ring 13 has a lip or annular flange extending around the outer side thereof, and which overlaps an edge of rotatable ring 14. Bearings, such as ball bearings 15, are interfitted between annular ring 13, which is stationary, and annular ring 14 which is rotatable therearound. The rotatable annular ring 14 has a friction member 16 interfitting within a recess in the outer periphery of annular rotatable ring 14. This friction member is, preferably, of V shape, but it is in inverse position to the normal V-shape of V-belts and is secured to the outer periphery of annular member 14 to prevent slippage.

A shaft 17 is journaled in bearings 18 and 19. A V-belt pulley 20 is mounted on the shaft 17 in position to engage friction member 13'. A universal joint 21 is positioned on the inner end of shaft 17 and a shaft 22 is attached thereto. The outer end of shaft 22 is journaled in bearing 23 which is positioned between springs 24 and 25. The bearing 23 is slidable within slotted guide 26 secured to the rotatable annular ring 14. The relative position of the outer end of shaft 22 may be changed, either by set screw 27 or by movement

of slidable frame S relative to the stationary frame F.

A granular stone 28 is secured on the shaft 22 intermediate universal joint 21 and bearing 23, as by set screw 29, however, grinding element 28 may be moved along shaft 22 to secure proper radial adjustment of the grinding element, relative to the pipe P. While it is usually preferable to use a stone of granular composition, it is to be understood that for certain work, abrasive cloth or a metallic cutter element formed with cutting teeth, similar to a milling cutter, may be used.

An ear 30 is positioned on inner stationary arcuate member 1 and has a lever 31 pivoted thereto. An ear 33 is positioned on slidable arcuate member 11 and has links 34 pivoted thereon and connected with lever 31 so as to move slidable frame S relative to stationary frame F.

A motor M is positioned on one of the slidable arcuate members 11 and preferably has a V-pulley 35 which interengages with a frictional member 36, which is preferably, also of V cross section and is composed of material similar to that of a V-belt, but is inversely constructed to the normal V-belt. This friction member 36 is positioned on a pulley 37 secured to shaft 38. The shaft 38 is journaled in a bearing sleeve 39 and said shaft has a pulley 40 thereon which engages with friction member 16 on annular ring 14. The sleeve bearing 39 is positioned on top of standard 41 which is adapted to slide through slot 42 in a sleeve 2'. The standard 41 is secured to one of the rods 12, as by welding (Fig. 3). A handle 43 is positioned on top of frame F to permit the lifting of the machine from one pipe to another. A guard 44 is secured to the base of the bearing 19 and to the top of the guide 26, and is adjustably positioned over grinding element 28 to prevent injury to the operator. A wire brush 45 is adjustably positioned on shaft 17 for cleaning the end of pipe P. The grinding element 28 is preferably formed to have a bevel on either side and a flat face interposed between the bevels which enables either an exterior or an interior bevel to be ground, or the face of the pipe may be ground perfectly smooth and square on the end, as the nature of the work indicates.

In usual practice the bevels are such as to give a normal bevel to accommodate the correct welding beads to enable the pipes to be welded end to end. However, the bevel may be varied to accommodate the particular use to which the pipe is to be adapted.

In the operation of the device the frame F is placed upon a pipe P which may be any diameter within the range of the machine, and the set screws 4 adjusted until the arcuate members 1 are spaced equidistant from pipe P. This will, in turn, space shafts 17 and 22 diametrically across pipe P. Chains 6 are then tightly drawn around the lower portion of the pipe P and engaged with hooks 9. The tension of spring 7 will hold the frame in adjusted position. When the stationary frame F has been securely adjusted with respect to pipe P, the grinding element is adjusted along shaft 22 until the proper position is obtained. Set screw 29 then secures grinding element 28 against longitudinal movement on shaft 22. By manipulating the lever 31, grinding element 28 is brought into contact with the end of the pipe P and the motor M is then started. The pulley 35 on the motor shaft will drive pulley 37, which in turn, will drive pulley 40 to rotate annular ring 14, to which is secured bearings 18 and 26. This will cause shafts 17 and 22 to revolve in unison with annular ring 14. A pulley 20 is in frictional contact with friction member 13' positioned on annular stationary ring 13. As the annular ring 14 slowly revolves around annular ring 13, a driving relation is imparted from friction member 13' to pulley 20 which, in turn, will rotate shafts 17 and 22 and grinding element 28 at high speed. The shaft 22 is in normal axial alignment with shaft 17 and with universal joint 21, which universal joint 21 will permit angular divergence of shaft 22 by adjustment of screw 27 to cause an increased tension on spring 24, which will move bearing 23 within slotted guide member 26. This will cause the compression of spring 25, and if the bevel is an exterior bevel, it will grind a wider bevel on the pipe. However, the inverse is true if the bevel is to be an interior bevel. If it is desired to grind a narrower exterior bevel, this can be accomplished by putting an increased tension on lever 31 which will cause a compression of the spring 24 and permit shaft 22 to swing outward. The bearing 23 will permit longitudinal movement of shaft 22 and this bearing 23 will be rocked about its pivot point within slot of slotted guide member to permit angular divergence of shaft 22.

Primarily the grinding of the bevel portion of the pipe is to smooth up and remove the scale from a bevel which has been cut by a cutting torch. However, it is to be understood that the unit is not restricted to this particular use, but may be used for forming a bevel in its entirety, if so desired.

It is to be understood that the size of the driving pulleys may be varied or gears may be substituted therefor to be within the scope of the inventive intent of the present invention, although preference is given to the present arrangement, inasmuch as the abrasive dust is not so detrimental to a frictional element as shown, as it is to gears.

I claim:

1. In a machine for surfacing the ends of pipe, an elongated saddle type stationary frame, means for detachably securing said stationary frame in spaced relation around the outer periphery of a pipe and extending therealong, means for mounting a rotatable frame adjacent the end of said stationary frame, means for mounting a grinding element on said rotatable frame, means for rotating said rotatable frame, and means for imparting rotation to said grinding element while rotating said rotatable frame.

2. In a machine for grinding the ends of pipe, a stationary frame, means for detachably securing said stationary frame in spaced relation to a pipe, a slidable frame adapted to slide within said stationary frame, an annular element mounted on the outer end of said slidable frame and carrying a driving element, a second annular member rotatably mounted on said first mentioned annular member and having a shaft journalled thereon, a driving element mounted on said shaft and secured thereto and engaging the driving element of the first mentioned annular member, a grinding element connected with said shaft for engagement with the end of said pipe, means for supplying power to said rotatable annular member and to said grinding element, and means for adjusting said grinding element relative to the end of said pipe.

3. In a machine for grinding the ends of pipe, a stationary frame, means for detachably securing said stationary frame in spaced relation to a

pipe, a slidable frame adapted to slide within said stationary frame, an annular element mounted on the outer end of said slidable frame and carrying a driving element, a second annular member rotatably mounted on said first mentioned annular member and having a shaft journaled thereon, a driving element mounted on said shaft and secured thereto and engaging the driving element of the first mentioned annular member, a grinding element connected with said shaft for engagement with the end of said pipe, means for supplying power to said rotatable annular member and to said grinding element, means for adjusting said grinding element relative to the end of said pipe, and means for sliding said slidable frame to secure adjustment of said grinding element relative to the end of said pipe.

4. In a machine for grinding the ends of pipe, a stationary frame, means for detachably securing said stationary frame in spaced relation to a pipe, a slidable frame adapted to slide within said stationary frame, an annular element mounted on the outer end of said slidable frame and carrying a driving element, a second annular member rotatably mounted on said first mentioned annular member and having a shaft journaled thereon, a driving element mounted on said shaft and secured thereto and engaging the driving element of the first mentioned annular member, a grinding element, a shaft having said grinding element mounted thereon and connected with said first mentioned shaft for driving said grinding element in engagement with the end of said pipe, means for supplying power to said rotatable annular member and to said grinding element, means for adjusting said grinding element relative to the end of said pipe, means for sliding said slidable frame to secure adjustment of the grinding element relative to the end of said pipe, and means for adjusting the angularity of the grinding element shaft by movement of said slidable frame.

5. In a machine for surfacing the ends of pipe an elongated saddle type stationary frame, means for detachably securing said stationary frame in spaced relation around the outer periphery of a pipe and extending therealong, means for mounting a rotatable frame adjacent the end of said stationary frame, means for mounting a bevel grinding element on said rotatable frame, means for rotating said rotatable frame, and means for imparting rotation to said bevel grinding element while rotating said rotatable frame.

6. In a machine for grinding the ends of pipe, a stationary frame, means for detachably securing said stationary frame in spaced relation to a pipe, a slidable frame adapted to slide within said stationary frame, an annular element mounted on the outer end of said slidable frame and carrying a driving element, a second annular member rotatably mounted on said first mentioned annular member and having a shaft journaled thereon, a driving element mounted on said shaft and secured thereto and engaging the driving element of the first mentioned annular member, a grinding element connected with said shaft for engagement with the end of said pipe, means for supplying power to said rotatable annular member and to said grinding element, means for adjusting said grinding element relative to the end of said pipe, means for sliding said slidable frame to secure adjustment of said grinding element relative to the end of said pipe, and means of adjusting the angular divergence of said shaft on which said grinding element is disposed comprising an adjustable screw element adapted to engage a resilient element to move said grinding element shaft.

7. In a machine for surfacing the ends of pipe, a frame, means for detachably securing said frame about said pipe in spaced relation thereto, a grinding element disposed on the end of said frame for operation upon the end of said pipe, means for driving said grinding element comprising a motor, a V-shaped pulley on said motor, a complementary V-shaped frictional element, a shaft having said last-mentioned element mounted thereon for engagement with said V-shaped pulley, a second V-shaped pulley disposed on said shaft, a second V-shaped frictional element in engagement with said second V-shaped pulley, an annular ring having said second V-shaped frictional element circumferentially disposed therearound, a shaft mounted on said annular ring and carrying a third V-shaped pulley, a bevel grinding element connected with said last-mentioned shaft, a V-shaped friction element stationarily mounted on the frame and axially disposed with respect to said pipe, the last mentioned V-shaped pulley being in contact relation with said last-mentioned frictional element and connected with said last-mentioned shaft for driving the bevel grinding element, and means of adjustably moving said grinding element with respect to the end of said pipe.

8. In a machine for surfacing the end of a pipe, the combination of a frame, means for detachably securing said frame about the pipe and in spaced relation thereto, a grinding element for the end of the pipe, an annular ring mounted on the end of the frame and supporting the grinding element thereon for operation, means for rotating said grinding element relative to the annular ring, and means for adjusting the position of the grinding element with respect to the end of the pipe.

9. In a machine for surfacing the end of a pipe, the combination of a frame, means for detachably securing said frame about the pipe and in spaced relation thereto, a rotatable grinding element adapted to operate on the end of the pipe, an annular ring mounted on an end of the frame, a shaft journaled on the annular ring and supporting the grinding element thereon, means for driving said grinding element, and means for adjusting the position of the grinding element relative to the end of the pipe.

10. In a machine for surfacing the end of a pipe, the combination of a frame, means for detachably securing said frame about the pipe and in spaced relation thereto, a rotatable grinding element adapted to operate on the end of the pipe, an annular ring mounted on an end of the frame, a shaft journaled on the annular ring and supporting the grinding element thereon, means for driving said grinding element including a motor and means forming a frictional driving connection between the motor and the shaft, and means for adjusting the position of the grinding element on the shaft relative to the end of the pipe.

11. In a machine for surfacing the end of a pipe, the combination of a frame, means for detachably securing said frame on the pipe, an annular ring mounted on the frame, a shaft extending transversely across the ring and journaled thereon for operating movement, and a flexible element mounted on the shaft in position to act on the end of the pipe to produce a cleaning action thereon.

12. In a machine for surfacing the end of a

pipe, the combination of a frame, means for detachably securing said frame on the pipe, an annular ring mounted on the frame, a shaft extending approximately radially of the ring and journaled thereon, an abrading element mounted on the shaft in position to act on the end of the pipe, and power means for operating said shaft.

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