

July 15, 1958

S. RALYS
VALVE GRINDING MACHINES

2,842,901

Filed May 13, 1955

2 Sheets-Sheet 1

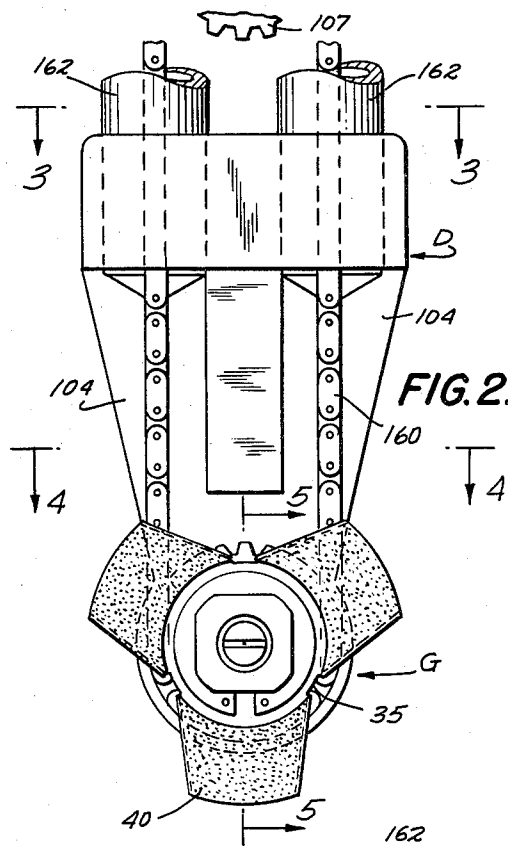
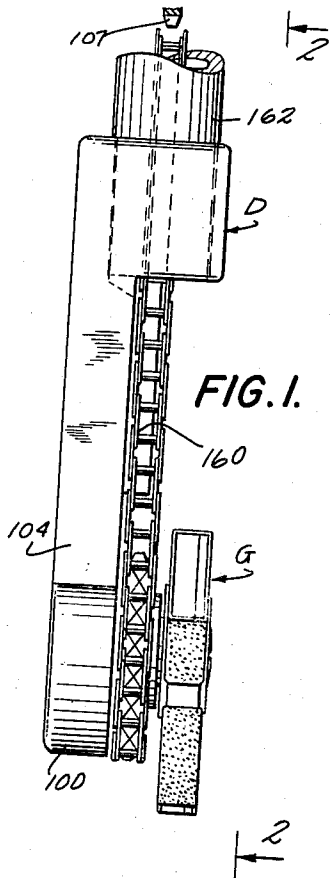


FIG. 3.

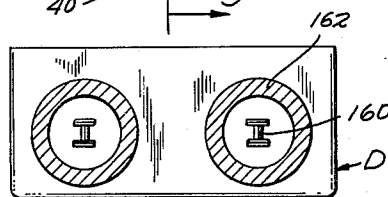
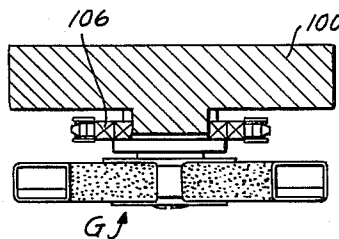


FIG. 4.



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2 Sheets-Sheet 2

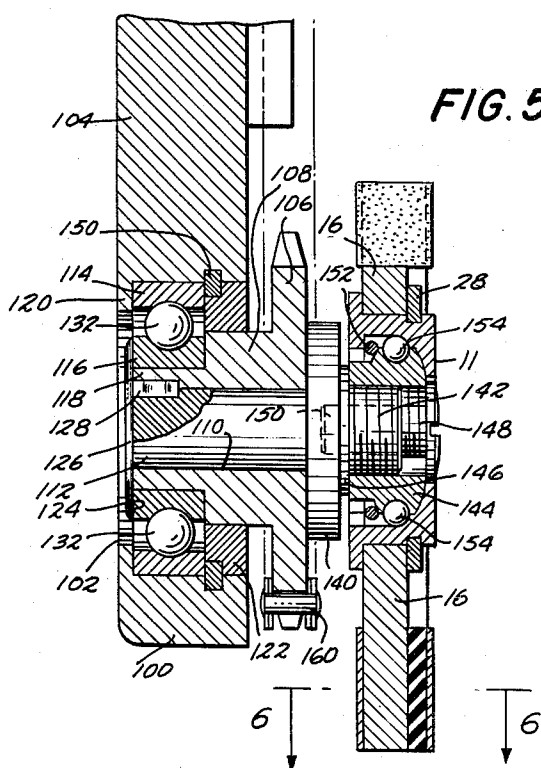


FIG. 5.

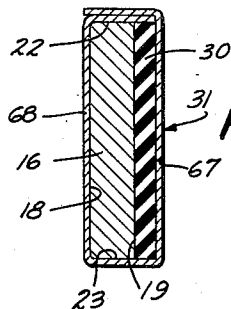


FIG. 6.

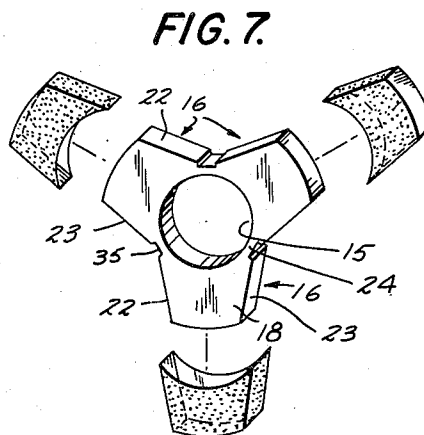


FIG. 7.

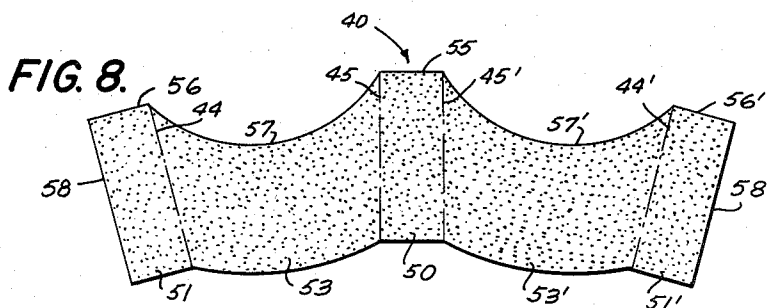


FIG. 8.

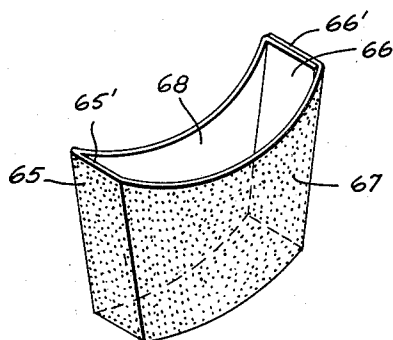


FIG. 9.

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1
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VALVE GRINDING MACHINES

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2 Claims. (Cl. 51-166)

This invention relates to a grinding machine and more particularly to a machine for grinding gate valve seats.

A general object of the invention is a new, improved and simplified grinding head. This general object is attained by one or more of the following provisions: the surface thereof which does the grinding is made readily replaceable; a yieldable or resilient cushion or backing underlies the grinding surface; the grinding surface is comprised of a plurality of spaced apart sections; the grinding surface is formed tubular for entry thereto of a base member which will present a grinding surface on one face thereof in the working plane and an inactive grinding surface on its other face usable for grinding by shifting the grinding surface to present that surface in the working plane; a grinding tool comprised of a leg extending radially outwardly from a central core, a yieldable cushion applied to one face of said leg and a grinding strip overlying the cushion and in its specific embodiment a grinding surface which is tubular; a grinding tool having plural legs extending outwardly radially from a central core and a tubular grinding element engaged about each of the legs to provide spaced apart grinding surfaces in the working plane.

Other provision for attaining the aforementioned general object will be pointed out as the details of the illustrative embodiments shown in the drawings are set forth.

A second general object of the invention is a new and improved and simplified drive for the grinding head of the grinding machine. This second general object is attained by the provision of a driving means comprised of a driving sprocket whose axis extends transversely of the length of the machine, a driven sprocket in driving relation to the tool head and a chain engaged with both sprockets.

Fig. 1 is a side view of the lower portion of the grinding machine, partly broken away;

Fig. 2 is a front view of the machine of Fig. 1;

Fig. 3 is a section taken on line 3-3 of Fig. 2;

Fig. 4 is a section taken on line 4-4 of Fig. 2;

Fig. 5 is a section taken on line 5-5 of Fig. 2;

Fig. 6 is a section taken on line 6-6 of Fig. 5;

Fig. 7 is a perspective showing of a detail;

Fig. 8 is a plan view of the expanded blank from which the grinding element is formed; and

Fig. 9 shows the blank of Fig. 8 folded to its position of Fig. 6.

The lower portion of the grinding machine of the illustrative embodiment of the invention is shown in Figs. 1 and 2 as comprised generally of the grinding head G (see Fig. 1) whose details will be first described by reference to Figs. 5 to 9, inclusive, and of the driving mechanism D whose details will then be described by reference to Figs. 1 to 5.

The grinding head is comprised of a sleeve or housing 11 for mounting the grinding tool. The grinding tool in turn is comprised of the disc shown in Fig. 7, resilient backing elements on the disc, one of which is shown at 30 in Fig. 6, and of abrasive sections on the resilient backing elements which serve to perform the grinding operation, one such abrasive section being shown at 31 in Fig. 6.

Upon reference to Fig. 7, it will be observed that the base or core has a central opening 15 and is illustrated in the drawing as having radially outwardly directed legs.

2

Three equidistantly spaced legs are shown in Fig. 7 for exemplification. The disc or core somewhat resembles a spider.

From the cross-sectional showing in Fig. 6, it will be observed that each of the legs is shown as defined on its opposite faces by flat surfaces 18 and 19 which are shown parallel and side walls 22 and 23 which are shown as converging outwardly (see Fig. 7) to gradually narrow the width of the legs outwardly from central web 24.

The size of the central opening 15 is such that the spider can be mounted on the circumferential periphery of the housing or tool mount 11 and held in position thereon between flange 26 extending outwardly from the inner end portion of the tool mount 11 and means such as a spring washer 28 seated in an annular groove provided in the periphery of the mount and spaced from flange 26 for the thickness of the base or core.

Upon reference to Fig. 7 it will be observed that the side walls of the legs 16 are cut down to provide a groove or depression 35 on the periphery of web 24 and between the innermost ends of adjacent legs. The purpose of this will be explained as the description proceeds.

Backing element 30 is provided on the outer face 19 of each leg 16 of the spider. This backing element is made of yieldable or resilient material such as rubber, plastic and the like and may be cut from a sheet. Its width and contour are preferably the same as those of the front faces 19 of the leg 16 to which it is applied.

The character of the abrasive section for one of the legs and the preferred manner of its attachment thereto are shown in Figs. 5 to 9, inclusive, of which Fig. 8 shows the blank 40 from which the preferred embodiment is formed. This blank may be cut from flexible material of indefinite length, at least one face of which is provided with abrasant which does the grinding.

The preferred embodiment of the invention contemplates that the blank be folded on inclined fold lines 44, 44¹ and vertical fold lines 45 and 45¹ to define two end sections 51 and 51¹ which are inclined, a central section 50 which is shown vertical in Fig. 8, and two sections 53 and 53¹ intermediate the central section and the two end sections.

When the blank of Fig. 8 is folded along the aforementioned fold lines to bring the end sections 51 and 51¹ into superimposed relation, the casing shown in Fig. 9 will be formed.

The central section 50 of the blank of Fig. 8 forms the end wall 65 of the casing of Fig. 9; the superimposed end walls 51 and 51¹ of the blank form the opposed end wall 66 thereof; and the intermediate sections 53, 53¹ of the blank form the front and rear faces 67 and 68 of the casing. It will be observed that the top and bottom of the casing are both open, and that the top edges of the walls 67 and 68 are concavely curved and their bottom edges convexly curved.

It will now be pointed out that the width of the sections 50, 51 and 51¹ of the blank of Fig. 8 which form the end walls 65 and 66 of the casing approximate the combined thickness of a leg 16 and the resilient backing element 30 associated therewith and that these walls are angled to converge downwardly approximately to the angle of the side walls 22 and 23 of leg 16 of the base or core of Fig. 7; that the open top of the casing of Fig. 9 is wider than the open bottom thereof, the dimensions of these openings being such that the leg 16 with the resilient backing member 30 associated therewith can be freely entered into the casing (Fig. 7) through the wider top mouth thereof until the angled side walls 65 and 66 thereof frictionally engage the angled side walls 22 and 23 of leg 16 as shown in Fig. 5. The size of the top and bottom openings of the casing is such that the four walls 65, 66, 67 and 68 of the casing will

be tightly and fully and frictionally engaged against further entry of leg 16 thereinto, before any portion of the top edge of the casing reaches the bottom of the depressions 35 in the core or spider of Fig. 7.

These grooves or depressions 35 serve to clear the inner edges of the casings positioned on adjacent legs from interference, and the size of the depressions is made ample for that purpose.

It will be observed that the engagement of a shoe or casing of Fig. 9 over a leg 16, with the resilient element 30 applied thereto, generates a sufficient frictional engagement therebetween to hold the two fully engaged and yet permit of the ready removal and replacement of a worn casing. The resilience of backing element 30 functions in securing a tight engagement. It will be further observed that the abradant surface of one or the other of the two wall faces 67 and 68 of the casing is the active grinding face of each leg and the other is inactive, the face or wall 67, for example, being shown as the active one in Fig. 6, and that where the grinding surface section 67 is no longer usable the casing can be withdrawn from the leg, reversed and then reengaged therewith to thus present the unused face 68 in the working plane.

The upper edges of intermediate sections 53, 53' of the blank of Fig. 8 and of the faces 67 and 68 of the casing are curved as shown to clear the driving mechanism shortly to be described.

The driving mechanism D is comprised of a casing 100 (Fig. 4) having an opening 102 therein and the two legs 104 extending therefrom. A sprocket wheel 106 has a flange 108 extending into the opening 102 and has an opening 110 therein to accommodate the shaft 112. The bearing rings 114 and 116 are interposed between a reduced portion 118 of the flange 108 and the casing 100 and lie between the flange 120 on the casing 100 and the washer 122 to present an end abutment 124 for the head 126 of the shaft 112. The shaft 112 is keyed to the flange 118 of the sprocket 106 at 128 so that movement of the sprocket will be imparted to the shaft 112 and the washer 122 is keyed to the casing 100 by the split ring 130 to lock the sprocket 106 in the casing 100.

The balls 132 are interposed between the rings 114 and 116 to reduce friction.

The shaft 112 has the shoulder 140 thereon and the threaded front portion 142. On the threaded portion 142 is screwed a bushing 144 which is spaced from the shoulder 140 by the spacer 146. The bushing is held in place by the screw 148 threaded in the front opening 150 in the shaft 112. The tool mount 11 is mounted on the bushing 144 and is keyed thereto by the spring element 152 which holds the two together so that when the shaft 112 is rotated the tool mount 11 will be rotated through the bushing 144. The balls 154 are interposed between the tool mount 11 and the bushing 144 to minimize friction. The spider 16 is mounted on the tool mount 11 through the opening 15 and held thus by the spring washer 28.

The sprocket 106 is operated preferably by sprocket chain 160 shown in the drawing. The sprocket chain 160 runs through tubular extensions 162 formed on the legs 104 of the casing and is driven by a mechanism not shown.

In operation, a shoe formed from the folded abrasive blank 40 as hereinabove described is placed on each of the legs 18 of the spider. Since the side walls 65 and 66 are converging at angles corresponding to the converging side walls 22 and 23 of the legs 18, the abrasive tubes comprising the shoes will fit snugly on the legs 18. The edges 65¹ and 66¹ will lie in the depressions 35 in the spider and the curved edges 57 and 57¹ will conform to the opening 15 of the spider so that the edges of the shoes will not interfere with each other or with the operation of the device.

Thereafter the sprocket wheel 106 is rotated by the chain 160 which is driven by a second sprocket 107 and this rotation will be imparted to the spider 16 through the bushing 144 and the tool mount 11 thereby rotating the spider 16 and the abrasive shoes which will thus perform their grinding function. When a face, say 67, of the abrasive shoe is worn out and no longer usable, the shoe can be withdrawn from the leg, reversed and then reengaged therewith to thus present the unused face 68 in the working plane.

It will be seen from the foregoing that the invention provides a new and improved grinding head wherein the abrasive surfaces can be selectively and inexpensively replaced.

I claim:

1. A shoe for mounting interchangeably on any one of a plurality of identical gate valve grinding head legs radiating circumferentially equidistantly in a common plane from a rotatable central core and each having a pair of spaced parallel flat faces of identical size and dimensions consisting of a front working plane face and a rear face and having a pair of radially outwardly converging flat end faces connecting said front and rear faces, said shoe comprising a thin sheet of flexible material having an abrasive coating on one surface and folded to oppositely open ended tapering tube shape having four flat walls conforming respectively to the front and rear faces and the end faces of one of said legs, said four walls including front and rear walls each having an outer abrasive surface whereby the shoe may be mounted on any of the legs with either of said abrasive surfaces disposed on the front working plane face of the leg.

2. A shoe for mounting interchangeably on any one of a plurality of identical gate valve grinding head legs radiating circumferentially equidistantly in a common plane from a rotatable central core and each having a pair of spaced parallel flat faces of identical size and dimensions consisting of a front working plane face and a rear face and having a pair of radially outwardly converging flat end faces connecting said front and rear faces, said shoe comprising a thin sheet of flexible material having an abrasive coating on one surface and having an oblong central panel conforming in size and shape to an end face of said leg, a pair of end panels, and a pair of identical intermediate panels each connecting the central panel with one of the end panels, each of said intermediate panels having one relatively long concave side edge and one relatively short convex edge and the lengthwise dimension of each of said end panels converging toward the lengthwise dimension of said central panel, said sheet being folded with the two end panels superposed and secured together to form a body of oppositely open ended tapering tube shape having four flat walls formed by said respective panels conforming respectively to the four faces of one of said legs and including front and rear walls formed by said intermediate panels each having an outer abrasive surface whereby the shoe may be mounted on any of the legs with either of said abrasive surfaces disposed on the front working plane face of the leg.

References Cited in the file of this patent

UNITED STATES PATENTS

65	289,879	Almond	Dec. 11, 1883
	685,697	Smith	Oct. 29, 1901
	707,082	Brown	Aug. 19, 1902
	972,533	Heusermann	Oct. 11, 1910
70	2,148,627	Kulp et al.	Feb. 28, 1939
	2,332,676	Stetler	Oct. 26, 1943
	2,430,785	Scattone	Nov. 11, 1947
	2,484,335	Dingerson	Oct. 11, 1949
	2,493,852	Bonkowski	Jan. 10, 1950
75	2,611,222	Johnson	Sept. 23, 1952