Sept. 19, 1950 E. I. HARRISON ET AL 2,522,613

FINISHING DEVICE

Filed Dec. 12, 1946 3 Sheets-Sheet 1

Fig. 1

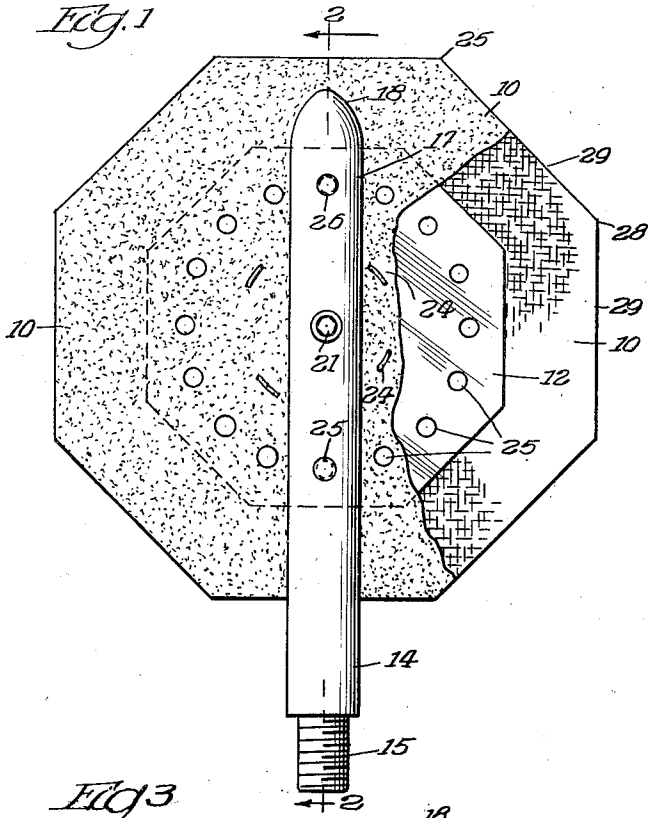


Fig. 2

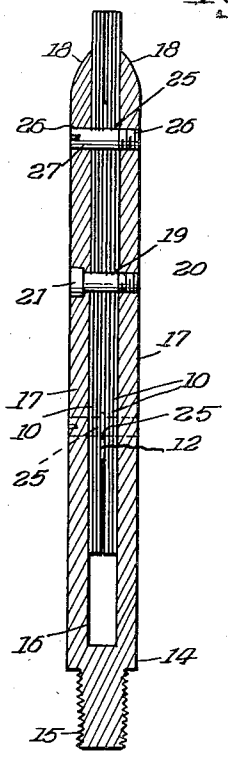


Fig. 3

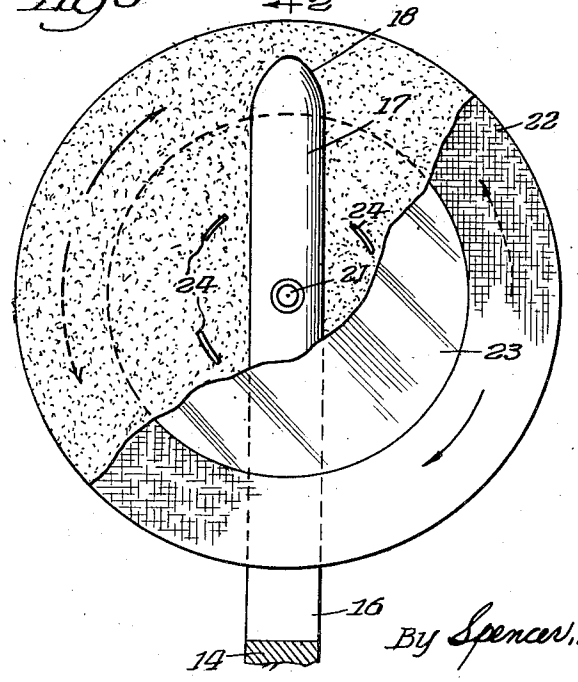
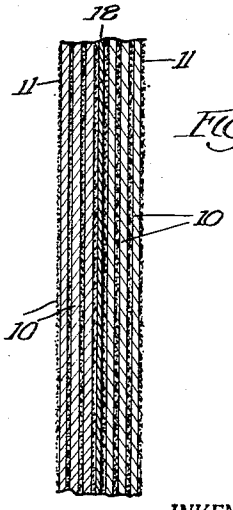


Fig. 4



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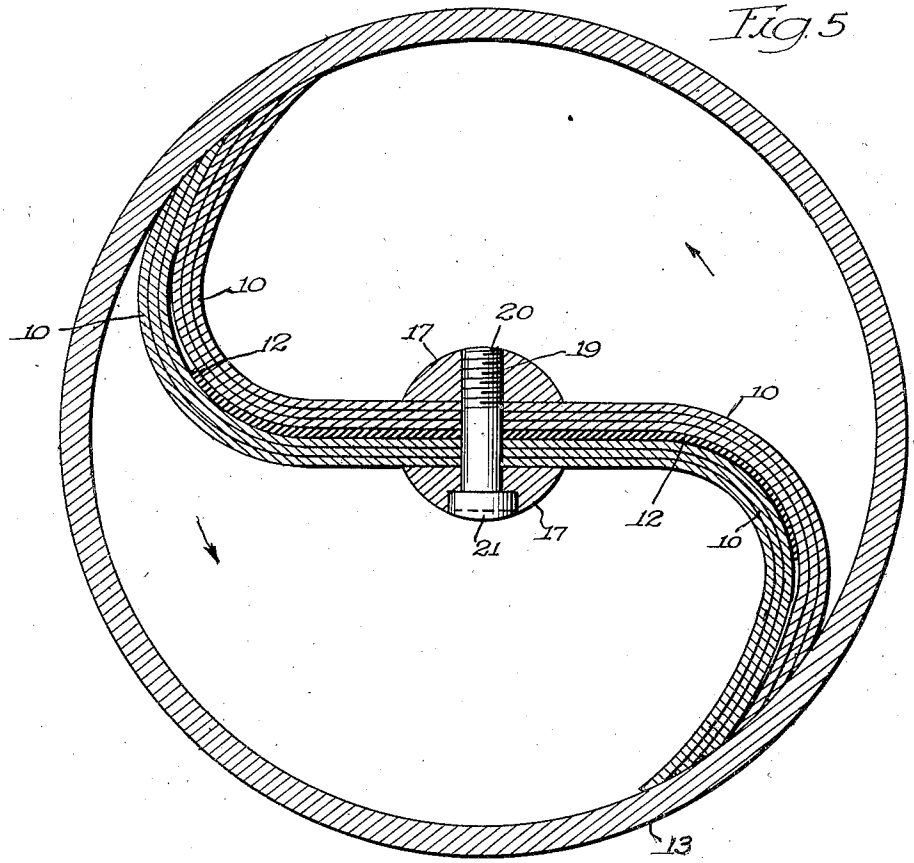
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Sept. 19, 1950 E. I. HARRISON ET AL 2,522,613

FINISHING DEVICE

Filed Dec. 12, 1946 3 Sheets-Sheet 2

Fig. 5



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Sept. 19, 1950 E. I. HARRISON ET AL 2,522,613

FINISHING DEVICE

Filed Dec. 12, 1946 3 Sheets-Sheet 3

Fig. 7

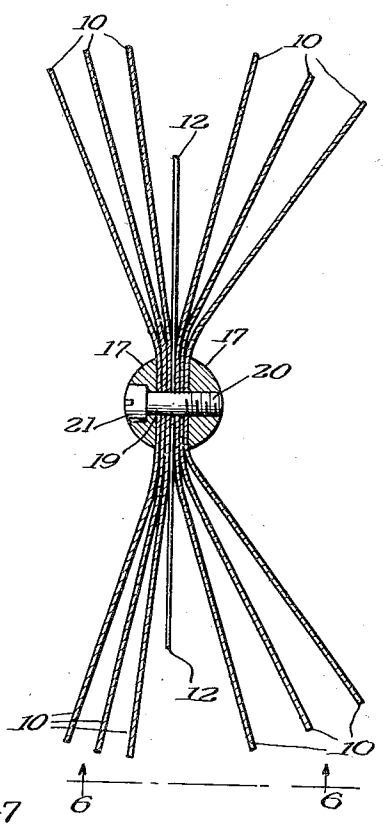
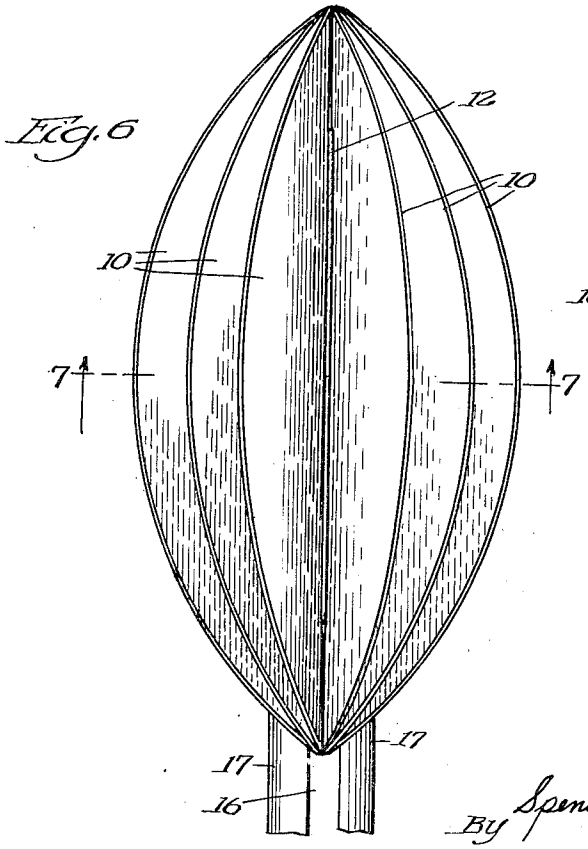


Fig. 6



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UNITED STATES PATENT OFFICE

2,522,613

FINISHING DEVICE

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Application December 12, 1946, Serial No. 715,720

8 Claims. (Cl. 51—185)

1

This invention relates to improvements in finishing devices, particularly adapted, though not necessarily limited in use, for finishing or polishing the inside of pipe or other hollow or tubular articles.

Heretofore, with devices of this general character, and where sheets of flexible material on one or both surfaces of which abrading material is applied, are employed, and secured to a holder by means of which the material is inserted into the tubular article, and the article and finishing device rotated one with respect to the other, the abrading or finishing sheets are deflected so as to present their abrading faces to the surfaces to be polished or finished. It has been found that when the sheets are secured in a fixed relation to the holder, a considerable area of the abrading surface is lost, by reason of the fact that the manner of deflection of the sheets prevents a considerable area of the sheets from contacting the surface of the work. This is accentuated by reason of the fact that by repeated or long use of the device, the sheets become more or less set in their deflection, and all of the abrading surface is not brought into use, especially that portion which is in proximity to the handle or holder. Furthermore, in order to adjust such a device, it has heretofore been necessary to dismantle the parts by removing the fastening devices and the polishing or finishing elements from the holder, then re-insert the elements into the holder, and then fasten them in position and against bodily rotative adjustment with respect to the holder.

It is one of the objects of the present invention to overcome these difficulties and objections, and to provide in a device of this character, improved means for securing or fastening the abrading or finishing elements to the operating holder.

Another object is to provide a device of this character, in which the elements are adjustably secured to the holder, and improved means whereby the finishing or abrading elements may be readily adjusted with respect to the holder, so that a new surface may be presented to the work, and without removing or detaching the finishing element from the holder.

A further object is to provide an improved finishing or abrading element, the configuration of which is angular in cross-section, whereby the peripheral edge of the element will be of a shape to facilitate the insertion of the element into the tubular article, the inner surface of which is to be finished.

A still further object is to provide an improved finishing device of this character, embodying a

2

holder, and one or more flexible abrading or finishing elements secured to the holder in such a manner as to permit of rotative adjustment of the element with respect to the holder.

Still another object is to provide improved means for securing the element in any position to which it has been adjusted with respect to the holder, and while the element remains attached to the holder.

To the attainment of these ends, and the accomplishment of other new and useful objects as will appear, the invention consists in the features of novelty in substantially the construction, combination and arrangement of the several parts, hereinafter more fully described and claimed, and shown in the accompanying drawings, in which

Fig. 1 is a front elevation, partly broken away, of a finishing device of this character, embodying the principles of this invention.

Fig. 2 is a longitudinal sectional view taken on line 2—2, Fig. 1.

Fig. 3 s a view, similar to Fig. 1, of another form of this invention.

Fig. 4 is a detail longitudinal sectional view of superposed abrading or finishing elements, and a reinforcing element between some of the abrading elements.

Fig. 5 is a transverse sectional view of the finishing device, and of a tubular article with the finishing element within the article, showing the manner in which the finishing element will be deflected while in use.

Fig. 6 is an edge plan view of the device, showing the abrading or polishing elements spread apart, and as viewed on line 6—6, Fig. 7.

Fig. 7 is a sectional view as taken on line 7—7, Fig. 6.

Referring more particularly to the drawings, the numeral 10 designates a plurality of sheets of any suitable flexible material such as fabric, paper or the like, which are provided, on one or both faces, with a suitable abrasive or polishing material 11, such as sand, emery, or the like. Any number of these sheets may be arranged face to face, as shown in Fig. 4, and, if desired, a reinforcing or strengthening sheet 12 (see particularly Fig. 7) may be interposed between adjacent sheets, and the sheet 12 is preferably of a considerably smaller area, so that portions of the sheets 10 will project beyond and encompass the periphery of the sheet 12. The reinforcing sheet 12 may be constructed of any suitable flexible material which is stiffer than the sheets 10, so as to cause the sheets 10 to assume a substantially flat condition or shape when not in use, but which

will yield to permit the sheets 10 to be deflected or bent when inserted into the article 13, as shown in Fig. 5.

The sheets may be of any desired configuration in cross-section, such as octagonal, as shown in Fig. 1; circular, as shown in Fig. 3; or of any other desired configuration.

The numeral 14 designates, generally, a holder of any suitable size and configuration, which may be provided with a threaded extremity 15, by means of which it may be detachably secured to a suitable operating or rotating device or tool, not shown. The holder is bifurcated, as at 16, to form a space for receiving a plurality of sheets 10, and the bifurcation is of a size that the sheets, when inserted thereinto, will fit snugly, to cause friction against the arms or fingers 17 formed by the bifurcation. The extremities of the fingers may be beveled or rounded, as at 18, if desired.

The sheets 10 are of a size to project beyond the extremities of the fingers 17, and are secured within the bifurcation 16 in any desired or suitable manner, such as by means of a screw 19 that passes through one of the fingers 17, through the sheets 10, and is threaded into the other finger, as at 20, the head 21 being countersunk in the opposite finger. The fingers 17 may, if desired, have a somewhat inherent resiliency, so that they may be drawn against the sheets 10, to create additional friction to hold the sheets in adjusted position when they are rotated about the fastening device 19 as an axis.

The reinforcing or stiffening element 12 preferably conforms in contour with the shape of the sheets 10; that is, it is of a hexagonal shape, as are also the sheets, as shown in Fig. 1. In Fig. 3, the sheets 22 are circular, as is also the reinforcing or stiffening element 23.

If desired, when the sheets are assembled with the stiffening or reinforcing sheet therebetween, the entire sheet assembly may be secured together in any suitable manner, such as by fastening devices 24, such as wire staples or stitching, so as to maintain the sheets against relative rotative displacement.

In use, the sheets are assembled and then placed between the fingers 17 of the holder 14, and a sufficient number of sheets are employed so that they will fit snugly within the bifurcation. The fastening device 19 is then placed in position, the sheets being perforated before insertion, and the perforation having been placed in alinement with the openings in the fingers 17. The holder 14, with the sheets thus secured thereto, may be attached to any suitable actuating device.

When the finishing device is inserted into a tubular article 13, the sheets 10 and the reinforcing or strengthening element 12 will assume the positions shown in Fig. 5, and the finishing device and the article 13 are rotated one with respect to the other, the sheets bending to present their faces to the surface of the work. The relative rotation of the finishing device and the work may be in either direction.

After the portions of the faces of the sheets 10 which contact the work have worn away, the sheets may be adjusted with respect to the holder by simply rotating the assembled sheets with respect to the holder, and about the fastening device 19, as an axis, to any desired extent, to present a new portion of the active faces of the sheets to the work. The sheets will be maintained in such adjusted position by reason of the friction created against the fingers 17. If desired, fastening devices may be provided for securing the sheets in such adjusted position. To that end, there may be provided a series of openings 25 through the assembled sheets, which are adapted to be brought into register with alined openings 26 in the fingers 17, and into which registering openings fastening devices 27 may be inserted and suitably secured. When such fastening devices 27 are employed, they must first be removed before the sheets can be rotated about the fastening device 19, as an axis.

The octagonal configuration of the sheets, in Fig. 1, renders it possible to adjust the sheets with respect to the holder 14, so that one of the angles 28 between adjacent peripheral faces 29, may be disposed in alinement with the extremities of the fingers 17, to facilitate insertion of the device into a pipe or tubular article 13. The faces 29 may also be respectively positioned adjacent such extremities of the fingers 17, as shown in Fig. 1, which will also facilitate insertion into the tubular article. In use, either face of the sheets may be caused to operate upon the work.

While the preferred forms of the invention have been herein shown and described, it is to be understood that various changes may be made in the details of construction, and in the combination and arrangement of the several parts, within the scope of the claims, without departing from the spirit of this invention.

What is claimed as new is:

1. A device for finishing an interior surface of a hollow work article comprising a holder having resilient longitudinally extending furcations and a plurality of flexible abrasive sheet elements arranged side by side and extending laterally in opposite directions beyond said holder, said sheet elements being mounted on said holder between said furcations and being angularly adjustable relative to said holder in substantially the planes of said sheet elements whereby different portions of the faces of said sheet elements may be engaged with the interior surface of the work element and pivot means for said sheet elements engaging said furcations and holding the latter in position to fricitonally retain said sheet elements in their angularly adjusted positions.

2. A device for finishing an interior surface of a hollow work article comprising a holder having resilient furcations and an abrasive unit comprising abrasive sheet elements and an intermediate reinforcing sheet element arranged side by side, said abrasive sheet elements extending in all directions beyond said reinforcing sheet element and also extending laterally in opposite directions beyond said holder, said abrasive unit being angularly adjustably mounted on said holder between said furcations whereby different portions of the faces of said abrasive sheet elements may be engaged with the interior surface of the work article, and means forming a pivot for said abrasive unit holding said furcations against opposite sides of said abrasive unit to frictionally retain the latter in its angularly adjusted positions.

3. A device for finishing an interior surface of a hollow work article comprising a longitudinally extending holder, an abrasive sheet element extending laterally in opposite directions beyond the holder, said sheet being angularly adjustable relative to said holder in substantially the plane of said sheet whereby different portions of the sheet element may be engaged with the interior surface of the work element, and securing means for said sheet engaging said holder and holding

the sheet in position to retain the sheet in its angularly adjusted position.

4. A device for finishing an interior surface of a hollow work article comprising a longitudinally extending holder, an abrasive sheet element extending laterally in opposite directions beyond the holder, said sheet being angularly adjustable relative to said holder in substantially the plane of said sheet whereby different portions of the sheet element may be engaged with the interior surface of the work element, securing means for said sheet engaging said holder and holding the sheet in position to retain the sheet in its angularly adjusted position, and a sheet reinforcing element engageable with said sheet, said reinforcing element being of a size smaller than said sheet extending laterally from said holder and extending in opposite directions of said holder.

5. A device for finishing the interior of a hollow work article comprising a holder, an abrasive unit comprising abrasive sheet elements extending laterally in opposite directions from said holder, said unit and holder being provided with complementary means, whereby said abrasive unit is shiftably turnable on said holder so that different portions of the faces of said abrasive sheet elements may be brought selectively into position to be engaged with the interior surface of the work article, said complementary means including locking means for holding said unit against the holder to retain the unit in its angularly adjusted position.

6. A device for finishing the interior of a hollow work article comprising a holder, an abrasive unit comprising abrasive sheet elements extending laterally in opposite directions from said holder, said abrasive unit being angularly adjustably mounted on said holder whereby different portions of the same faces of said abrasive sheet elements may be brought into position and be engaged with the interior surface of the work article, means forming a pivot for said abrasive unit with respect to the holder and holding said unit in locked position against the holder to retain the unit in its angularly adjusted position, and a reinforcing element arranged intermediate the abrasive sheet elements.

7. A device for finishing the interior of a hollow work article comprising a holder, an abrasive unit comprising abrasive sheet elements extending laterally in opposite directions from said holder, said abrasive unit being angularly adjustable

about a pivot mounted on said holder whereby different portions of the faces of said abrasive sheet elements may be brought into position and be engaged with the interior surface of the work article, means forming said pivot for said abrasive unit for holding said unit in position against the holder to retain the unit in its angularly adjusted position, and a reinforcing element arranged intermediate the abrasive sheet elements, said abrasive sheet elements and said reinforcing element each being multi-sided, the sides of the reinforcing element being parallel with the sides of the abrasive sheet elements.

8. A device for finishing the interior of a hollow work article comprising a holder, an abrasive unit comprising abrasive sheet elements extending laterally in opposite directions from said holder, said abrasive unit being adapted to be shifted with respect to said holder whereby different portions of the faces of said abrasive sheet elements may be brought into position to be engaged with the interior surface of the work article, cooperating interfitting means on said abrasive unit and said holder for holding said unit in locked position with respect to the holder to retain the unit in its angularly adjusted position, and a reinforcing element arranged intermediate the abrasive sheet elements, said abrasive sheet elements and said reinforcing element each being multi-sided, the sides of the reinforcing element being parallel with the sides of the abrasive sheet elements, said reinforcing element being of spring metal and of a size smaller than the size of the sheet elements.

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HARLAN L. KILLEY.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
394,406	Seeger	Dec. 11, 1888
437,463	Teague	Sept. 30, 1890
2,316,257	Krastin	Apr. 13, 1943
2,370,490	Rice	Feb. 27, 1945
2,370,491	Rice	Feb. 27, 1945

OTHER REFERENCES

"Grits and Grinds," vol. 33, No. 4, page 9, published by Norton Co., April 1942, Worcester, Mass.