Jan. 26, 1971 R. W. MARTIN 3,557,496

ABRASIVE TOOL

Filed July 5, 1968

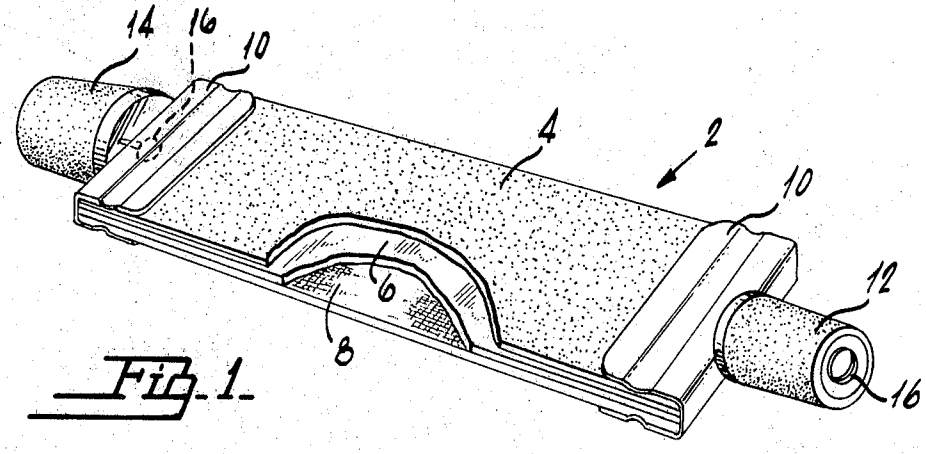


Fig. 1.

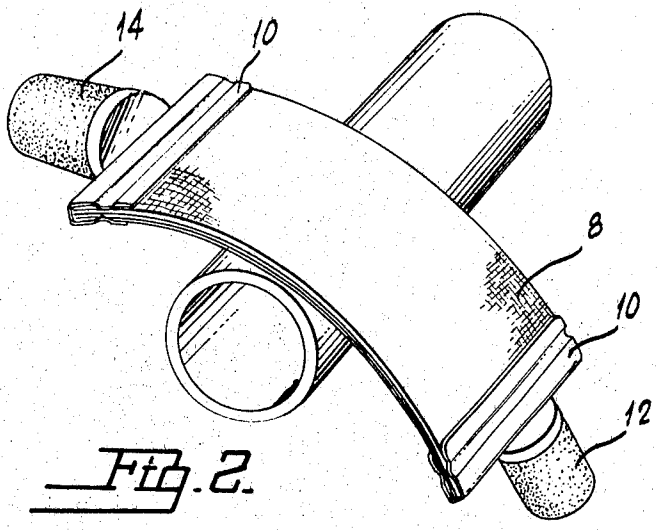


Fig. 2.

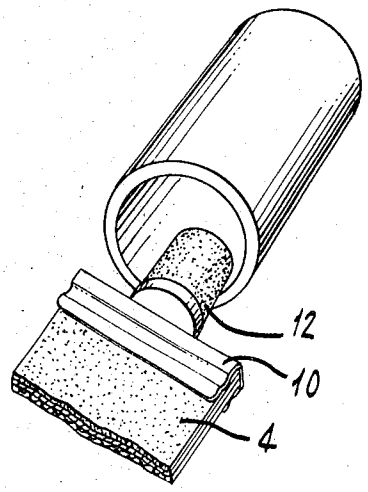


Fig. 3.

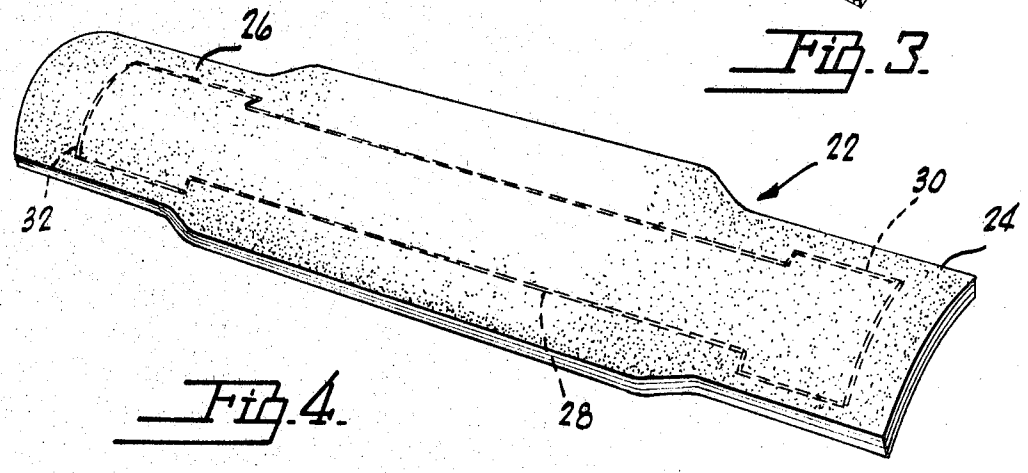


Fig. 4.

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ABRASIVE TOOL

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ABSTRACT OF THE DISCLOSURE

An abrasive tool for use in cleaning or polishing the interior and exterior surfaces of pipes, tubes and the like to prepare the same for soldering, brazing or other operations. The tool embodies a flexible strip of flat material presenting at least one abrasive surface and having handles connected to the opposite ends of said strip. The handles have a generally cylindrical or slightly tapered form and are provided with abrasive surfaces for cleaning the inner surface of a pipe tube or fittings.

FIELD OF THE INVENTION

Various forms of tools have been provided heretofore for use in cleaning the inner or outer surfaces of tubes, pipes, fittings and the like in order to remove films of oxide, oil or grease so as to facilitate the soldering of tubes and fitting together and provide a sound and complete joint between the tubes. However, such tools have frequently been expensive to produce and cumbersome to use. Moreover, they have not always been capable of use in cleaning either large or small tubes and fittings in an effective manner.

In accordance with the present invention these objections are overcome by providing a tool embodying a flat and flexible strip of material presenting an abrasive surface which may be drawn back and forth over the outer surface of a tube of any diameter to clean the outer surface thereof. In addition, the strip is provided with handles connected to the opposite ends thereof to permit manipulation of the strip. The handles employed are themselves shaped to be inserted into the ends of tubes and fittings of various sizes and are provided with abrasive surfaces which not only can be used to clean the inner surfaces of the tubes and fittings, but also aid in gripping the handles in a manner to forcibly press the strip against the outer surface of a tube in cleaning the same.

THE DRAWING

FIG. 1 is a perspective view illustrating a typical embodiment of the present invention with parts of the flexible strip broken away;

FIG. 2 is a view indicating the manner in which the construction of FIG. 1 may be used in cleaning the outer surface of a pipe, tube, or fitting;

FIG. 3 illustrates the manner in which the handles of the device of FIG. 1 may be used in cleaning the inner surface of a tube or fitting, and;

FIG. 4 is a perspective view illustrating an alternative embodiment of the present invention.

PREFERRED EMBODIMENTS OF THE INVENTION

In that form of the invention chosen for purposes of illustration in FIGS. 1, 2 and 3 of the drawing, the abrasive tool embodies a layer of abrasive material in the form of an elongated strip which is prefearbly rectangular in shape as indicated at **2** in FIG. 1. The flexible strip preferably embodies a layer of abrasive material **4** together with a flexible metal or plastic layer **6** which may be provided with a backing layer **8** formed of fabric or similar material. However, if preferred, the layer **8** may itself present an abrasive surface on the opposite face of the strip **2**. The abrasive layer **4** may

consist of emery cloth, sandpaper, fibrous material such as steel wool, or the like, whereas the layer **6** of metal is relatively thin and flexible, but serves to reinforce the layer of abrasive material and prevents cracking or damage to the abrasive layer **4** by folding of the abrasive material through a sharp angle. The backing layer **8** as indicated, may also consist of a layer of emery cloth, sandpaper or the like, and may present an abrasive grit or surface which is either coarser or finer than the abrasive surface presented by the layer of material **4**. In the alternative, the layer of material **8** may be formed of plastic fabric or the like, to present a smooth attractive backing for the strip **2**.

The various layers making up the flexible strip **2** may be bonded together or secured in any suitable preferred manner. However, as shown, the opposite ends of the strips are provided with clamping means **10** which serve to hold the various layers of the strip **2** in fixed relative positions. The clamping means as illustrated, are in the form of generally U-shaped members which extend transversely of the strip **2** and are sufficiently rigid, stiff and strong to hold the flexible strip **2** extended transversely.

The opposite ends of the strip **2** are provided with handles **12** and **14** which are preferably secured to the transversely extending U-shaped strips **10** by means of screws **16** or the like, to hold the handles **12** and **14** fixedly in place with respect to the U-shaped members **10**. The diameter of the members **12** and **14** is preferably somewhat different so that as shown, the handle member **12** is slightly smaller in diameter than the handle member **14**. Each of the handle members is provided with an outer surface formed of abrasive material which, if desired, may be of one coarseness in one handle and of a different coarseness in the other handle. Each of the handle members **12** and **14** is generally cylindrical in shape and if desired, may be slightly tapered. However, the diameter of each of the handles **12** and **14** should be small enough to permit the insertion of the handle into the end of a tube or fitting for use in removing rust, oxide or other objectionable film from the inner surface of a tube to be soldered or welded.

The construction shown in FIG. 1 is adapted to be used as illustrated in FIG. 2 to clean the outer surface of a tube **20** so as to remove oxide, rust, film and grease or other contaminating material from the outer surface in preparing the tube for soldering, brazing, or other operations. As shown, the abrasive surface **4** of the strip **2** may be placed against the outer surface of the tube **20** and may be drawn back and forth by the handles **12** and **14** so as to remove the rust or the like, from the surface of the tube which is to be engaged by solder, flux or other material. Thereafter, when the inner surface of the tube **20** is to be cleaned to remove rust or oxide coating therefrom, the handle **12** or **14** may be inserted into the end of the pipe, tube, or fitting **20** and may be rotated or moved arcuately about the inner surface of the tube so as to polish the inner surface and present it in a suitable condition for effective brazing or the like.

The handles **12** and **14** thus may be employed for firmly grasping the opposite ends of the tool to move it back and forth in cleaning the outer surface of the tube and at the same time, may be used for cleaning the inner surface of the tube.

The U-shaped members **10** which clamp the various layers of the strip **2** together are preferably pressed forcibly against the various layers to hold them in place. However, the strips **10** may be made sufficiently yieldable that they can be pried apart by insertion of a tool between the opposite sides of the U-shaped member to permit removal of the abrasive layer **4** or **8**, or both layers to permit the substitution of a new abrasive layer of material into the flexible strip **2**.

In the alternative form of the invention illustrated in FIG. 4, the strip **22** is formed with integral end portions **24** and **26** which are actually extensions of the strip **22**. The strip **22** preferably further embodies an elongated flexible strip of metal or plastic **28** which has opposite end members **30** and **32** connected thereto and located within the end portions **24** and **26** of the strip **22**. The members **30** and **32** may be relatively stiff and are arcuate in shape, and thus serve to form the end portions or handles **24** and **26** of the strip into an arcuate shape which will permit them to be inserted into the end of a pipe, tube or fitting for cleaning the inner surface thereof, whereas the strip portion **22** is relatively flat and elongated and so as to be adapted for use in cleaning the outer surface of the pipe or the like. As in the construction of FIG. 1, the strip **22** is provided with abrasive material on one face thereof for use in cleaning the exterior surface of a pipe as shown in FIG. 2.

The opposite face of the strip **22** may be formed of flexible fabric, plastic material or the like. However, if desired, both opposite faces of the strip **22** may be provided with abrasive material which differ in the coarseness thereof so as to enable the user of the tool to perform a rough cleaning job and a final polishing job in presenting the desired surface condition for soldering and abrasing or other operations.

It will be apparent from the foregoing description of the various forms of the invention that the tool is capable of being produced with a minimum number of elements and at the same time is inexpensive to produce and is convenient to handle. It is light in weight and is capable of being folded without creasing so as to occupy a minimum of space in the users tool kit.

I claim:

1. An abrasive tool comprising a flat flexible strip of material presenting an abrasive surface on at least one face thereof and having handles which present relatively stiff, generally cylindrical abrasive surfaces connected to the opposite ends of the strip.

2. An abrasive tool as defined in claim **1** wherein said flexible strip includes a layer of strong flexible reinforcing material and a layer of abrasive material.

3. An abrasive tool as defined in claim **1** wherein said flexible strip presents abrasive surfaces on the opposite faces thereof.

4. An abrasive tool as defined in claim **1** wherein said handles are generally cylindrical in shape and present outer surfaces provided with abrasive material.

5. An abrasive tool as defined in claim **2** wherein the ends of said strip have clamping means applied thereto serving to secure the layers of material in fixed relative positions and said handles are connected to said clamping means.

6. An abrasive tool as defined in claim **1** wherein the flexible strip is provided with a longitudinally extending flexible reinforcing member which aids in preventing such transverse bending of the strip as will tend to impair the layer of abrasive material.

7. An abrasive tool as defined in claim **1** wherein the handles are formed integral with the flexible strip and are provided with arcuate reinforcing members imparting a rounded contour to the handles.

8. An abrasive tool as defined in claim **7** wherein said flexible strip embodies a longitudinally extending flexible reinforcing member to which the arcuate reinforcing members in the handles are secured.

References Cited

UNITED STATES PATENTS

81,986	9/1868	Crane	51—401
2,442,107	5/1948	Wallich	51—401
3,168,799	2/1965	Johnson	51—392

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