July 21, 1942. E. W. HALL 2,290,236

ROTARY ABRADING TOOL

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Fig. 1.

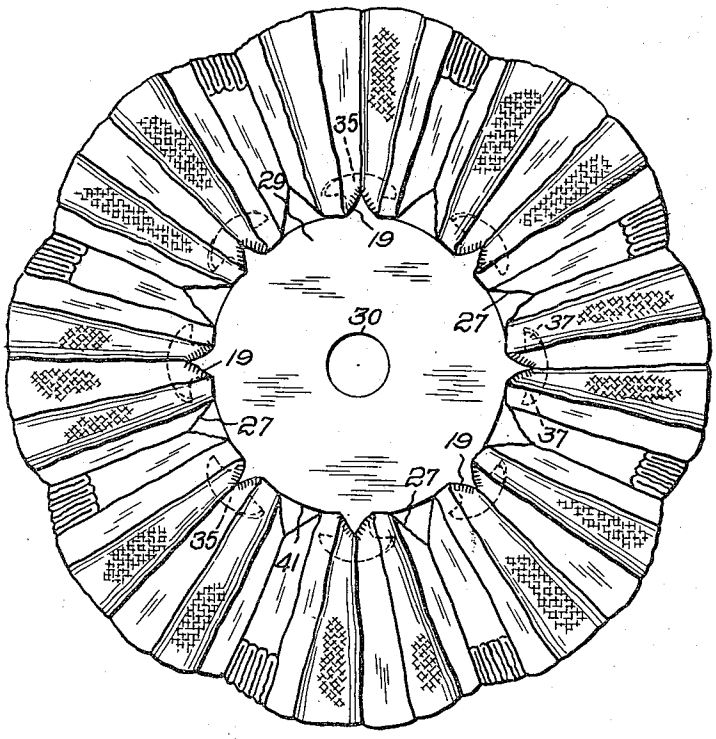


Fig. 2.

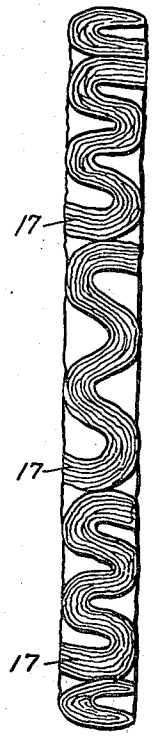


Fig. 3

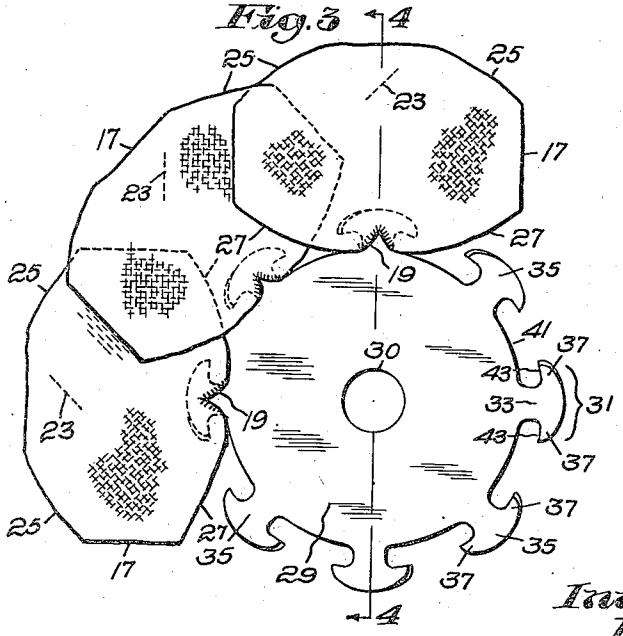
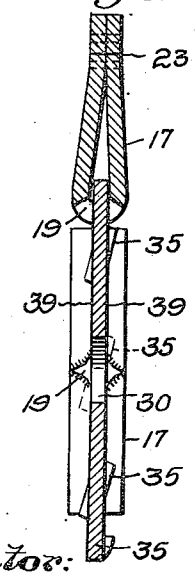


Fig. 4.



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Fig. 5.

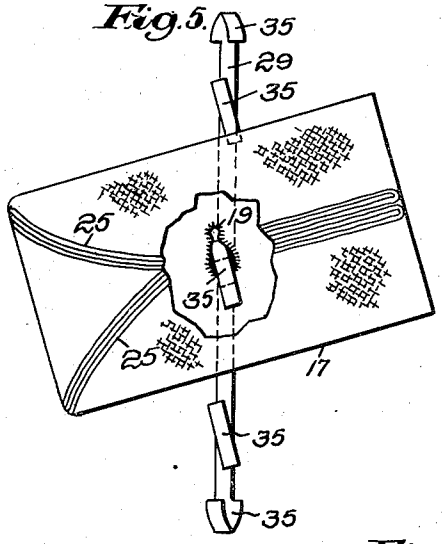


Fig. 6.

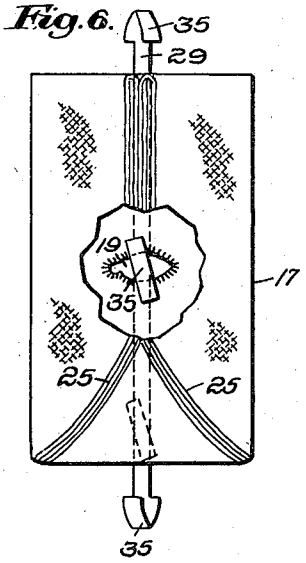
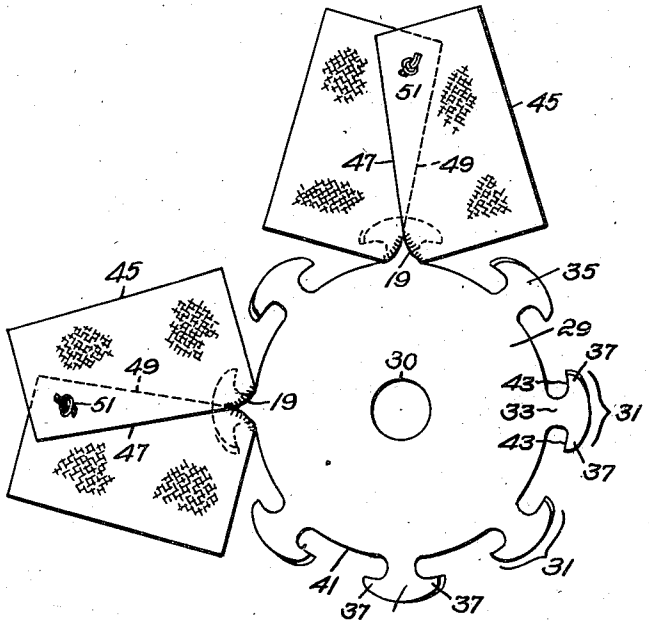


Fig. 7.



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Fig. 8.

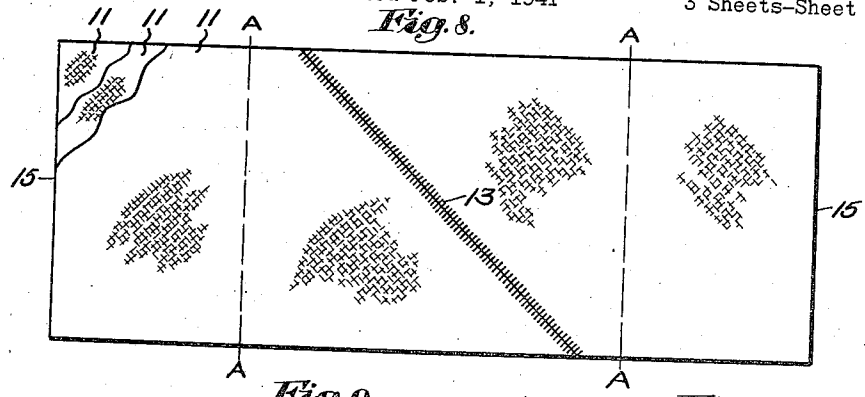


Fig. 9.

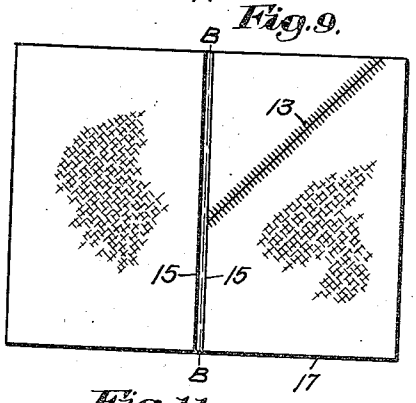


Fig. 10.

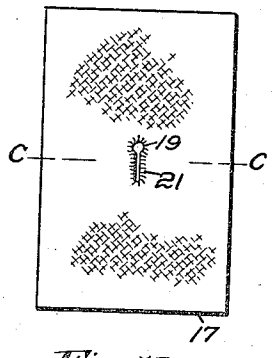


Fig. 11.

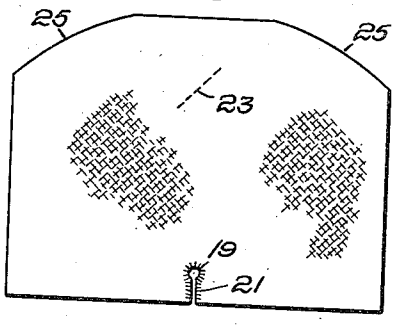


Fig. 12.

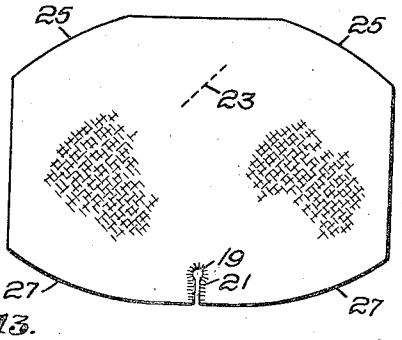
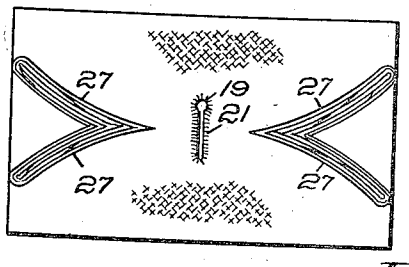


Fig. 13.



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UNITED STATES PATENT OFFICE

2,290,236

ROTARY ABRADING TOOL

Elisha W. Hall, Scituate, Mass.

Application February 1, 1941, Serial No. 377,061

12 Claims. (Cl. 51—194)

This invention relates to rotary abrading tools of the class employing a series of flexible abrading elements about and secured to a hub, and to be associated with other like assemblies coaxially disposed on and about an arbor and secured to the latter by clamping plates and a clamping nut threaded onto the arbor. The invention aims to overcome some of the disadvantages of prior tools of this class, and among its aims are (1) to simplify the construction by the elimination of certain parts heretofore employed, (2) to reduce the cost of manufacture, (3) to reduce the cost of replacing the abrading elements from time to time, (4) to secure the abrading elements to the hub without the use of parts other than a simple, one-piece hub, (5) to render the application of the abrading elements to and their removal from the hub rapid and convenient, and (6) to increase the durability of the abrading elements. Other aims and advantages will appear during the course of the following description or will be apparent to those skilled in the art.

The invention will best be understood by reference to the following description when taken in connection with the accompanying drawings of one specific embodiment thereof while its scope will be pointed out more particularly in the appended claims.

In the drawings:

Fig. 1 is an elevation of an assembly of a hub and a series of abrading elements to be associated with other like assemblies on an arbor;

Fig. 2 is an elevation of the assembly as viewed from the right hand side of Fig. 1;

Fig. 3 is an elevation of a portion of the assembly before it reaches its final, assembled form;

Fig. 4 is a sectional view on line 4—4 of Fig. 3;

Fig. 5 is a plan of the hub and one abrading element, illustrating the first step in assembling the latter with the former;

Fig. 6 is a similar plan of the hub and the abrading element, illustrating the second step in assembling the latter with the former;

Fig. 7 is an elevation similar to Fig. 3, showing a modification of the abrading element;

Fig. 8 is an elevation of a plurality of plies of bias-cut strips of woven cloth superposed in readiness for folding to produce an abrading element.

Fig. 9 is an elevation of the superposed plies as they appear after being folded along lines A—A of Fig. 8;

Fig. 10 is an elevation of the superposed plies as they appear after being folded along line B—B of Fig. 8, and after being slotted, and button-holed to prepare them for attachment to the hub;

Fig. 11 is an elevation on an enlarged scale of the superposed, folded, and button-holed plies stitched together and with their upper corners trimmed;

Fig. 12 is an elevation like Fig. 11 but showing the lower corners likewise trimmed; and

Fig. 13 is a bottom plan of the completed abrading element ready for attachment to the hub.

Referring to the drawings and to the embodiment of the invention illustrated therein by way of example, there is shown in Fig. 8 a plurality of plies of bias-cut strips 11 (herein three strips) of woven cloth superposed in readiness for folding to produce one of a series of abrading elements. The three pieces 11 are, in practice, cut from a strip of indefinite length and composed of bias-cut strips sewed together at intervals along lines oblique to the longitudinal edges as at 13. These bias-cut strips are employed in order to produce a substantially non-fray working surface.

The first step is to fold the ends 15, 15 of the three plies inwardly toward each other along the two parallel lines A—A in Fig. 8. The composite folded strip now appears as in Fig. 9, whereupon the composite strip is again folded along the line B—B in Fig. 9, and thus produces a relatively smaller, rectangular shape for an abrading body 17 as in Fig. 9.

The next step is to prepare this body for attachment to a hub, to cut the plies to form a slot 19, and preferably to "button-hole" stitch the slot as at 21 to increase the durability of the slots. The next step is to fold the abrading body along the line C—C in Fig. 10, across the slot 19 and to maintain this folded condition as by a few stitches 23 preferably obliquely disposed as shown (see Fig. 11). The next step is to trip the upper corners as at 25 obliquely and preferably along arcs struck from a center in the slot 19. Next, the two lower corners are similarly trimmed as at 27 (see Fig. 13), and finally, the completed abrading element is flattened (see Fig. 13) along the bottom.

The mounting for the abrading elements is in the nature of a hub 29 (see Fig. 3) having a central aperture 30 to receive a usual arbor, now shown, on which several of the assemblies will be mounted coaxially between usual clamping plates and forced axially together by a usual nut, not shown, threaded onto the arbor. The hub is a single plate or disk (see Fig. 4) which I prefer to make of metal such as aluminum because of its light weight and ample strength for the purpose, although it is possible that other materials might be employed.

This single plate 29 is provided with generally radial T-shaped lugs 31, each of which comprises a neck 33 and a head 35 having two oppositely extending projections 37, all of which are within the two planes which define opposite faces 39 of

the plate. As herein shown, the necks 33 project from a cylindrical peripheral surface 41 and the under sides 43 of the projections 35 are parallel with the peripheral surface. This shape gives to the projection a desirable hook-like characteristic. As shown in Figs. 4, 5 and 6 the necks 33 are twisted so that the heads 35 are angularly disposed.

Attachment of an abrading element 17 to a lug 31 of the hub 29 is quickly and conveniently accomplished (compare Figs. 5 and 6) by first aligning the slot 19 with the elongated head 35, then passing the head through the slot while moving the abrading element radially inward until the slot is about the neck 33, and finally turning the abrading element into the position shown in Fig. 6, in which the slot 19 is angularly related to the elongated head 35. The abrading element is now securely interlocked with the hub and without the employment of any additional part. The assembly appears as in Fig. 1 and may be combined with other like assemblies coaxially on an arbor. During this assembling onto the arbor, the stitches 23 keep the sides of the abrading elements together (see Fig. 4) and facilitate the work of assembling.

Owing to the size and shape of the abrading elements, they will at first overlap one another as shown in Fig. 3. However, they assume the fluted or corrugated form shown in Figs. 1 and 2 when they are crowded together in working position so that thicknesses of the cloth at the working surface are presented crosswise of the direction of travel of the surface.

In the modification shown in Fig. 7, the abrading elements 45 do not have their corners trimmed, but to avoid undue interference at their lower corners they are narrowed by folding along lines 47 and 49 and the folds retained as by a string 51 passed through the folds and knotted. These strings may be removed after the assemblies have been placed face to face on the arbor.

Having described two embodiments of the invention, what I claim and desire by Letters Patent to secure is:

1. In an abrading tool, the combination of a hub consisting of a single plate provided with a series of generally radial T-shaped lugs, and a series of abrading elements about said hub and having axially extending slots interlocked with and attachable to said lugs, respectively, and detachable from said hub by rotative movement about axes generally radial with respect to the axis of rotation of said hub.

2. In an abrading tool, the combination of a hub, and a series of abrading elements about said hub, said hub and said abrading elements having cooperative interlocking means providing for unlocking by rotative movement of said elements about generally radial axes, said means consisting of a single set of lugs carried by said hub and a corresponding number of slots in which said lugs are received, said slots being normally disposed transversely of said lugs.

3. In an abrading tool, the combination of a hub, presenting a single series of generally radial lugs, each lug comprising a one-piece neck and a head elongated transversely of the axis of rotation of the hub, and a series of abrading elements provided, respectively, with slots about said necks, said slots extending lengthwise of the axis of rotation of said hub and being shorter than said elongated heads, respectively.

4. In an abrading tool, the combination of a hub consisting of a single, centrally apertured plate presenting a marginal series of T-shaped lugs each having a neck and a circumferentially elongated head having oppositely extending projections overhanging said neck, and a series of flexible abrading elements carried by said lugs, respectively, each abrading element being provided with a slot which receives the neck of the associated lug, said slot extending transversely of the longest dimension of the head of such lug and being shorter than said head.

5. As a new article of manufacture, an abrading element for attachment to a hub, said element comprising one or more bias-cut generally rectangular elongated strips of woven cloth folded transversely of the longitudinal edges thereof into generally rectangular form to produce superposed plies and having a slot extending lengthwise of the folds and through said plies.

6. As a new article of manufacture, an abrading element for attachment to a hub, said element comprising one or more bias-cut, generally rectangular elongated strips of woven cloth folded transversely of the longitudinal edges thereof into the form of a rectangle and having a slot extending lengthwise of the folds and through said plies, the corners of the rectangle to produce superposed plies being trimmed obliquely.

7. As a new article of manufacture, an abrading element comprising a generally rectangular, elongated flexible sheet having transverse folds producing plies provided with a slot through said plies.

8. As a new article of manufacture, an abrading element comprising a generally rectangular, flexible sheet provided with a slot, folded across said slot, and having two edges brought together and secured to each other.

9. As a new article of manufacture, an abrading wheel hub consisting of a single disk provided with a single series of generally radial lugs, each consisting of a neck and a head which is elongated transversely of the axis of rotation of the hub.

10. As a new article of manufacture, an abrading wheel hub consisting of a single disk provided with a single series of generally radial lugs, each consisting of a neck and a head and having oppositely disposed hook-like projections which overhang said neck.

11. In an abrading tool, the combination of a hub and a series of abrading elements about said hub and mounted to turn about axes generally radial with respect to the axis of rotation of said hub, said hub and said elements having means in one angular position interlocked and preventing withdrawal of said elements in radial directions and in another angular position unlocked and free to permit withdrawal of said elements in radial directions.

12. In an abrading tool, the combination of a hub and a series of abrading elements about said hub and mounted to turn about axes generally radial with respect to the axis of rotation of said hub, said hub and said elements having means in one angular position interlocked and preventing withdrawal of said elements in radial directions and in another angular position unlocked and free to permit withdrawal of said elements in radial directions, said means including a member and an opening normally out of register and which when registered will pass one through the other.

ELISHA W. HALL.

CERTIFICATE OF CORRECTION.

Patent No. 2,290,236. July 21, 1942.

ELISHA W. HALL.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, first column, line 52, claim 1, for "and attachable to said lugs, respectively, and" read --said lugs, respectively, and attachable to and--; and second column, lines 42 and 48, claims 9 and 10 respectively, for "a neck and a head" read --a single neck and a single head--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 29th day of September, A. D. 1942.

(Seal)

Henry Van Arsdale,
Acting Commissioner of Patents.