

July 5, 1949.

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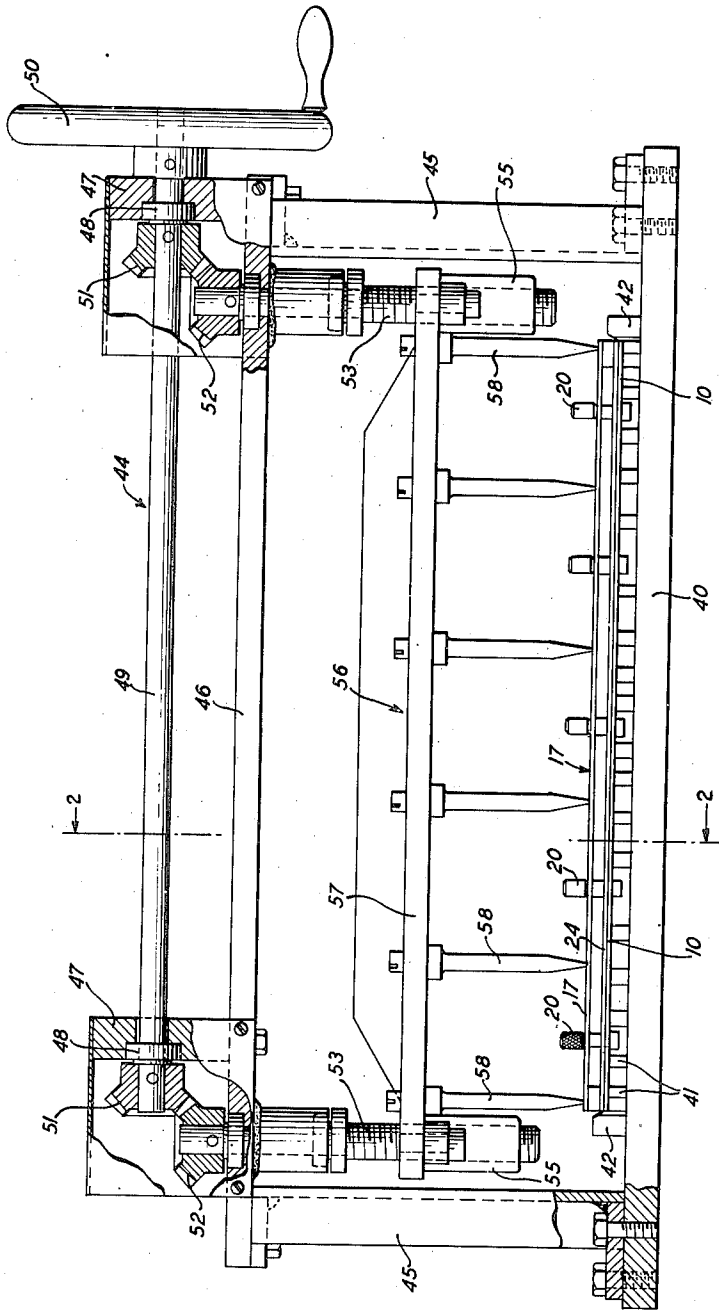
2,475,434

APPARATUS FOR MASKING ARTICLES

Filed June 20, 1944

3 Sheets-Sheet 1

FIG. 1



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FIG. 2

FIG. 9

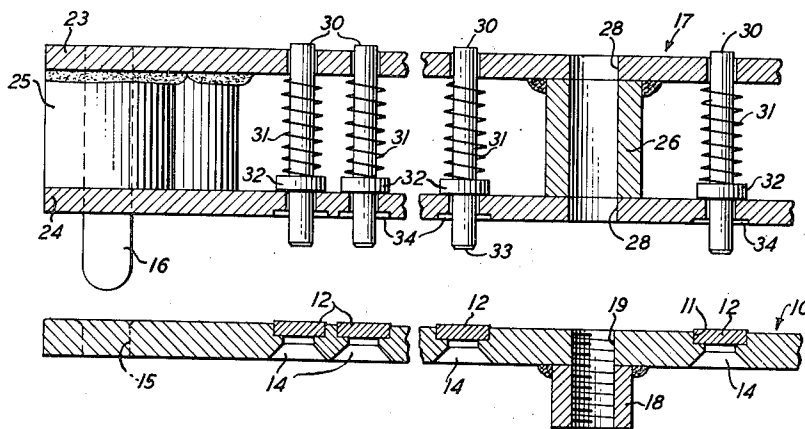
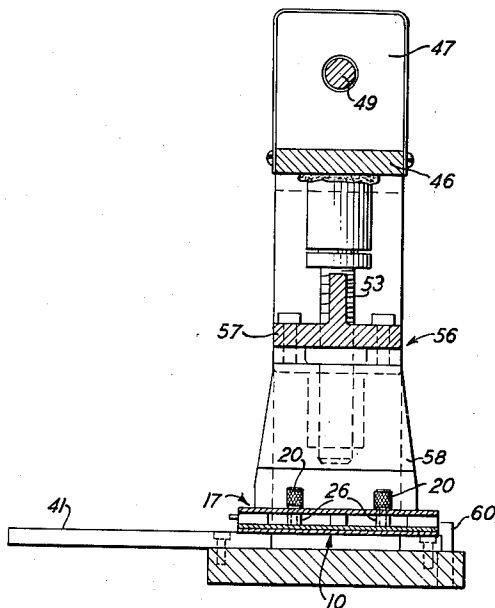
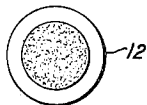


FIG. 7

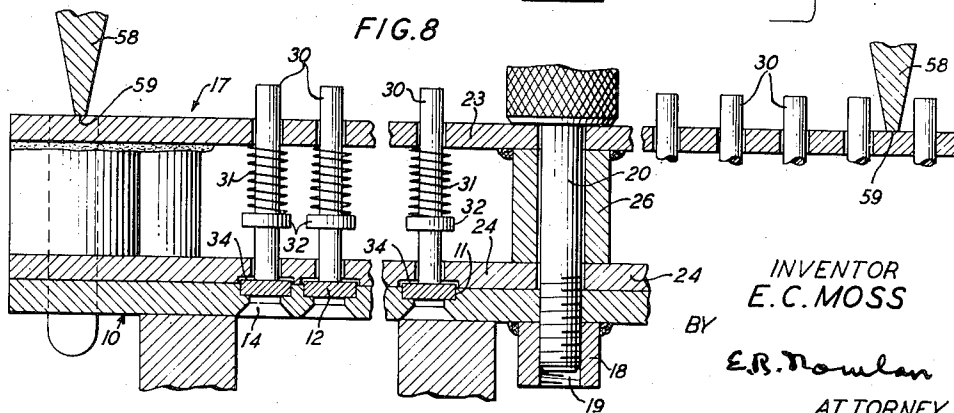


FIG. 8

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FIG. 3

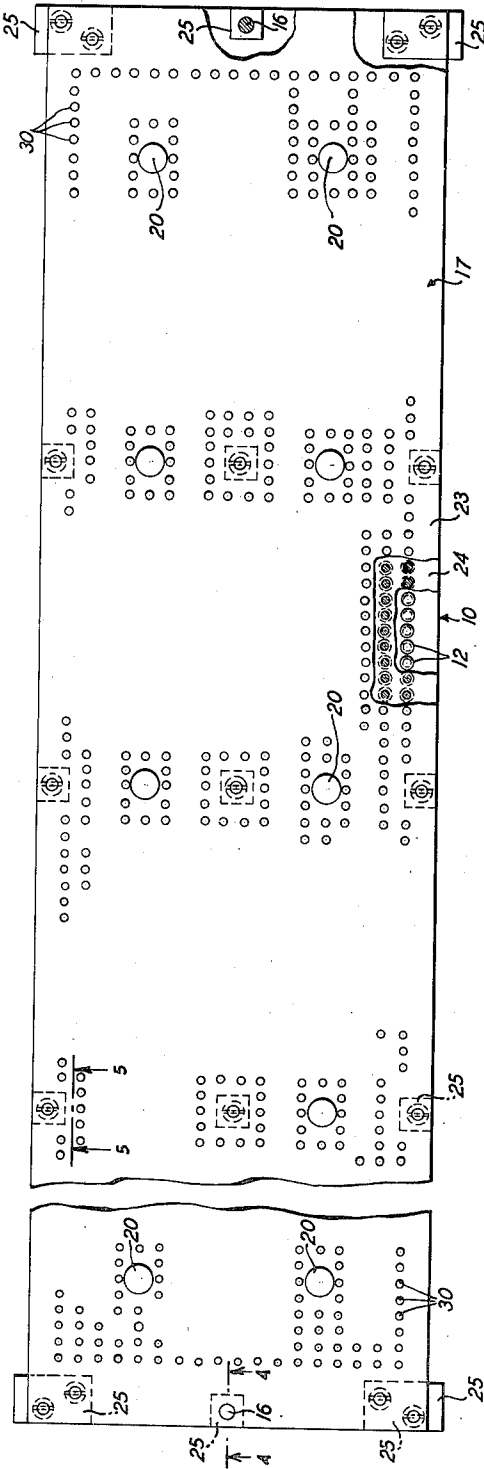


FIG. 4

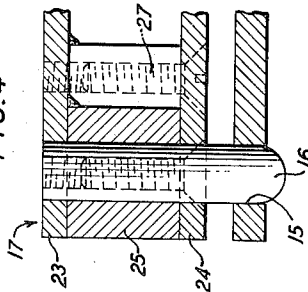


FIG. 5

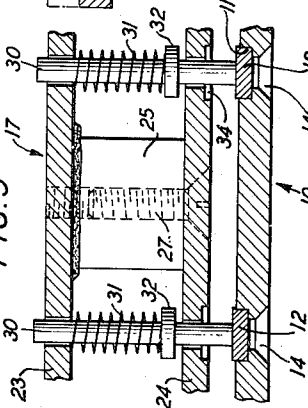
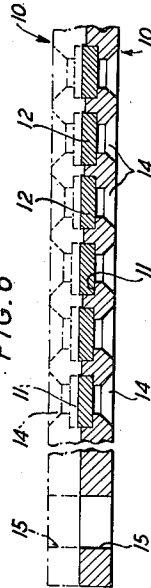


FIG. 6



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2,475,434

APPARATUS FOR MASKING ARTICLES

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Application June 20, 1944, Serial No. 541,211

4 Claims. (Cl. 101-114)

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This invention relates to an apparatus for masking articles, more particularly copper varistor discs.

In the manufacture of certain electrical units for use in the art of telephony, including copper oxide or varistor discs, such articles or discs vary in size depending upon the units in which they are to be disposed. Some of these articles are as small as three-sixteenths of an inch ($\frac{3}{16}$ "') in diameter, and in the present embodiment it is required that approximately sixty per cent (60%) of the faces of the discs, excluding the areas adjacent the peripheries thereof, be coated with a precious metal.

An object of the invention is to provide an apparatus which is simple in structure and readily actuable for conditioning a multiplicity of articles for treatment.

With this object in view, the invention comprises an apparatus for concealing all parts of a multiplicity of articles excepting those to be treated, whereby a coating from the exposed portions of the articles may be removed, and the cleaned portions of the articles coated.

Other objects and advantages will be apparent from the following detailed description when considered in conjunction with the accompanying drawings, wherein

Fig. 1 is a front elevational view of the apparatus including the assembling unit, the holding unit and the mask;

Fig. 2 is a vertical sectional view taken along the line 2-2 of Fig. 1;

Fig. 3 is a fragmentary top plan view of the holding unit and the mask;

Fig. 4 is an enlarged fragmentary sectional view taken along the line 4-4 of Fig. 3;

Fig. 5 is an enlarged fragmentary sectional view taken along the line 5-5 of Fig. 3;

Fig. 6 is an enlarged fragmentary sectional view of two masks, one shown in section in solid lines with the articles or discs therein, the other shown in dot and dash lines;

Fig. 7 is a fragmentary sectional view of both the holding unit and the mask in readiness for assembly;

Fig. 8 is a fragmentary sectional view of a portion of the structure shown in Fig. 7 in assembled positions; and

Fig. 9 is an enlarged top plan view of one of the articles or discs resulting from the method.

Referring now to the drawings, attention is first directed to the mask indicated generally at 10 and composed of a metal plate rectangular in general contour and having a multiplicity of ar-

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ticle receiving apertures 11. In the present embodiment there are one thousand five hundred and twenty-seven (1,527) of these apertures, of a given size adapted to receive articles 12 which are to be treated. As previously stated, the articles 12 are copper oxide discs, the oxide coatings of which are to be removed from portions of each side or face thereof, making it necessary for the other portions to be covered or protected against such treatments. Adjacent each of the apertures 11 are tapered portions or apertures 14 so that access may be gained to the particular portion of each article to be treated. A locating aperture 15 is disposed in the mask 10 adjacent each end thereof, to receive locating pins 16 of the holding unit indicated generally at 17. Furthermore, at suitably spaced positions threaded sleeves 18 are secured to the under surface of the mask 10 adjacent threaded apertures 19, to receive retaining screws 20 which are included as parts of the holding unit 17.

The holding unit 17 includes spaced parallel plates 23 and 24 secured at their spaced positions by intermediate members 25 and 26. In certain of the intermediate members 25, all of which are welded to the plate 23, the locating pins 16 are mounted, while through others, screws 27 extend to removably secure the plate 24 thereto. The intermediate members 26 are tubular in general contour and are disposed in alignment with apertures 28 in the plates 23 and 24 to provide portions to receive the holding screws 20. The unit 17 is provided with a multiplicity of plungers 30 equal in number and positioned to be aligned with the article receiving apertures 11 in the mask 10. The plungers 30 are normally urged downwardly through the aid of their individual springs 31, to apply a given pressure such as twelve (12) ounces to their individual articles when in the positions shown in Fig. 8. Collars 32, carried by the plungers 30, limit the downward movements thereof and assure positioning art article engaging ends 33 in a common plane parallel with the plates 23 and 24. The plate 24 is recessed, at 34, adjacent the apertures therein for the plungers 30 to receive the portions of the articles or discs 12 which are not completely embedded in the apertures 11 of the mask.

It is important that the unit 17 be disposed upon the mask 10 when the latter is filled with the articles or discs 12, so that both the unit and the mask will be parallel with each other, and that uniform pressures will be applied to all of the discs through their spring pressed plungers 30. To accomplish this result the unit illus-

trated in Figs. 1, 2 and 8 is employed. This unit includes a table 40 having a plurality of parallel equally spaced rails 41 thereon disposed between guides 42 upon which the mask 10 with the discs 12 may be disposed, after which the unit 17 may be disposed thereon and forced uniformly downwardly.

Considering further the structure of the unit which may be identified generally by reference numeral 44, uprights 45, mounted upon the base or table 40, support a transverse member 46 which is fixed to the upper ends of the uprights. Brackets 47, mounted upon the transverse member 46, include bearings 48 for rotatably supporting a shaft 49, the latter being manually actuable in reverse directions through the aid of a hand wheel 50. Bevelled gears 51 are mounted upon the shaft 49 adjacent the ends thereof for interengagement with companion bevelled gears 52. The bevelled gears 52 are fixed to the upper ends of threaded shafts 53 which extend downwardly into threaded bushings 55 of a clamping element indicated generally at 56. The element 56 includes a lateral member 57 supporting engaging members 58 which are of the contours illustrated particularly in Figs. 1 and 2. The members 58 have their lower engaging edges 59 (Fig. 8) disposed in a common plane parallel with the upper surfaces of the rails 41 and are adapted to engage the unit 17 for almost the full width thereof.

Upon considering now the operation of the apparatus for treating the material or articles, namely the discs 12, one of the masks 10 is loaded with the articles and the unit 17 placed upon the loaded mask as illustrated in Figs. 4 and 5. The unit 17 is properly located upon the mask through the aid of the locating pins 16 to cause the plungers 30 to rest upon their respective articles concentric therewith. This assembly is then placed upon the rails 41 (Figs. 1 and 2) and moved inwardly between the guides 42 until it engages a stop 60. The pressure applying members 58 are normally in their upward position and may be moved downwardly simultaneously and uniformly through actuation of the hand wheel 50 to rotate the shaft 49. Rotation of the shaft 49 in a given direction will cause simultaneous rotation of the threaded shafts 53 to move the element 56 downwardly to cause the members 58 to simultaneously engage the plate 23 of the unit 17. Continued downward movement of the members 58 will cause the unit 17 to be moved downwardly until the plate 24 thereof engages the mask 10. During this movement the springs 31 of the plungers 30 are compressed to cause application of like pressures to each of the articles or discs 12. The thumb screws 20 are then disposed in place and turned until they meet the plate 23, after which they are loosened one-half turn so that a known like pressure will be retained upon the articles through their spring pressed plungers.

The elements 58 are raised by the rotation of the shaft 59 in the reverse direction, the removal of the assembly from the unit 44, and the placing of the assembly in a sandblasting machine (not shown), with the face, including the countersunk or tapered apertures 15, upwardly or in a position for sandblasting of the articles through the apertures. The sandblast is then applied to the assembly, particularly to the exposed portions of the articles or discs, removing the oxidized coating from the exposed surfaces and leaving a

margin thereon which is covered by the portion of the mask adjacent the aperture.

The assembly is removed from the sandblasting machine and placed in an oxidizing drum or structure capable, through an electrolytic process, of coating the exposed and sandblasted portions of the article with a suitable material, preferably gold.

The assembly is subsequently placed within the unit 44, where pressure is applied to the unit 17 through the aid of the members 58, and removed from the thumb screws 20 so that they may be removed. The unit 17 and the mask are then removed from the unit 44, after which the unit 17 is carefully removed from the mask. A like mask, as illustrated in dot and dash lines in Fig. 6, is then placed upon the original loaded mask, the articles or discs assisted in the accurate matching of the two masks, after which the closely positioned masks are inverted to cause the discs of the original mask to drop into the recesses or apertures 11 of the second mask. The unit 17 is then placed upon the newly loaded mask, which includes the articles or discs in the reverse positions from those originally assembled in the first mask, after which the same steps are followed for the sandblasting and coating of the then oxidized sides or surfaces of the articles. In other words, the unit 17 is disposed upon the loaded mask as illustrated in Figs. 4 and 5, after which they are disposed upon the rails 41 of the unit 44 and moved to the position controlled by the guides 42 and the stop 60. Pressure is then applied to the unit 17 to move it into engagement with the loaded mask, after which the thumb screws are disposed in place, the members 58 removed therefrom, and the assembly then placed in the sandblasting machine for the sandblasting of the exposed surfaces of the articles, followed by the coating of the exposed sandblasted surfaces.

Through the aid of the mask and the unit 17, the articles are completely surrounded except those portions to be treated, and the desired pressure is applied uniformly to all of the articles to hold them firmly against displacement in their apertures to assure against possible leakage during the sandblasting step or the coating step, and to further assure the holding of the articles in their apertures or recesses during the removal of the unit 17 from the mask.

Although specific improvements of the invention have been shown and described, it will be understood that they are but illustrative and that various modifications may be made therein without departing from the scope and spirit of this invention as defined by the appended claims.

What is claimed is:

1. An apparatus for use in treating articles comprising a mask having like apertures therein formed with recess portions adjacent one surface of the mask to receive and support articles disposed therein and cover the sides and portions of the faces of the articles from exposure through the apertures from the other surface of the mask, a sealing unit having a cover recessed to engage the mask with its recesses extending over the backs of the articles and apertures opening into the recesses of the cover, spring pressed plungers extending through the apertures in the sealing unit to engage the backs of their respective articles, and an assembling unit to force the sealing unit with the plungers engaging the backs of their articles to compress their springs until the cover is in intimate engagement with the mask with the recesses of the cover and the plungers

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surrounding the backs and portions of the sides of the articles, the forces of the spring pressed plungers causing sealing of the unexposed portions of the faces of the articles in the recesses of the mask.

2. An apparatus for use in treating articles comprising a mask having like apertures therein formed with recess portions adjacent one surface of the mask to receive and support articles disposed therein and cover the sides and portions of the faces of the articles from exposure through the apertures from the other surface of the mask, a sealing unit having a cover recessed to engage the mask with its recesses extending over the backs of the articles and apertures opening into the recesses of the cover, spring pressed plungers extending through the apertures in the sealing unit to engage the backs of their respective articles, an assembling unit to force the sealing unit with the plungers engaging the backs of their articles to compress their springs until the cover is in intimate engagement with the mask with the recesses of the cover and the plungers surrounding the backs and portions of the sides of the articles, the forces of the spring pressed plungers causing sealing of the unexposed portions of the faces of the articles in the recesses of the mask, and means actuable to secure the sealing unit to the mask while the springs of the plungers are compressed by the assembling unit.

3. An apparatus for use in treating articles comprising a mask having like apertures therein formed with recess portions adjacent one surface of the mask to receive and support articles disposed therein and cover the sides and portions of the faces of the articles from exposure through the apertures from the other surface of the mask, a sealing unit having a cover recessed to engage the mask with its recesses extending over the backs of the articles and apertures opening into the recesses of the cover, spring pressed plungers extending through the apertures in the sealing unit to engage the backs of their respective articles, an assembling unit comprising a support for the mask and sealing unit, a movable element spaced from the support and having members to engage the sealing unit at spaced positions, and means to move the element with its members toward the support to force the sealing unit with its plungers engaging the backs of their articles

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to compress their springs until the cover is in intimate engagement with the mask with the recesses of the cover and the plungers surrounding the backs and portions of the sides of the articles, the forces of the spring pressed plunger causing sealing of the unexposed portions of the faces of the articles in the recesses of the mask.

4. An apparatus for use in treating articles comprising a mask having like apertures therein formed with recess portions adjacent one surface of the mask to receive and support articles disposed therein and cover the sides and portions of the faces of the articles from exposure through the apertures from the other surface of the mask, a sealing unit having a cover recessed to engage the mask with its recesses extending over the backs of the articles and apertures opening into the recesses of the cover, spring pressed plungers extending through the apertures in the sealing unit to engage the backs of their respective articles, an assembling unit comprising a support for the mask and sealing unit, a movable element spaced from the support and having members to engage the sealing unit at spaced positions, threaded shafts operatively connected to spaced portions of the element, and means to drive the shafts in synchronism, one with the other, to force the sealing unit into intimate engagement with the mask compressing the springs of the plungers whereby the unexposed portions of the faces of the articles are sealed in the recesses of the mask.

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