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(54) **Improvements in and to aluminium discs for the manufacture of metal containers by impact extrusion.**

(57) Improvements in and to aluminium discs for the manufacture of metal containers by impact extrusion, which improvements are achieved by increasing the free surface of the faces of the discs, without varying their diameter, by means of a relief formed thereon, which is obtained by engraving or embossing the plane surfaces of an aluminium band, the said band being then subjected to a cutting operation for obtaining the said discs.

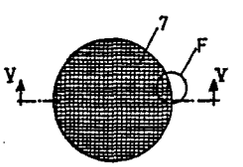

FIG. 3

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IMPROVEMENTS IN AND TO ALUMINIUM DISCS FOR THE MANUFACTURE OF METAL CONTAINERS BY IMPACT EXTRUSION

In the manufacture of aluminium containers intended to be used for cosmetics, pharmaceutical products, dentifrices, bottles, and the like, as a raw material there are utilized discs, pastilles or rings made of metal, especially aluminium, and having various diameters and thicknesses.

The manufacturer of such containers has to perform, in order to achieve the finished product, a series of operations, some of which are complex and laborious, if he desires to obtain a perfect and high quality product.

Among the successive operations which have to be carried out, the first of them is considered to be the most important, since depending on its conditions and characteristiques are the remaining operations, as well as the quality of the finished product.

Said first operation consists in the lubrication of the disc, pastille or ring from which the container is obtained. This lubrication should be carried out on both faces of the disc and in many occasions it creates quality problems giving rise to the rejection of a large number of

discs or pastilles, which results in a reduction of the productivity and accordingly determines a raise of the price of the product.

Various are the types of lubricants which the manufacturers of this type of containers have tried and used in order to improve the quality and the aspect of the container, especially in case of containers having a large length.

All the types of lubricants utilized are solid, in the form of very fine powder, the operation of lubricating the discs, pastilles or rings being carried out as follows: into rotatable cylindrical or polygonal metal containers, referred to as drums, there are introduced normally 75 kilograms of discs or pastilles, depending in any case on the drum. Thereafter, the solid powdery lubricant is introduced, in a well distributed condition, into the drum, causing the drum to rotate during 10 or 15 minutes, until a perfect lubrication of the discs on both faces is obtained.

To attain the object of a good adherence of the lubricant it is absolutely necessary for the discs to have both faces wrinkled, free from brilliancy and fineness. To obtain this, the discs are subjected, prior to the lubrication step, to a dry tumbling operation. To this end, the discs are introduced into a drum, similar to the lubrication drum, which is kept rotating for 25 or 30 minutes. During this rotation, the discs contained in the drum, in a number which may vary between 3,000 and 40,000, are made to rotated within the said drum, thereby producing a rubbing and friction with each other, giving rise to the disappearance of the brillancy and fineness of the surface, which

Obtains a rough and wrinkled finish. During this operation, owing to the rubbing between the discs, a detachment of fine Al_2O_3 is produced, which powder has to be evacuated by suction during the process.

The system described is used at present time by the manufacturers in the whole world, but it has some disadvantages, among which the following may be cited:

As said before, the Al_2O_3 detached during the tumbling is evacuated during the process. However, it is really impossible to obtain a 100% elimination of this powder, because, as is well known, the Al_2O_3 is very abrasive product. The residue of powder which remains on the surface of the discs, when these latter are lubricated by the manufacturer of the containers, produces a mixture of powder and lubricant which give rise to a highly abrasive paste owing to the hardness of the Al_2O_3 powder.

This emery paste formed is deleterious for the following reasons:

1. It rifles the matrixes and the punches of the press.
2. It renders it necessary to replace the matrixes and the punches more frequently for cleaning and burnishing them.
3. After having carried out many times the cleaning and burnishing operation the elements are worn to such an extent as to be rejected for having come out from the tolerances.
4. Rifled as well are the walls of the manufactured tins or containers,

giving rise to visible defects which causes their rejection after thre litography.

On the other hand, the said defects and riflings are originated also by other reasons, because the extrusion of a tin with a dirthy lubricant or with a lubricant mixed with any kind of powder is as prejudicial as the dry extrusion or the extrusion with an insufficient quantity of lubricant.

In case of defective or insufficiently lubricated discs, it would be necessary to immediately increse the dose of lubricant. However, the quantity of lubricant permitted for the discs has a limit, because the surface of the discs can be lubricated to such an extent as to cover them completely on both sides, but not more.

If we eincrease the quantity of lubricant introduced into the drum, as soon as the surfaces of all the discs have been completely lubricated, , any excess of lubricant would remain deposited on the bottom of the drum.

The object of the present invention is to avoid the above disadvantages, thus allowing to obtain discs, pastilles or rings in which, without increasing their diameter, a larger surface of lubrication is obtained, thereby allowing the discs to carry a larger quantity of lubricant.

The invention allows increasing the lubrication surface of the discs till obtaining a doubling thereof, maintaining , as said previously, the same dimensions of the discs.

According to the present invention, the free surface of the faces of the discs are increased, without increasing the dimensions of this latter, as already

pointed out previously, by forming a relief on the said surfaces, obtained by incision or by embossing the plane surfaces of an aluminium band which is successively subjected to the cutting operation for obtaining said discs.

The incision of the said aluminium band is achieved by passing the said band, after it has been laminated to its final thickness, between two rollers having lateral surfaces engraved with the impressions aimed to be produced on the band. The spacing between these rollers will be variable at will, to allow adjusting the pressure exerted onto the band and thus also the depth of the impressions.

According to an embodiment, the engraving of the aluminium band may be carried out on the band lamination line, in whose outlet the engraved rollers are to be mounted. In the same way, the engraving operation can be carried out on the cutting line, before whose inlet there are mounted the ingraved rollers.

The said rollers may be provided with two series of ribs perpendicular to one another, the ribs of one of them extending in a longitudinal direction and those of the other series extending in a peripheral direction, the said ribs having an angular cross-section so as to form in the two surfaces of the band and the discs, after they have been cut, an infinite number of aligned quadrangular pyramidal reliefs.

The preparation of the discs in the form described hereinabove allows omitting the tumbling operation, it being thus possible to avoid the corresponding plant. On the other end, the capacity of lubricating the discs is considerably increased, which allows increasing

the disc extrusion speed. All these advantages provide a great reduction of the production costs and the achievement of a remarkable amelioration of the quality in the manufacture of the containers.

The invention is especially important in the manufacture of containers from convex or conical discs, the use of which is becoming more and more frequent. In this case, the concave surface of the disc cannot be completely tumbled by the conventional systems, because it is impossible to obtain the rubbing between the discs which have reached the said concave zones. Wit the system according to the invention, thia peoblem is avoided because the discs are engraved on their two surfaces, whatever configuration they may have.

The characteristics described hereinabove will be better understood when reading the following description made with reference to the annexed drawings in which a possible embodiment is shown by way of a non limiting example.

In the drawings:

Figure 1 is diagrammatic perspective view of a rolling mill for cold-rolling a band, with the engraving rollers incorporated therein.

Figure 2 shows a cutting line for the band, into which the engraving rollers have been included.

Figure 3 is a plan view of a disc obtained according to the invention.

Figure 4 corresponds, in an enlarged view, to the detail F of Fig. 3.

Figure 5 is a sectional view along the line V-V of Figure 3.

Figure 6 corresponds, in an enlarge view, to the

detail H of Fig. 5.

Figure 1 is a perspective view of a rolling mill, to which an aluminium band 1, coming from the bobbin 2, is supplied for being laminated to the desired thickness. At the outlet of the rolling mill the band 1' passes between two rollers 3, whose surface is engraved with the impression which is desired to be provided on the said band. The rollers 3 can be apread apart from or approached to one another at will in order to vary the pressure exerted onto the band 1'. At the outlet of the rollers 3 the band results in being engraved on its two faces with the desired impression.

In the case of the Fig. 2, the engraved rollers 3 are mounted in a entrainer 5 for the already laminated band 1. As in the previous case, the pressure of the rollers 3 can be adjusted in order to obtain a band 4 engraved on its two surfaces. This band passes successively through a press 6 for cutting the discs.

The discs obtained according to the invention are shown in Figures from 3 to 5.

As can be seen, the discs 7 are provided on their two surfaces with a relief 8, Fig. 6, defined by two series of crossed channels which define intermediate quadrangular pyramides 9, duly alligned. Accordingly, the engraved rollers are provided on their lateral surfaces with two series of perpendicular channels, those of a series extending along the generatrixes and those of the other series extending in the peripheral direction, which are of angular cross-section.

Aith this system there is obtained an increase of the lubrication surface of the discs 7 till it is doubled.

Having sufficiently described the nature of the

invention, as well as the manner of its realization in the practice; it is to be pointed out that the arrangements described hereinabove are susceptible of modifications of their details, without altering the fundamental principles of the invention.

C L A I M S

1.- Improvements in and to aluminium disc. for the manufacture of metal containers by impact extrusion, characterized in that, without varying the diameter of the discs, the free surface of their faces is increased by forming a relief thereon, obtained by incision or by embossing of the plane surfaces of an aluminium band which is successively subjected to a cutting operation for obtaining the said discs.

2.- Improvements according to Claim 1, characterized in that the engraving of the aluminium band is achieved by passing the said band, laminated to its desired final thickness, between two rollers having surfaces which are engraved with the impression desired for the band, the distance between the said rollers being variable at will in order to be have the possibility to adjust the depth of the said impressions.

3.- Improvements according to Claim 2, characterized in that the engraving of the aluminium band is carried out on a rolling line for rolling the said band, in the outlet of which there are mounted the said engraving rollers.

4.- Improvements according to Claim 2, characterized

in that the engraving of the aluminium band is carried out on the cutting line for cutting the band, before whose inlet there are to be disposed the engraving rollers.

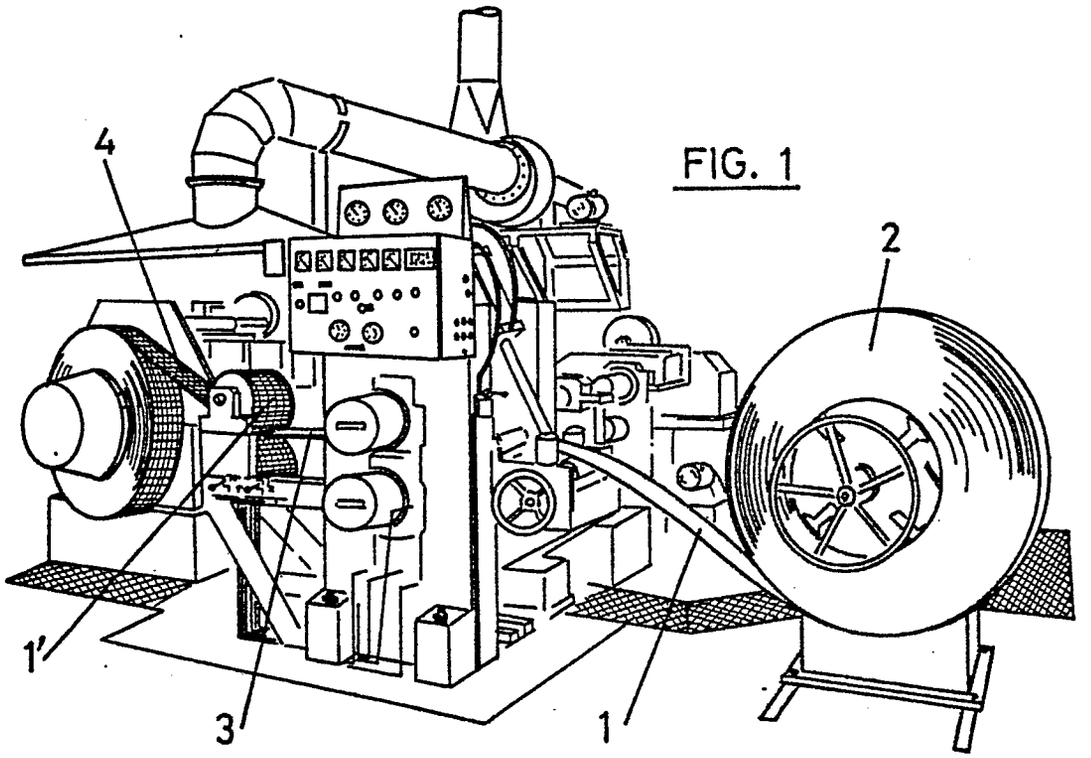


FIG. 1

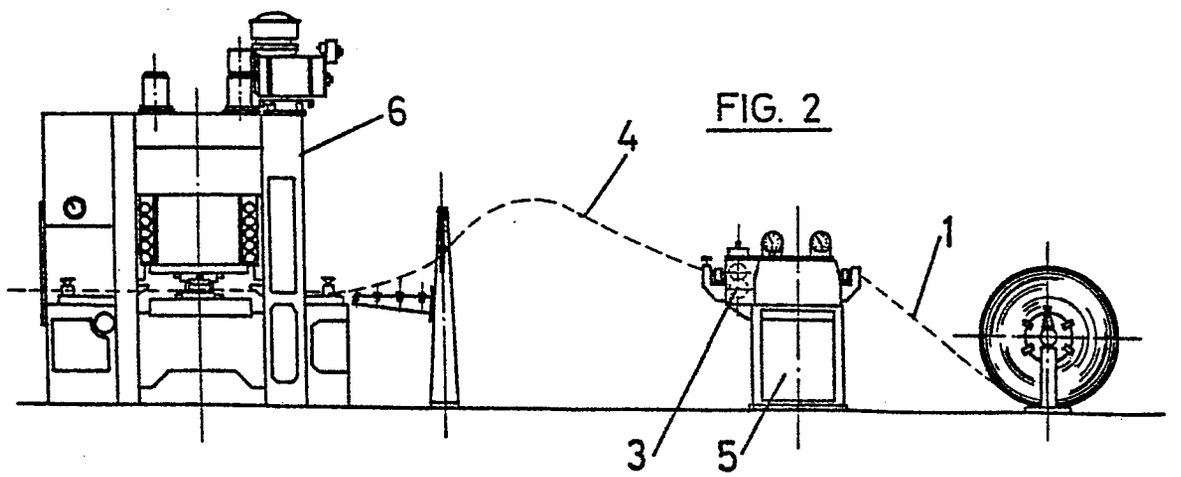


FIG. 2

FIG. 5

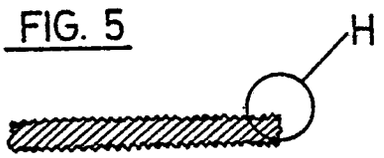
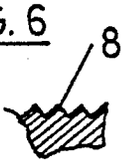


FIG. 6



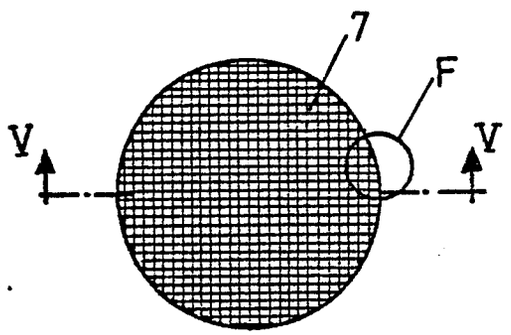


FIG. 3

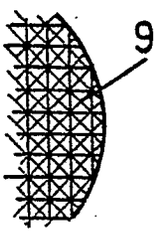


FIG. 4

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EUROPEAN SEARCH REPORT

0111624

Application number

EP 83106088.4

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
X	EP - A1 - 0 035 718 (VEREINIGTE METALLWERKE) * Page 6, lines 9-33; claims 5,6; fig. 1,2 *	1-3	B 21 D 17/04 B 21 D 22/20
A	GB - A - 18 668/A.D. 1910 (VICTOR CHARTENER) * Totality; fig. 1,2 *	1,3	
A	US - A - 2 969 586 (JOHN H. VICTOR) * Column 1, lines 30-32; claims 1-3; fig. 4-11 *	2	
A	DE - B - 1 063 105 (HOESCH) * Page 1, lines 35-48; claim 1; fig. 1,2 *	2	TECHNICAL FIELDS SEARCHED (Int. Cl. ³) B 21 B 1/00 B 21 B 27/00 B 21 D 17/00 B 21 D 22/00 B 21 D 35/00 B 21 D 37/00
A	DE - A1 - 2 349 074 (SAG) * Claims 1,4; fig. 1 *	2,3	
A	US - A - 1 074 824 (FRANK L.O.) * Totality *	2,3	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
VIENNA	23-02-1984	DRNOWITZ

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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