

Nov. 26, 1968

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3,412,524

APPARATUS FOR PACKING A NUMBER OF OBJECTS ARRANGED UPON EACH
OTHER AND FORMING A SUBSTANTIALLY CYLINDRICAL STACK

Filed Nov. 1, 1965

4 Sheets-Sheet 1

Fig.1

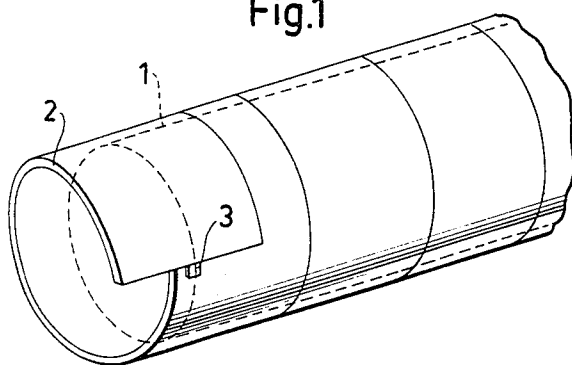
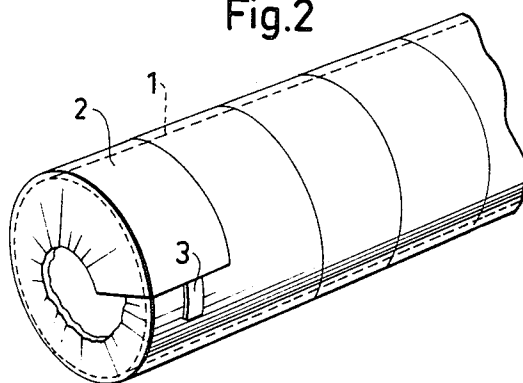


Fig.2



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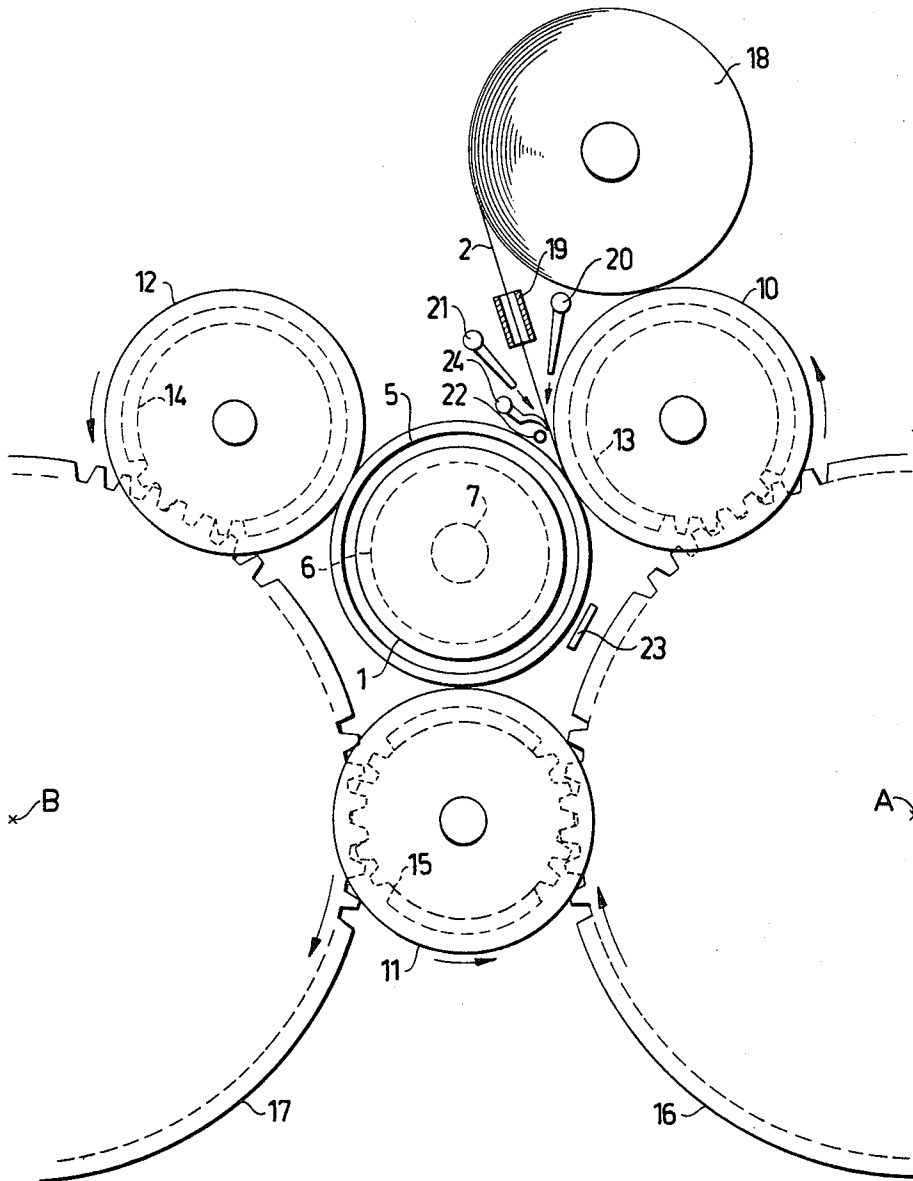
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Fig. 3



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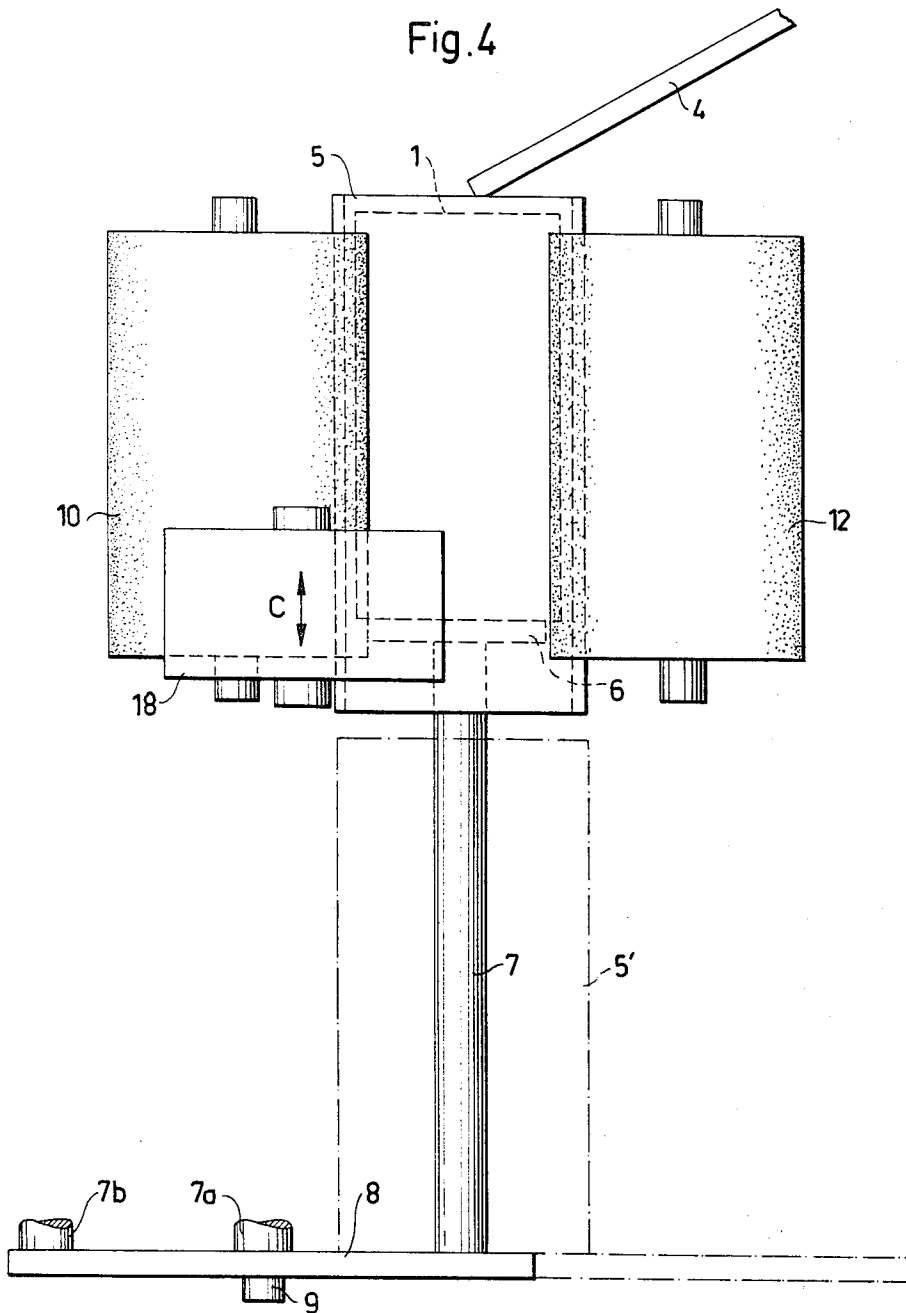
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Fig. 4



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Fig.5

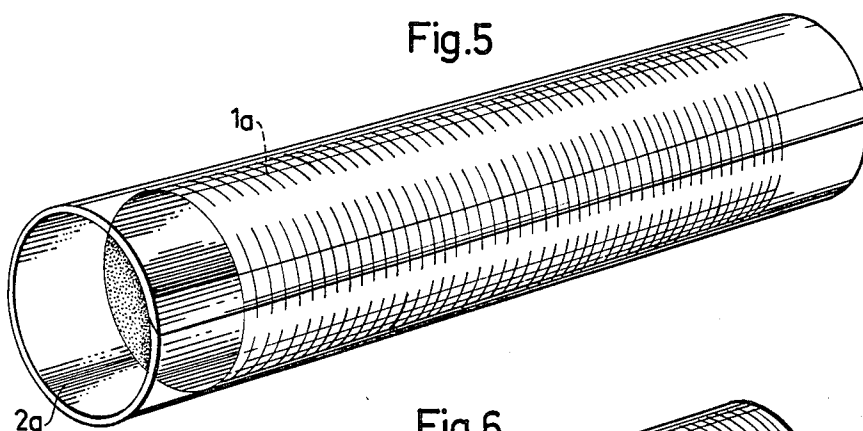


Fig.6

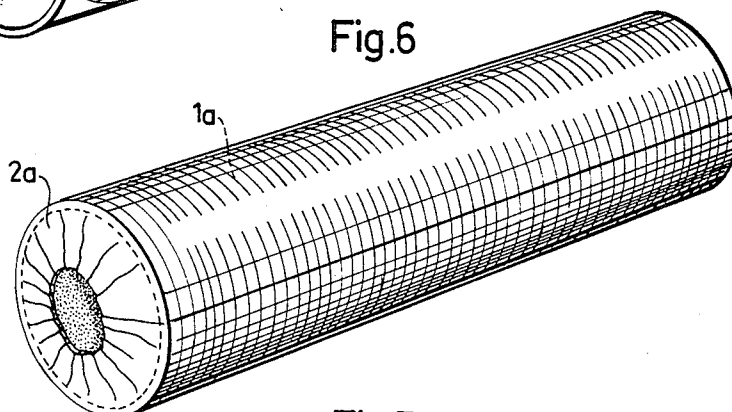
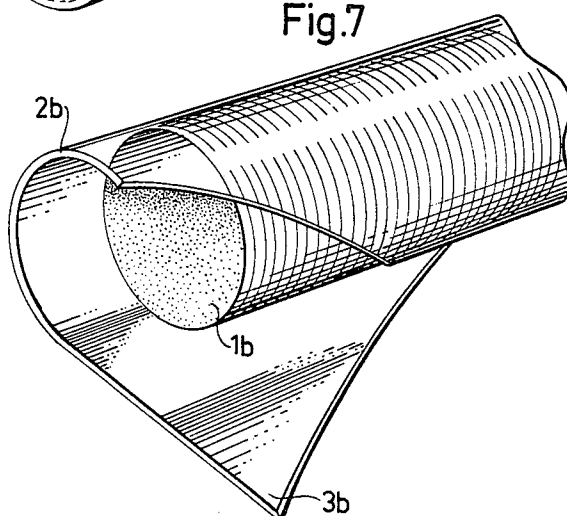


Fig.7



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APPARATUS FOR PACKING A NUMBER OF OBJECTS ARRANGED UPON EACH OTHER AND FORMING A SUBSTANTIALLY CYLINDRICAL STACK

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3 Claims. (Cl. 53-212)

ABSTRACT OF THE DISCLOSURE

Apparatus for packing a plurality of disc-like objects such as coins or the like in stack form comprises means for forming the coins into a cylindrical stack, wrapping the stack in a sheath of heat-shrinkable material, and then heating the material so as to cause it to shrink about the stack.

This invention refers to an apparatus for packing a number of objects arranged upon each other and forming a substantially cylindrical stack, especially a stack of disc-like objects such as coins, jettons or the like, by wrapping said stack in a heat-shrinkable film in order to keep the said objects tightly together, comprising a supply of said film; holding means for the stack to be packed; means for feeding and wrapping the film; and heating means.

The invention is characterized by the fact that the holding means includes three or more rollers, which are applied to rotate the stack between them while winding up the film, one or more of the rollers being movable in a direction perpendicular to the direction of the roller axes in order to be able to lay open the space intended for the stack between and defined by the said rollers when the said stack is to be positioned for the winding operation and for enabling the removal of the stack when the winding operation has been carried out, the rollers further being arranged to press against said stack during the winding operation.

Especially, the apparatus according to the invention is intended for packing a stack of a considerable length, the invention being further characterized by the fact that the supply of the film comprises a supply roll containing a strip-shaped film material, the breadth of the strip being smaller than the length of the stack, and that the said means for feeding and winding the film are arranged helically to wind the film around the stack and projecting beyond its both ends.

The invention, however, might also be applied more generally. Thus it may be applied for providing an apparatus for wrapping a stack of coins in a sheet of heat-shrinkable film material, the sheet being trapezium-shaped, especially having the shape of a rhomboid. It may also be applied to the method for packing according to our application Ser. No. 376,806 filed June 22, 1964, now abandoned said method briefly comprising the wrapping of an object into a sheet of a heat-shrinkable film, said sheet, e.g. a piece of web-shaped film material, projecting beyond both ends of the object, whereupon the film surrounding the object is caused to shrink by heat and to enclose and grip the object under permanent shrinkage.

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Further particulars and advantages of the invention will be apparent from the accompanying diagrammatic drawings showing an embodiment of the invention chosen by way of example, and where

FIGURE 1 shows one end of a package produced by means of the apparatus, prior to exposure to heat.

FIGURE 2 shows the same package after the heat treatment.

FIGURES 3 and 4 diagrammatically show a horizontal and a vertical projection respectively of the apparatus according to the invention, details of less importance being omitted to make the essentials more clear.

FIGURES 5 and 6 show one further embodiment of the package which can be produced by means of the apparatus according to the invention.

FIGURE 7, finally schematically shows a stack of coins; jettons or the like being wrapped in a sheet of a heat-shrinkable film having the shape of a rhomboid.

In FIGURES 1 and 2 there is shown an object 1 which is intended to be packed and which for example can consist of a stack of coins or the like. The object 1 has, by means of the apparatus according to invention, been provided with a wrapping consisting of a strip 2. The breadth of the strip 2 which is smaller than the length of the object 1 consists of a film material which is heat-shrinkable.

The wrapping is according to the embodiment shown, intended to be made helically and in such a way that the strip 2 projects beyond both ends of the object 1. When the film is heated, the shrinking obtained causes the film to lay close to the object and simultaneously, as shown in FIG. 2, grip its ends. FIGS. 1 and 2 further show how an additional strip 3 made from a preferably nonshrinkable material might be wound around the object under the film material and preferably simultaneously with the wrapping of the film. The additional strip 3 is arranged in such a way that it will be easily accessible from outside, at least after the upper layer having been shrunk, whereby it can serve as a handle grip when the package is to be opened. The strip 3 is, prior to the shrinking according to the embodiment shown, preferably of the same length as the strip 2, but might also be shorter or longer than this.

FIGS. 3 and 4 show, as above mentioned, diagrammatically a horizontal and a vertical projection respectively of an apparatus according to the invention for manufacturing the package above described. The object intended to be packed is still designated 1 and the package film 2. The object 1, which in this example might consist of a stack of coins, is fed into the apparatus by means of a feeding groove 4 (only shown in FIG. 4) or the like, the coins being separately fed via said feeding groove. As an alternative it is of course possible to deliver the coins by means of a funnel or the like, or in the shape of a ready-made stack. In accordance with the example described, the coins are stacked in a tube 5 on a stacking-plate 6, the plate being fastened on a rod 7 and closing the lower mouth of the tube 5. The rod 7 is fixed to a revolver table 8 which is turnable by means of a pivot 9 in a frame not shown. On the same table are arranged further rods 7a and 7b of the same kind as the rod 7. Each of these rods is in the same way as the rod 7 provided with a stacking-plate (not

shown) and co-ordinated with tubes not shown, the tubes being of the same kind as the tube 5 but having other dimensions in order to be able to receive other kinds of coins. Two preferably feltcovered rollers 10 and 11 are carried in bearings on pivots not shown, said pivots having their center of pivoting in the point A and being arranged resiliently to press the rollers 10 and 11 against the tube 5. In a similar way a third, also this one preferably felt-covered, roller 12 is arranged on a pivot not shown, said pivot having its center of pivoting in the point B. The rollers 10 and 11 are driven by gear wheels 13 and 15 which in their turn are drawn by two gear wheels 16 and 17 having their bearing centers in the above mentioned points A and B.

When the tube 5 has been filled with a desired number of coins, the tube is moved down to the position 5 which is indicated by the dash lines in FIG. 4. Hereby the rollers 10-12, under the influence of said resilient properties, will turn around the pivoting centers A and B into direct contact with the stack of coins 1. When this has occurred, the stripshaped film material 2 will be fed from a supply roll 18 by means of guiding means 19 towards the gap between the roller 10 and the stack of coins 1, the guiding means 19 being schematically shown in FIG. 3. As a complement or an alternative to the guiding means 19, the film 2 might be blown into the gap between the roller 10 and the stack of coins 1 by means of the air-nozzles 20 and 21.

In order to secure the film 2 adhering to and following the surface of the stack of coins rotating between the rollers, there has in accordance with the invention been provided a pivoting wetting-device 24 for wetting the film strip with a suitable wetting-agent on that surface which is turned toward the stack of coins. Paraffin oil has proved to be a suitable wetting agent, which on one hand secures an adhesion between the film and the stack of coins sufficient for the wrapping operation and on the other hand does not make the removing of the wrapping difficult when opening the package and further does not damage the coins owing to corrosion, and finally eliminates or reduces the repulsion power between the film and the object to be packed due to static electricity.

On the initiate phase of a wrapping operation the end of a film strip 2 is fed towards the gap between the roller 10 and the stack of coins 1 by means of the guiding means 19 and/or the air-nozzles 20 and 21. Simultaneously the wetting-device 24 is turned around its axis, thereby to bring the damp-applicator into contact with the strip which is wetted on a piece of its end portion, whereupon the damp-applicator is brought back. If considered more advantageous, of course the whole or substantially the whole of the length of the strip as well as its both end portions may be wetted.

Synchronous to the film being fed and wound around the stack of coins, there is a relative movement in an axial direction between the strip guiding means 19 and the stack of coins 1. Hereby a helical winding is obtained. By the way of example the relative movement is intended to be carried out by the fact that the supply roll 18, the wetting-device 24; the guiding-means 19; the air-nozzles 20, 21; and a heated wire 22 serving as a cutting tool are arranged on a carriage not shown, said carriage being movable in a vertical direction as is indicated by the double-arrow C in FIG. 4.

When the wrapping operation has proceeded to the status shown in FIG. 1, the strip 2 is cut off by means of the cutting wire 22. Simultaneously a second wire 23 is made hot, whereby the film strip is heated and shrunk to get the appearance shown in FIG. 2, the terminal of the strip being held aside by means not shown, thereby to be permitted to shrink. When this operation has been done, the package is finished and is pushed out by suitable means not shown through the interspace between the rollers 10 and 12, which is carried out by opposing the spring forces working upon said rollers. After this the

tube returns from the position 5' shown by dash lines to the position 5 shown by the continuous black lines in the same figure, the rollers 10-12 during this operation being kept apart by suitable means not shown. When the last operation has been carried out, the apparatus is prepared to repeat the packaging procedure above described.

As above mentioned some details of less importance to the invention have been omitted as well as all frame details of the machine; the pivots upon which the rollers 10-12 are mounted in bearings; and the spring working upon said pivots. To a man skilled in the art the details shown, however, will be sufficient for his carrying out the invention. The details which have been described are only intended to represent one embodiment of the invention chosen by way of example and might be modified or exchanged, without departing from the spirit and scope of the invention.

As mentioned one has tried to eliminate the powers of repulsion caused by electrostatic electricity. However, one has also shown that in some cases powers of attraction appear between the film and the object to be packed due to the electrostatic condition. This, for example, is the case if the film material is being braked so that a sliding motion will appear between the film material and any of the felt-covered rollers. According to one embodiment of the invention, the apparatus is therefore provided with means for braking the film so as to bring about a sliding motion between the film material and the roller 10.

FIGS. 5 and 6 show, as above mentioned, one further embodiment of the package which can be produced by means of the apparatus according to the invention. In these figures the object intended to be packed has been designated 1a and preferably consists of a stack of coins or the like. The object is, according to the example, wrapped in a sheet 2a of a film material of the above kind. To be able to produce this package, the apparatus shown in FIGS. 3 and 4 only has to be modified in respect to the supply roll 18 and to the feeding- and cutting means cooperating with said supply roll, i.e. the roll 18 can be exchanged for a roll having an axial length somewhat exceeding the length of the object intended to be packed, or to a supply of ready made sheets 2a. The sheets 2a can also be fed by hand. Due to the fact that the rollers 10, 11 and 12 can be pushed apart to vary the spacing therebetween, stacking tubes 5 of different diameters can be used thus making the apparatus practical for packing coins of different monetary values and which have different diameters, accordingly.

We claim:

1. Apparatus for packing a plurality of disc-like objects arranged upon each other and forming a substantially cylindrical stack having a considerable length by wrapping said stack in a heat-shrinkable film in order to keep the objects tightly together, comprising a supply roll of a strip shaped film material, the breadth of said strip material being smaller than the length of said stack of objects, means for holding said objects as a stack to be packed, means for feeding and winding said strip of film material helically around the stack with portions of the film material projecting beyond opposite ends of the stack, and means for heating said film material to shrink it after being wound around said stack into contact with the cylindrical surface of said stack as well as with the opposite ends thereof, said holding means comprising at least three rollers which are applied to rotate said stack between them while winding on said strip of film material, at least one of said rollers being movable in a direction perpendicular to the direction of the roller axes in order to be able to lay open the space intended for the stack between and defined by said rollers when said stack is to be arranged for the winding operation and for enabling removal of said stack after having been wound with said strip of film material, said rollers further being arranged to press against the objects forming said stack during the winding on of said strip of film material.

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2. Apparatus as defined in claim 1 for wrapping a stack of disc-like objects wherein at least one of said rollers is mounted in bearings carried by a pivot which is mounted to press that roller against the objects and which further includes a tube insertable between said rollers, said tube being arranged to receive said objects to form the stack, and a supporting device acting upon one end of said stack of objects in order to support said stack at least during the period of time when said tube is being removed and said rollers are caused to be pressed against the edges of the stack.

3. Apparatus as defined in claim 2 for wrapping a stack of disc-like objects wherein the spacing included between

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the surfaces of said rollers is variable to accommodate packing tubes of different diameters.

References Cited

UNITED STATES PATENTS

1,600,320	9/1926	Danquigney	-----	53—376	X
2,878,628	3/1959	Curry	-----	53—30	
2,893,190	7/1959	Lancaster	-----	53—214	X
2,945,337	7/1960	Waite	-----	53—389	
3,037,336	6/1962	Hoffmann et al.	-----	53—212	

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