United States Patent [19]

Dreher

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[45] **May 22, 1973**

[54] POLISHING APPARATUS

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[30] **Foreign Application Priority Data**

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[52] **U.S. Cl.**.....**259/89,** 259/81

[51] **Int. Cl.**.....**B01f 9/04**

[58] **Field of Search**.....259/81, 89, 3, 177, 259/176, 175, 14, 30, 57, 58

[56] **References Cited**

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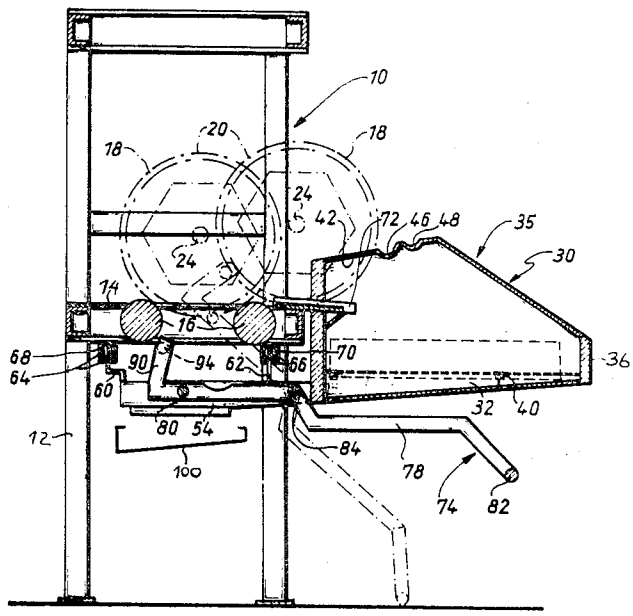
[57] **ABSTRACT**

A frame mounting a pair of rotatable rollers forming a seat for a cylindrical drum container. Means for receiving the drum after mixing and means for lifting the drum from the rollers into the receiving means with the axis of the drum maintained in parallel relationship to the axis of the rollers.

9 Claims, 2 Drawing Figures



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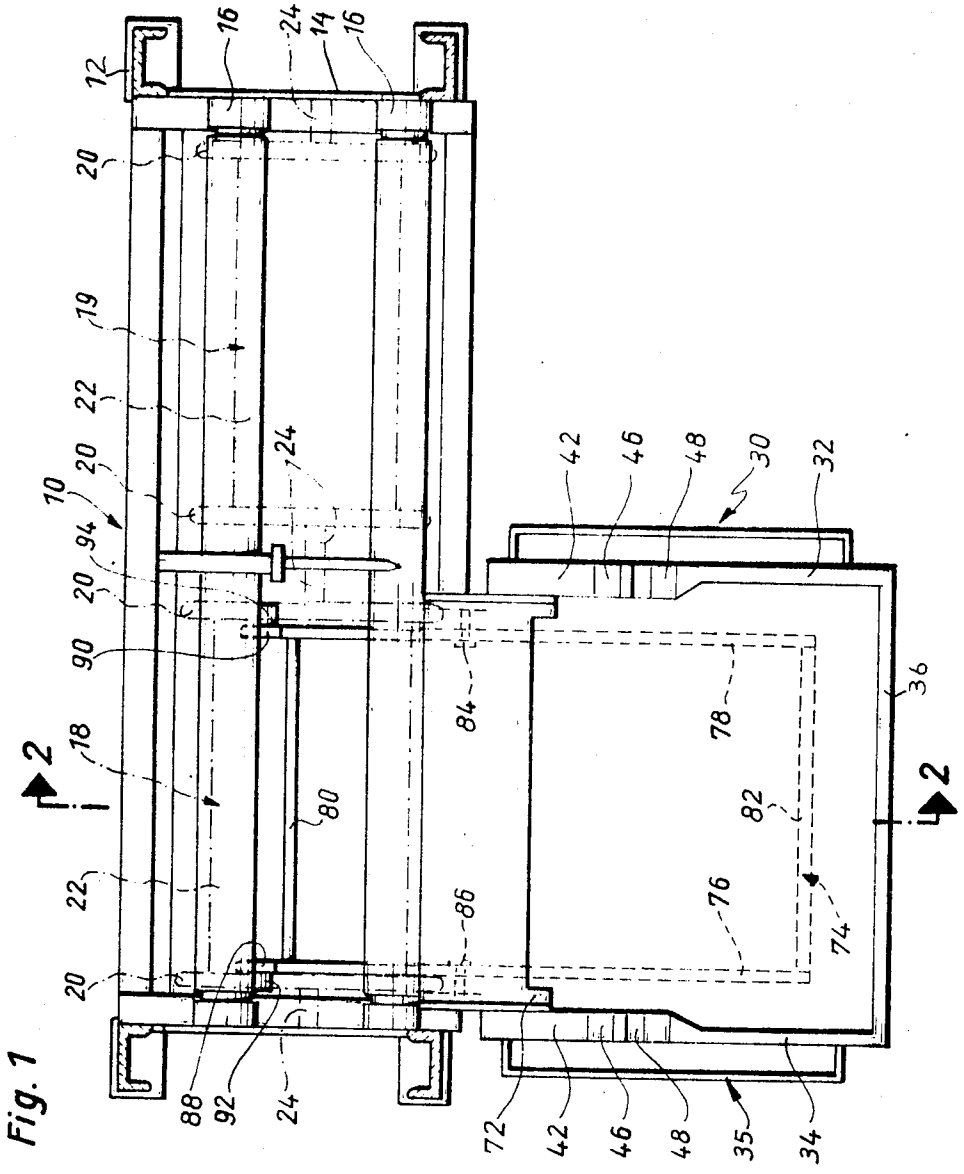

Fig. 1

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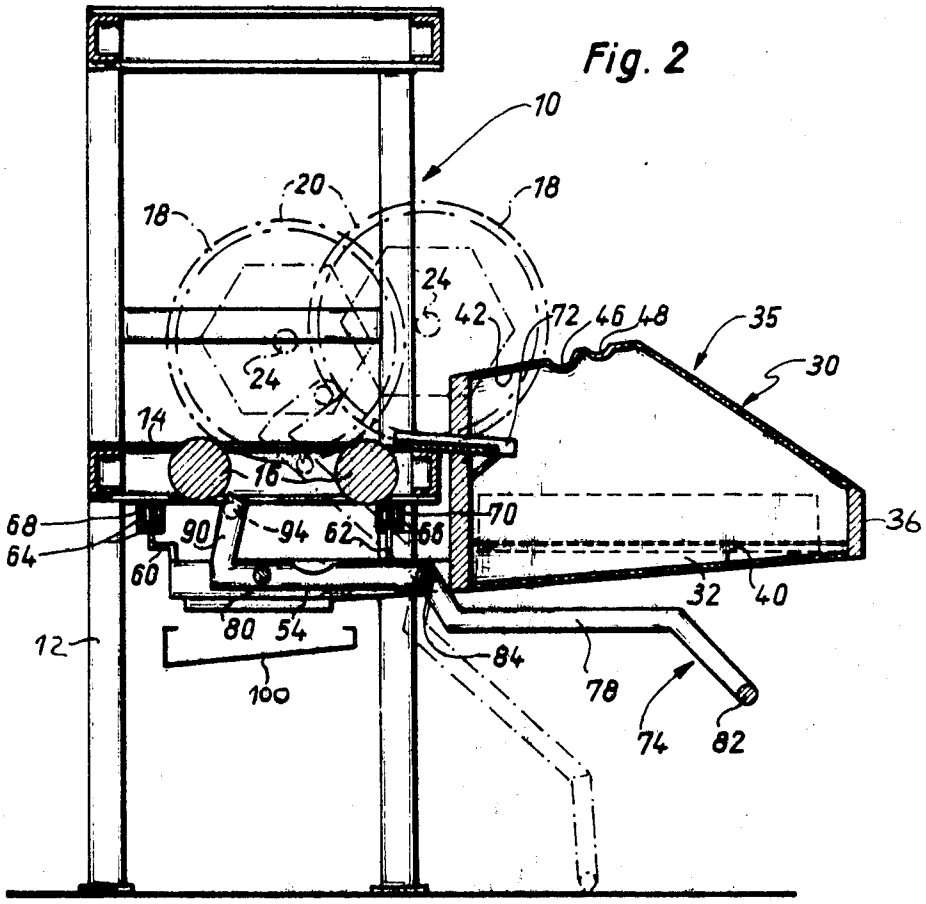
Fig. 2



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POLISHING APPARATUS

BACKGROUND OF THE INVENTION

The present invention relates to cylindrical drum mixing apparatus particularly adapted for the mixing of such missible materials as sand, concrete, plaster of paris, cement and similar articles.

In apparatus of the type herein described, a cylindrical vessel or container is filled with the material to be mixed and is propped or mounted on means by which it is rotated about its longitudinal axis. At the completion of the mixing operation, the cylindrical container is manually removed by an attendant from the rotating device and it is placed upon a carrier wherein it may be transported to the place of use, at which time the container may be emptied.

In general, containers of this type are cylindrical, hollow drums which are adapted to rest on one or more rollers which are driven to effect rotation. To help the attendant in the removal of the container from the rotating drive means, one of the rotating rollers may be driven in order to assist the attendant in rolling the container off of the mixing device. The degree of friction existing between the container and the rollers determines the ease at which the attendant is able to manipulate the container. Notwithstanding this, the lifting of the drum and its removal from the drive mechanism calls for an exceptionally large physical exertion since the relatively large size of the drum and its heavy weight in a filled condition does not make the task simple.

In recent years, plastic drums have been used since they are less expensive and more easily constructed for drum mixing operations. As a consequence of the use of plastic wheels, it has become increasingly more difficult for the attendant to remove the drums from the rotating device since the peripheral surface is of plastic and the containers, even if appropriately roughened, do not create a sufficient amount of friction with the driving rollers. It is for this reason that the cheaper and more sturdy plastic drums have not yet found a wide degree of commercial success.

It is an object of the present invention to provide a drum mixing device in which the manner of lifting and removing the drum container from the rotating apparatus is considerably facilitated and makes the job of the attendant relatively easy.

It is a further object of the present invention to provide a drum mixing device which is capable of successfully utilizing the more efficient and more economical plastic drum.

It is still a further object of the present invention to provide a drum and mixing device in which the drums may be removed by mechanical means with a minimum of manual effort on the part of the operator.

The foregoing objects together with numerous other objects and advantages are et forth in the following description of the present invention.

SUMMARY OF THE INVENTION

According to the present invention, apparatus for mixing materials such as sand, concrete and the like is provided comprising a frame on which a pair of elongated rollers are mounted. The rollers are arranged in parallel spaced relationship in order to create a seat for a drum container which receives the material to be mixed. At least one of the rollers is positively driven by conventional means to rotate the container about an axis parallel to the axis of the rollers. Means are mounted adjacent to the front of the frame, transversely of the rollers to receive the drum container after the completion of the mixing operation comprising a carrier in which the drums may be rotatably seated. Means are provided for mechanically lifting the drum container from its seat on the rollers and transporting it to the carrier.

In the embodiment of the apparatus, the carrier comprises a holding frame consisting of a pair of spaced walls between which the container may be hung. To facilitate this the container is closed at each of its ends and has extending along its central axis a pin or shaft which may rest in bearing grooves formed on the upper edge of each of the plates. The plates forming the carrier are also provided with a flat cross piece joining them which is positioned to receive the drum container as it is being lifted and allow the container to roll into the bearing grooves. The carrier frame rests upon supporting means which is secured to the frame of the mixing apparatus so as to be located directly in front of the drum container so that the container may be removed in a direction transverse to the axis of rotation on the axis of the rollers.

In accordance with the present construction the mixing frame and the elongated rollers may be longer than the length of a single container so that more than one container may be seated axially on rollers. In this manner multiple mixing operations can be effected simultaneously. The supporting means for the carrier is preferably movably mounted so that it can be shifted in front of any one of the axially positioned containers so that they may be selectively removed.

Preferably the lifting means comprises at least one double armed lever swingable about an axis and whose lever arm engages the circumference of the mixing drum container and which is pivotable to move the drum from its seat on the rollers onto the receiving carrier.

Full details of the present invention are found in the following disclosure and in the attached drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. 1 is a top plan view of the apparatus; and

FIG. 2 is a vertical sectional view of the apparatus taken along line 2—2 of FIG. 1.

DESCRIPTION OF THE INVENTION

As seen in the figures, the mixing apparatus is generally defined by the numeral **10** and comprises an elongated chassis frame formed from a plurality of upright beams **12** and a number of elongated cross connecting beams **14**. A pair of cylindrical roller shafts **16** are arranged across the length of the chassis on the lower pair of cross beams **14**, parallel but transversely spaced from each other to form a saddle-like supporting seat for a pair of mixing drums **18, 19** (seen in dot-dash lines). The length of the frame and rollers **16** is chosen to accommodate a multiple number of containers which if desired may be more than the two shown. The drums **18, 19** are axially aligned with each other and thus provide two stations containing drums which may be simultaneously rotated. One or both of the cylindrical shafts **16** can be driven by conventional drive means such as an electric motor and a gear or pulley transmis-

sion means linking the motor to the appropriate roller shaft. In this manner, the drums may be revolved about their central axes. Preferably the front roller shaft should be driven.

Each of the drums **18, 19** are formed with end caps, being radially extending flange-like bogey wheels **20** and a hollow cylindrical container portion **22** therebetween. Extending outward along the central axis of the drum of the bogey ends is a supporting bearing pin or spindle post **24.** The cylindrical portion **22** is provided with an appropriate door or flap mechanism having a suitable latching or fastening means through which the material to be mixed may be inserted and removed prior and after the mixing operation.

Arranged in front of the chassis of the mixing apparatus is a carrier, generally designated by the numeral **30,** supported on a movable table generally designated by the numeral **35.** The supporting table comprises a flat rectangular based plate **40** inclined downwardly toward the chassis of the mixing apparatus. The plate **40** is secured to a pair of transversely extending bracket arms **54** which are supported in a manner to be described later below, and transversely of the rotating rollers **16.**

The carrier **30** comprises a pair of transversely spaced vertical wall plates **32** and **34** joined at their rearward end by a wall **36.** Both vertical wall plates **32** and **34** are similar to each other having an upper forward edge **42** inclined upwardly away from the chassis and in which are formed a pair of arcuate receiving grooves or half bearing portions **46, 48** which are adapted,as will be described later, to receive the bearing pins **24** of each of the drums **18** and **19.** The vertical wall plates **32** and **34** are spaced apart from each other a distance conforming to the outer linear distance of each of the drums **18, 19** so that when the drums are placed thereon the container drums **18** and **19** may easily revolve about the pins **24.** Joining the forward edge of the retaining plates **32** and **34** is a generally flat ledge **72** which is inclined slightly rearwardly and downwardly from the chassis of the mixing apparatus. The ledge **72** provides a flat deck on which the drum containers may rest and roll as they are being shifted from the rotating rollers **16** to their position in the bearing grooves **45** and **48.** This is shown in the dot-dash line in FIG. **2.**

The bracket arm **54** is supported within the chassis frame by a pair of upwardly extending roller arms **60** and **62** on which there are mounted roller runners **64** and **66** respectively. The runners are held and guided in rails **68** and **70** respectively which themselves are fastened to the lower cross connecting beams **14** below the roller shafts **16.** The supporting table **35** for the carrier **30** is designed to have a width corresponding to one of the drums **18–19,** the parts of the carrier itself being all correspondingly formed to receive just one drum. The supporting table is thus movable within the guide rails **68–70** so that it can be shifted along the length of the chassis between a position in front of either one of the drums; consequently, either one of the drums may be selectively removed from their seated position of the rollers **16** into the carrier frame **30.** The resting ledge **72** provides the transfer means between the chassis **10** and the carrier **30** on which the container is rolled.

Because of the rearward tilt of the ledge **72,** the drums **18** or **19** can be rolled from the chassis **10** onto the frame **30** easily. The distance between the plate **72** and the grooves or bearing halves **46** and **48** is such that the drums may be rolled out of the chassis and onto the carrier so that the pins **24** can be made to easily rest in either one of the bearing halves **46** or **48,** which are spaced on the upwardly rising ledge **42** so that drums having different radii can be accommodated. Preferably the distance between the bearing halves **46, 48** in which the shafts **24** seat and the supporting table plate **40** is such that the drum **16** can be fully seated in the bearing halves **46** and **48** while being rotatable about the axis shafts **24.** In this manner the containers are easily emptied by merely rotating them.

A drum lifting mechanism generally designated by the numeral **74** is provided for lifting the drums **18** or **19** out of its seat in the saddle formed by the rollers **16** and **18.** The drum lifting mechanism is mounted on the bracket **54** so that it too is shiftable with the supporting table **35** into position in front of either one of the drums **18** or **19.** The lifting mechanism **74** comprises a frame formed of a pair of parallel lever arms **76** and **78** connected at its forwardmost position under the rollers **16** by a crosspiece **80** and at its rearmost position under the supporting table **35** by a foot pedal piece **82.** The double lever arms **76, 78** are each pivotally connected to their associated bracket **54** by a bolt **84, 86** respectively, located midway along their length. The lever arm is shown as being vertically staggered with a rearward depending portion connected by the bar **82.** This confirguration allows the lifting mechanism to extend below the supporting table **35** so as to be actuated by movement of the attendant's foot on the connecting bar **82.** As will be seen later, this leaves the operator's arms free to otherwise manipulate the drum or other portions of the apparatus.

At the rearmost end of each of the lever arms **76** and **78,** there is provided a substantially vertical angle piece **88** or **90** respectively. The angle pieces **88** an **90** extend upwardly between the roller shafts **16** preferably just forward of the rearmost roller **16.** Each of the angle pieces **88** and **90** supports a propping roller **92, 94** respectively, each of which is adapted to engage the periphery of the spaced bogey wheel flanges **20** of either of the container drums **18** or **19.** A refuse receiving tray **100** is located in conventional manner below the operation equipment in line with the rotating drums in order to receive any refuse which may inadvertently fall from the drums as the material is being mixed.

In operation, empty drums **18** and **19** are placed in their seated position on the rollers **16** and thereafter a suitable number of materials to be mixed is inserted therein. After locking the door of the container, the rollers **16** are driven in conventional manner and the material within the containers are thereby mixed by causing the rapid rotation of the containers **18** and **19.** On completion of the mixing operation, a carrier mechanism is placed over the supporting table **35** and the table and carrier are aligned along the length of the mixing apparatus in front of the selected one of the drums **18** or **19** to be emptied. The operator then depresses the foot pedal bar **82,** pivotting the lifting mechanism **74** so that the rearward angle brackets **88** and **90** move upwardly between the rollers **16.** As the angle bar **90** moves upwardly, the rollers **92** and **94** attached thereto engage the periphery of the flanged bogey wheels **20** causing the container and bogey wheels to roll over the forward rollers **16** onto the table **72.** It is noted that in FIG. **2** that the transfer ledge **72**

rests in part upon the lower crossbeam **14** in front of the driven roller **16**. This insures a greater stability for the table **71** and prevents it from being tilted or skewed during the transfer of the drum into the carrier **30**. Because of the continuing movement of the lifting mechanism **74** and the downwardly tilting table **72**, the full container rolls onto the carrier frame **30** until it falls into either one of the bearing grooves **46** or **48**. Slight manual effort, basically a guiding operation, is all that is required to insure that the containers seat adequately within the bearing grooves **46** or **48**. Because the lifting mechanism is essentially manipulated by operation of the attendant's foot, the attendant's hands and arms are free to effect the manual manipulation of the drum and/or any other manual operation that is required, as for example, shutting off the machine or readjusting the drums on the roller.

It may be desirable to maintain the forwardmost roller **16** under driven conditions during this transfer in order to facilitate the movement of a rather heavily filled container. This, however, is not essential since the lifting mechanism together with the tilting ledge **72** will maintain adequate lifting of the container without itself being assisted by the movement of the roller **16**. Because the propping rollers **92, 94** are aligned with and engage the periphery of the flange bogey wheel **22**, reliable lifting is produced without the fear of skewing or axially offsetting the cylindrical containers even though the container may be rotating. The propping rollers engage the outwardly extreme ends of the drums and therefore cause the drums to be lifted parallel to the roller axis and moved transversely to it. Furthermore, the position of the propping rollers and the fact that they are rollers, causes the drum, which is being lifted, to roll about the axis of the forwardmost cylinder **16** and maintain itself parallel to that axis during the entire lifting operation. The lever relationships in the lifting mechanism are such that the lever normally tends to move in a counterclockwise relationship about its connecting bolts **84** and **86** so that it is normally in the solid line position seen in FIG. **2** and the rollers **94** and **92** are normally out of contact with the flanged bogey wheels on the drums **18** and **19**. Thus, on release of the foot pedal, lever arms **76, 78** assume an out of the way position.

After receiving one of the drums **18** or **19**, the carrier mechanism **30** may be removed and the mixed material may be delivered to the site at which it is to be used and removed from the mixing drum. A carrier **30** is then replaced on the supporting table **35** and the supporting table and carrier and lifting mechanism all are moved axially along the drame into position in front of the other one of the mixing containers. It will thus be seen by alternating the placement of empty containers and the removal of full containers from the apparatus that a sequential operation may be effected wherein a continuously mixing operation is underway at all times.

It will thus be seen that here is provided simple mechanism for the lifting and removal of heavy rotating drums from a mixing apparatus onto a carrier member.

Various modifications and changes may be made to the exact configuration of the device and it is accordingly intended that the present disclosure and drawings be illustrative only and not limiting of the scope of the invention in any way.

What is claimed:

1. Apparatus for mixing, comprising a frame, a pair of rotatable rollers mounted on said frame, said rollers being arranged in parallel spaced relationship to form a seat therebetween for receiving a drum container thereon with its axis parallel to the axis of the rollers, means for rotating at least one of said rollers to thereby effect the rotation of said drum, a carrier mounted to the frame in front of said rollers for receiving said drum and means for lifting said drum from said rollers and causing said drum to roll with its axis parallel to said rollers on to said carrier.

2. The apparatus according to claim **1** wherein the lifting mechanism is arranged on the frame to extend below the rollers and below the carrier, said lifting mechanism being activated by means of a foot pedal.

3. The drum apparatus according to claim **2** wherein the drum lifting mechanism comprises a double armed lever swingable about an axis parallel to the axis of the rollers, having a foot bar at the front end and means at the other end for engaging said drum container thereby to move said drum container under pressure on said foot end.

4. The apparatus according to claim **3** wherein the drum container is provided with a flanged bogey wheel at each end and wherein the inner arm of said lever is provided with a propping roller cooperating by engaging the periphery of said bogey wheel and adapted to lift said drum thereby.

5. The apparatus according to claim **4** wherein said carrier comprises bearing means adapted to receive said drum container and to per-mit rotation of said drum container therein.

6. The apparatus according to claim **5** wherein said carrier means comprises a pair of vertically spaced walls connected by a transverse member at its forward and rear end, the upper edge of each of said walls being provided with at least one bearing groove, said containers having extending shafts adapted to be received by said grooves.

7. The apparatus according to claim **6** wherein the forward connecting member comprises a ledge inclined downwardly to the forward portion of said carrier whereby said container may be made to roll over said plate onto said bearing grooves.

8. The apparatus according to claim **7** wherein the support table comprises a pair of outwardly extending brackets joined by a flat bottom member adapted to support the carrier member.

9. The apparatus according to claim **8** wherein the rollers are elongated so as to receive two or more drum containers arranged in axial juxtaposition, the carrier supporting table being movably secured to said chassis to be movable in front of a selected one of said drums, the lifting mechanism mounted on said movable supporting table whereby selected ones of said drums may be individually removed from the rotating roller.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,734,470 Dated May 22, 1973

Inventor(s) MANFRID DREHER

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

On the cover sheet [73], "Manfrid Dresher" should read -- Manfrid Dreher -- .

Signed and sealed this 20th day of November 1973.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

RENE D. TEGTMEYER
Acting Commissioner of Patents

ORM PO-1050 (10-69)

USCOMM-DC 60376-P69
* U.S. GOVERNMENT PRINTING OFFICE : 1969 O—366-334.