Nov. 8, 1966 J. R. RICHARDSON 3,283,944

BARREL APPARATUS

Filed June 19, 1963 4 Sheets-Sheet 1

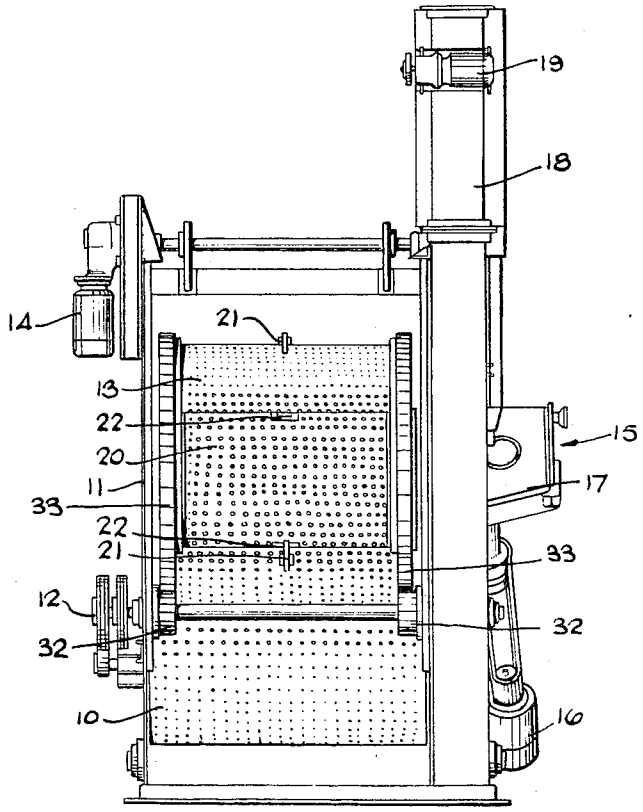


FIG. 1.

INVENTOR.

JAMES RICHARD RICHARDSON

By Kurt Kelman

agent

Nov. 8, 1966 J. R. RICHARDSON 3,283,944

BARREL APPARATUS

Filed June 19, 1963 4 Sheets-Sheet 2

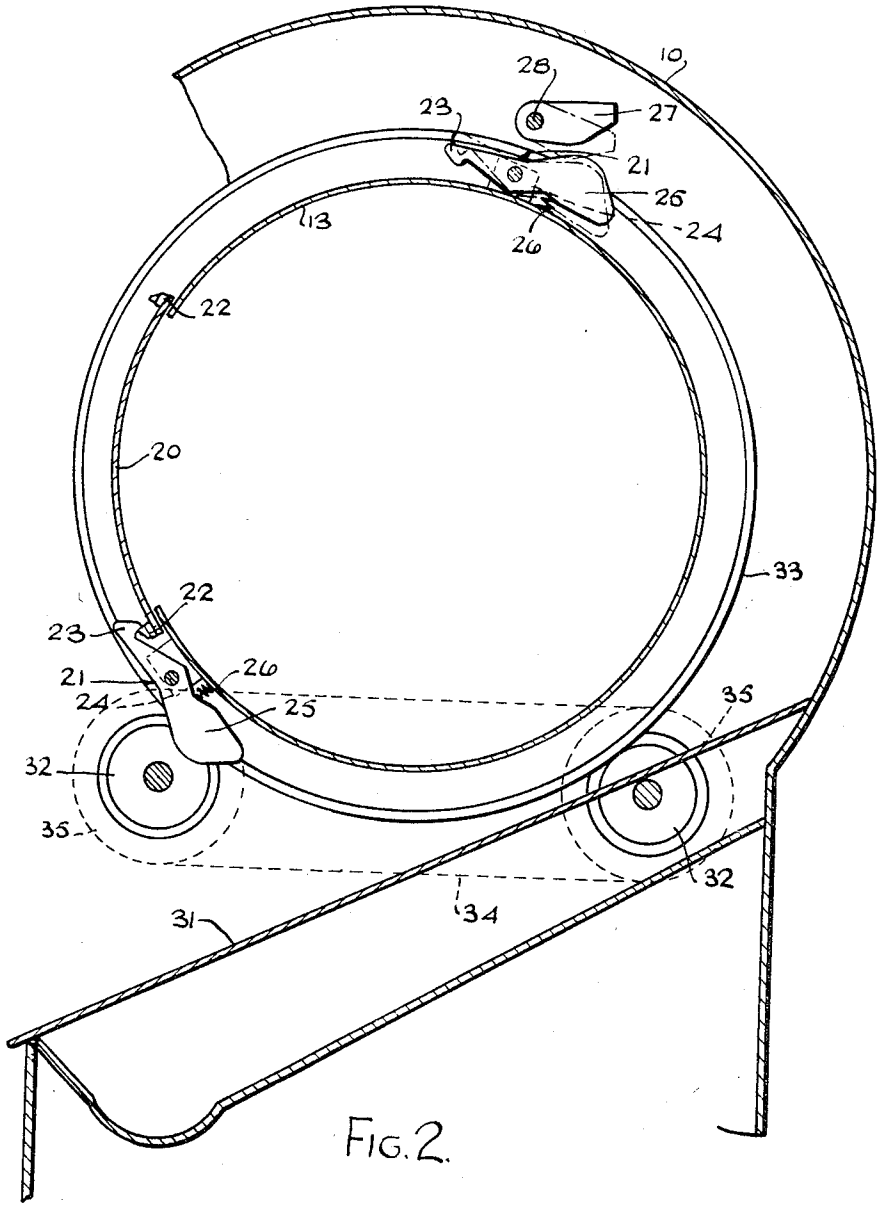


FIG. 2.

INVENTOR.
JAMES RICHARD RICHARDSON
By Kurt Kelman
agent

Nov. 8, 1966 J. R. RICHARDSON 3,283,944

BARREL APPARATUS

Filed June 19, 1963 4 Sheets-Sheet 3

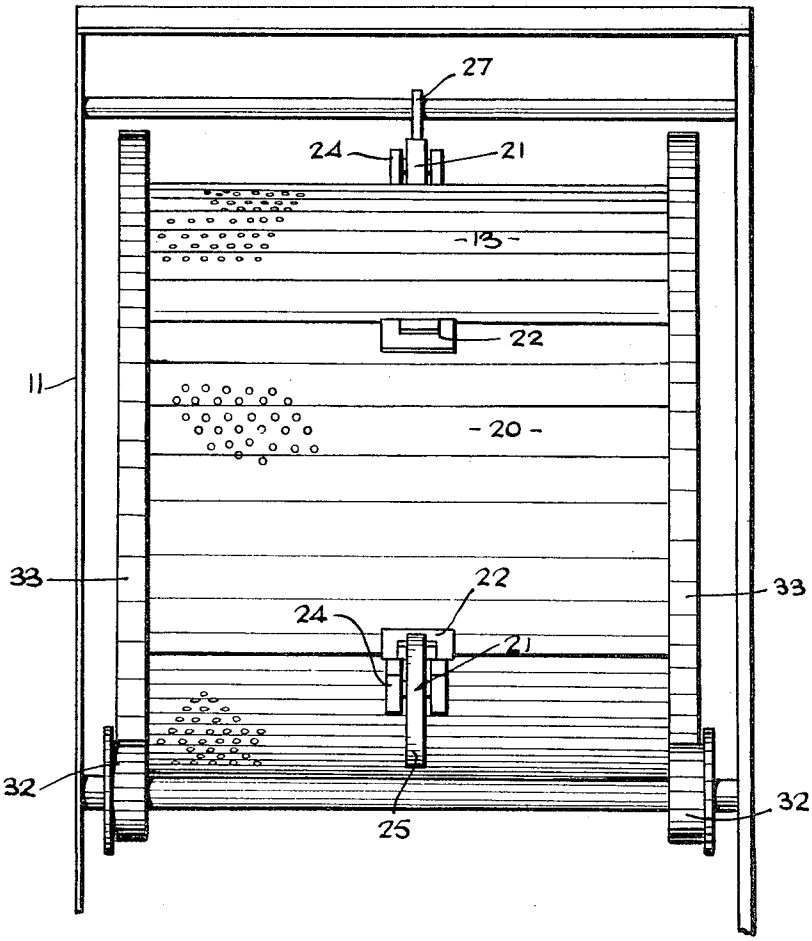


FIG. 3.

INVENTOR.

JAMES RICHARD RICHARDSON

By Kurt Kelman

agent

Nov. 8, 1966 J. R. RICHARDSON 3,283,944

BARREL APPARATUS

Filed June 19, 1963 4 Sheets-Sheet 4

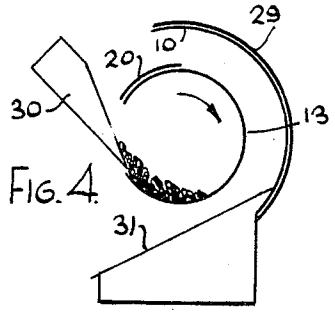


FIG. 4

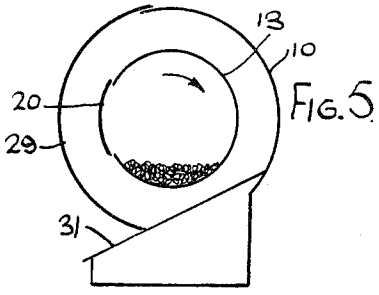


FIG. 5

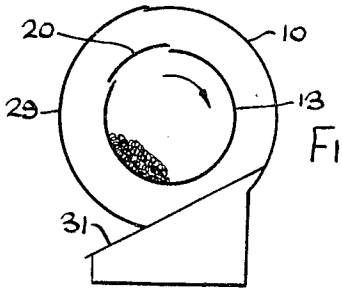


FIG. 6

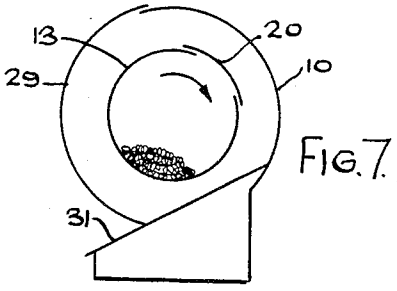


FIG. 7

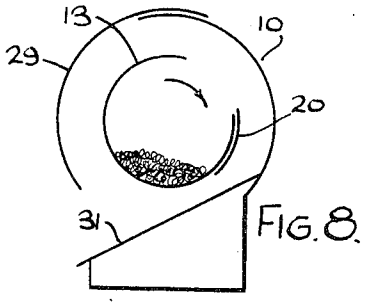


FIG. 8

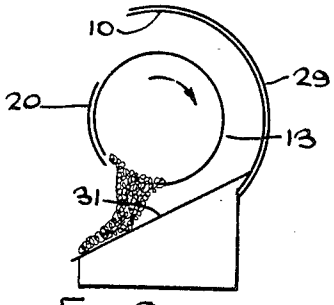


FIG. 9

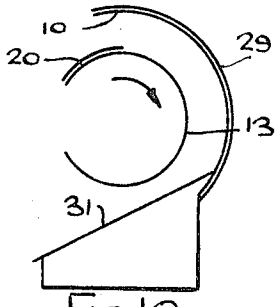


FIG. 10

INVENTOR.

JAMES RICHARD RICHARDSON

BY Kurt Kelman

agent

United States Patent Office

3,283,944

Patented Nov. 8, 1966

3,283,944

BARREL APPARATUS

James Richard Richardson, Harborne, Birmingham, England, assignor to Richardson Engineering (Birmingham) Limited, Edgbaston, Birmingham, England, a British company

Filed June 19, 1963, Ser. No. 288,981
Claims priority, application Great Britain, June 20, 1962, 23,680/62
2 Claims. (Cl. 220—41)

This invention relates to rotatable barrel apparatus of the type in which work pieces are contained within a rotatable barrel such barrels being used for tumbling, shot blasting, plating or other similar operations which may be performed therein and it is the object of the present invention to provide a new or improved construction of such barrel apparatus.

According to the present invention I provide rotatable barrel apparatus including a rotatably mounted inner barrel having a door opening formed therein, two sets of catch means, each set of catch means being mounted on the barrel on opposite sides of the door opening, a door slidably mounted on the barrel and slidable under gravity across the door opening from an open position to a closed position and vice-versa, projections mounted on said door adjacent to edges thereof, the one projection adjacent the one edge of the door being engageable by one of said sets of catch means and the projection adjacent the other edge of the door being engageable by the said other set of catch means, operating means mounted on the apparatus and selectively engageable with either one of said sets of catch means dependent upon the angular position of the barrel to release one of said sets of catch means from engagement with the door whereby the door may slide under gravity from its open position to its closed position or vice versa and to be held therein by said other set of catch means.

Preferably each set of catch means comprises one or more spring loaded pawls pivotally mounted on the barrel and the operating means comprises a cam adapted to bear upon a part of either one of the pawls to cause it to pivot and become disengaged from the corresponding cooperating projection on the door.

One embodiment of rotatable barrel apparatus constructed in accordance with the invention will now be further described with reference to the accompanying drawings wherein:

FIGURE 1 is a front elevation of the complete apparatus with part of the outer casing round the barrel being removed and the door of the barrel being shown in its closed position.

FIGURE 2 is a side sectional view of the barrel showing the door in its closed position, the outer casing of the apparatus being partly cut away.

FIGURE 3 is a front elevation of the barrel showing the door in its closed position.

FIGURES 4 to 10 are diagrammatic views showing the position of the barrel door during a complete cycle of operations.

In this construction the rotatable barrel apparatus is of the type used for tumbling metal work pieces therein whilst at the same time subjecting the work pieces to a shot blasting process.

Referring to FIGURES 1 to 3 of the drawings, the barrel apparatus comprises an outer cylindrical casing **10** mounted securely in a frame **11** which also carries the motor and driving gear **12** to rotate the inner barrel **13**, the barrel **13** being rotated by means of rollers **32** bearing upon the outer rim **33** of the barrel **13**, the rollers themselves being driven by a chain drive **34** from the driving gear **12** to sprocket wheels **35** mounted co-axially

with the rollers **32**. The casing **10** has an outer door (shown at **29** in FIGURES 4 to 10), which is operated by a motor **14**, and the frame **11** also carries the shot blasting apparatus, indicated generally at **15**, which itself comprises a motor **16** driving an impeller **17**, the shot being re-circulated into the impeller by means of a conveyor **18** driven by a motor **19**. The inner barrel **13** comprises a perforated cylindrical drum mounted for rotation about a horizontal axis and having an arcuate portion cut-away to define a door opening whereby the barrel may be loaded or unloaded with work pieces.

The door **20** for the inner barrel **13** is formed as a perforated arcuate metal section of substantially the same dimensions as the door opening and is so mounted on the barrel **13** so that it may slide circumferentially in guide channels therein, or on guide rails, or by any other suitable means from an open to a closed position and back again around the outer periphery of the barrel under the action of gravity when it is in a suitable angular position to do so.

The door **20** is held in either one of the open or closed positions by means of one of two pivotally mounted spring loaded pawls **21** mounted on the barrel **13** and adapted to engage with a co-operating projection **22** formed adjacent each edge of the door **20**.

The projection **22** at each edge of the door comprises an upstanding triangular lug which is engaged in the latched position by a hook portion **23** of one of the spring loaded pawls **21**. Each spring loaded pawl **21** is pivotally mounted within a suitable bearing **24** on the barrel **13** and has a tail portion **25** extending rearwardly from the hook portion **23** thereof. A light compression spring **26** acts between the outer surface of the barrel **13** and this tail portion **25** to urge the hook portion **23** towards the surface of the barrel, i.e. into latching engagement with the projection **22** on the door.

The tail portion **25** of each spring loaded pawl **21** is convex outwardly and is adapted to be engaged by a cam **27** mounted on a pivot pin **28** at a slightly offset position from the top dead-centre of the barrel and above it, so that, with reference to FIGURE 2, clockwise rotation of the cam will cause it to bear upon the tail portion **25** of one of the pawls **21** to remove the hook portion **23** thereof from latching engagement with the door, this disengaged position being shown in chain-dotted lines in FIGURE 2.

In order to clarify the invention still further a full sequence of operations will now be described from the loading of work pieces into the barrel to the discharging of the work pieces therefrom, the direction of rotation of the barrel being shown by the arrows in FIGURES 4 to 10.

The outer door **29** in the casing **10** of the barrel apparatus is opened by operation of the motor **14** and the inner rotating barrel **13** brought to rest with the door opening opposite the door opening in the outer casing as shown in FIGURE 4 of the drawings. The door **20** to the inner barrel **13** is held in the open position by means of the projection **22** on its upper edge engaging under the hook portion **23** of the spring loaded pawl **21** which is mounted at substantially the same distance circumferentially from the edge of the door opening as the width of the actual door so that the door is completely clear of the opening.

Work pieces are then loaded into the barrel by any suitable means such as a chute **30** and the outer door **29** of the housing is closed. The motor **12** is started to rotate the barrel **13** and the cam **27** is then operated either mechanically or electronically to bear upon the curved tail portion **25** of the spring loaded pawl thereby releasing the door **20** which, due to the angular position of the barrel **13**, will slide down under gravity on its

guide rails until the projection on its lower edge engages under the hook portion **23** of the second spring loaded pawl which is mounted adjacent the bottom edge of the door opening, this position being shown in FIGURE 5. Alternatively the cam **27** may be operated before the motor **12** is started to rotate the barrel.

The cam **27** is then released and the barrel continues to rotate for a predetermined time, an intermediate position being shown in FIGURE 6, after which time, at the position shown in FIGURE 7, the door **29** of the casing is opened and the cam **27** again operated so that as the inner barrel **13** rotates the cam **27** will bear upon the curved tail portion **25** of the second spring loaded pawl thereby releasing the door which, due to the angular position of the barrel **13**, then slides under gravity to its open position and is retained in this position by means of the first spring loaded pawl, this position being shown in FIGURE 8.

As the door opening in the inner barrel **13** reaches its lowest point, as shown in FIGURE 9, the work pieces discharge themselves under gravity on to a suitable chute **31** built into the housing **10** and the barrel is then brought to rest with the door opening in the barrel **13** opposite the door opening in the housing **10**, i.e. in the ready for loading position as shown in FIGURE 10.

Alternatively the inner barrel may be braked so that as the door opening comes to the bottom of the housing the inner barrel **13** is brought to rest and the work pieces discharge themselves from the barrel on to the chute **31**, the barrel then being further rotated into the loading position.

The barrel is then ready for re-loading and the same sequence of operations is applied, this sequence being capable of being operated electronically if required for a predetermined time of rotation.

What I claim then is:

1. Rotatable barrel apparatus comprising,

(a) a barrel mounted for rotation about a horizontal axis and having a door opening in its circumferential wall,

(b) a door slidably mounted on the exterior of the barrel and moveable circumferentially thereof between an open position and a position in which it closes said door opening,

(c) first catch means mounted on the barrel exterior and spaced circumferentially away from the leading edge of said door opening,

(d) a first projection on the leading edge of said door engageable by said first catch means to hold the door in the open position,

(e) second catch means mounted on the barrel exterior adjacent the trailing edge of said door opening,

(f) a second projection on the trailing edge of the said door engageable by said second catch means to hold the door in the closed position and,

(g) an operating member mounted in a fixed position above the barrel adjacent the top dead-centre position thereof and selectively engageable with one or other of said catch means, during rotation of the barrel, to release it from engagement with its associated projection.

2. Rotatable barrel apparatus according to claim **1** wherein each catch means comprises a pawl pivotally mounted on the barrel, there being spring means holding the pawl in its engaged position and wherein the operating member comprises a cam pivotally mounted above the barrel end moveable from an inoperative position into a position in which it lies in the path of movement of the pawls during rotation of the barrel.

References Cited by the Examiner

UNITED STATES PATENTS

947,700	1/1910	Raymond	220—41
1,502,872	7/1924	Oberg	220—41
2,316,674	4/1943	Dow.	

THERON E. CONDON, *Primary Examiner.*

GEORGE E. LOWRANCE, *Examiner.*