Feb. 2, 1960 J. ROUND 2,923,675

APPARATUS FOR ELECTRO-PLATING OR TREATING ARTICLES

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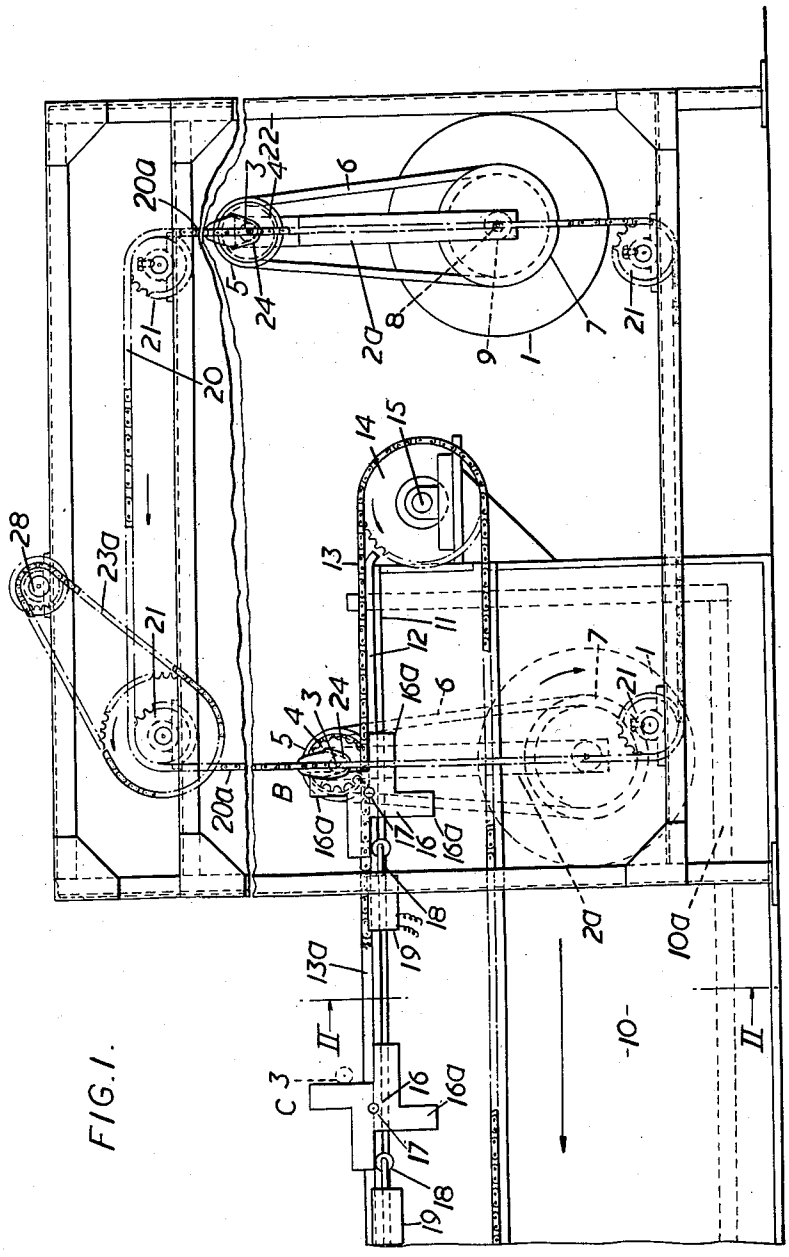


FIG. 1.

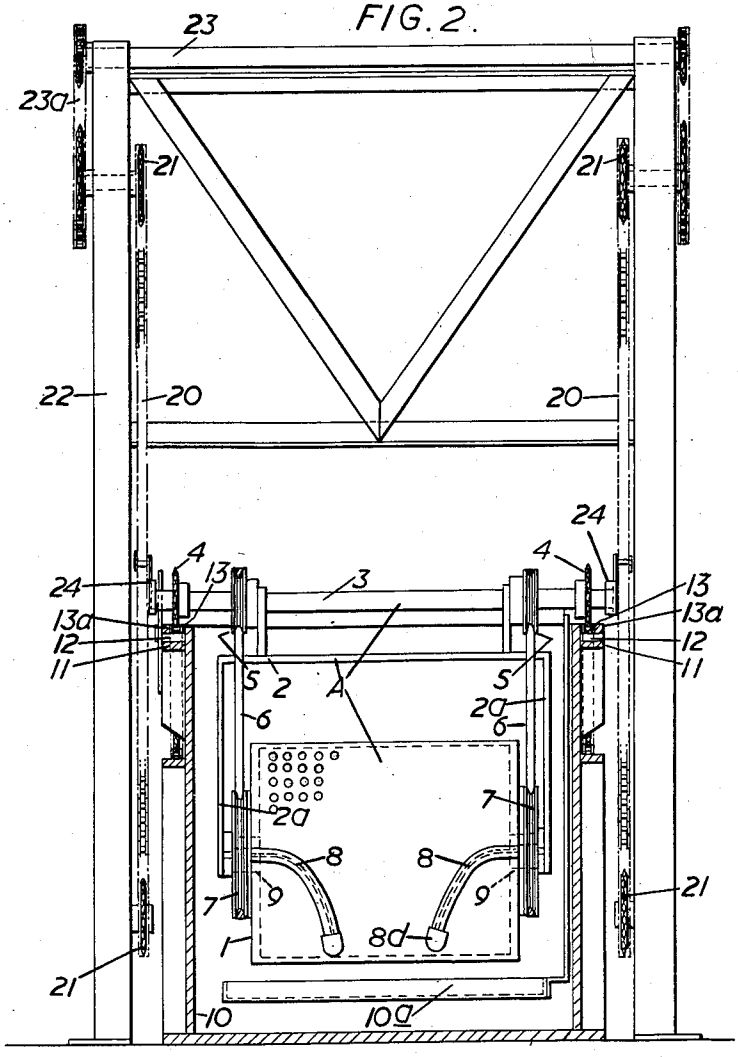
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FIG. 2.



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APPARATUS FOR ELECTRO-PLATING OR TREATING ARTICLES

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2 Claims. (Cl. 204—213)

This invention relates to apparatus for electroplating or treating articles contained in a barrel revolving in a vat containing electrolyte or a liquid and it has for its object to facilitate mass production of electro-plated articles.

A further object is to provide means for driving the barrel which can be disconnected or connected by lifting the barrel unit from the vat or lowering the barrel unit into the vat and simplify the charging circuit.

A further object is to enable a number of barrels to rotate at stations in a vat and move along the vat from the charging end to a discharging end, in an improved manner.

Referring to the drawings:

Figure 1 is a side elevation of a device constructed according to this invention, and

Figure 2 is a section on line II—II of Figure 1.

According to a convenient embodiment of this invention, an electro-plating perforated barrel **1** and means for rotating the barrel form a self-contained barrel unit A which comprises a head frame **2** in which a shaft **3** is rotatably mounted, the shaft **3** having sprocket wheels **4** and pulleys **5** mounted thereon and belts **6** engage pulleys **7** fixed on the sides of the barrels **1** and the pulleys **5**. The belts **6** are conveniently made of rubber and the pulleys **5** and **7** are conveniently made of plastics material. The head frame **2** is formed of copper or electric conducting material and has depending arms **2***a* which carry electrodes **8** which pass through openings **9** in the centre of the sides of the barrel **1**. The electrodes **8** may be pig-tail electrodes comprising a conducting cable enclosed in insulating material except for the tips **8***d*. The head frame is covered with a layer of insulating material such as a plastics material. The barrel **1** is thus supported from the head frame only through the medium of the belts **6**, the holes **9** allowing freedom of movement of the barrel **1** in relation to the head frame **2**. The electro-plating vat **10** has ledges **11** extending longitudinally along each side from end to end and copper bus bars **12** electrically connected to the electrodes are mounted thereon to form runways for the upper runs of endless roller chains **13** which pass over chain sprocket wheels **14** mounted in bearings on each end of the vat **10**. The bus bars **12** are electrically insulated from the vat **10**. The two sprocket wheels **14** at each end of the vat are mounted on a transverse shaft **15**. A shaft **15** is driven by an electric motor and therefore such motor is at the side of the vat **10** and does not lie over the vat and the destructive fumes which arise therefrom. The sprocket wheels **4** of the barrel unit A are adapted to be lowered into engagement with the upper runs of the endless chains **13**, so that the endless chains can carry the said barrel unit longitudinally along the vat, without rotating the barrel **1**. The chain **13** runs between two guide strips **13***a* on each side of the bus bar **12**. When, however, the barrel unit is held against longitudinal movement, the moving chains will rotate the sprocket wheels **4** and rotate the barrel **1**. The bus bars **12** are electrically connected to the electrodes **8** through

the chains **13**, sprocket wheels **4**, shaft **3** and head frame **2** which are all formed of electric conducting material and this electrical contact is maintained whilst the sprocket wheels **4** are in engagement with the chains **13**. Thus a barrel unit A is free to be lifted from the vat and can be lowered into electric and mechanical operative position, merely by lowering the sprocket wheels **4** into engagement with the chains **13**. An anode carrying tray **10***a* is mounted in the vat. The chains are driven conveniently by an electric motor at any predetermined speed and when the sprockets **4** are in engagement with the chains **13**, the barrel unit will move along the vat **10** without the barrel **1** being rotated, but when the barrel unit A moves against a stop, the sprockets **4** will be rotated by the moving chain **13** and rotate the barrel **1**. A number of barrel units can be arranged in a vat **10** to successively pass step by step from the feed end of the vat **10** to the discharge end. For this purpose stops are provided to retain the barrel units A in predetermined positions where the barrels are rotated, the stops being releasable to allow the barrel units A to travel along the vat. In one form, a stop **16** comprises a member mounted to rotate on a pivot **17** and having four arms **16***a* against one of which an arm **18** of a solenoid **19** lies to prevent rotation, whilst another arm **16***a* forms a stop against which the end of the spindle **3** moves. When the solenoid **19** is energised, the arm **18** is withdrawn which allows the barrel unit to be carried forward to another stop by the moving chain **13**. The solenoids **19** can be manually or automatically switched on at timed intervals which controls the time a barrel unit A stops at each station and time of the electro-plating process.

The barrel units A can be lowered on to the chain **13** manually at the feed end of the vat and lifted out manually at the discharge end of the vat after the electro-plating process. The barrel units A can be automatically fed into the vat and automatically removed therefrom, and in the form illustrated, an automatic feed or discharge device comprises two endless chains **20** each running over four sprocket wheels **21** mounted on a frame **22** and the top pair of sprocket wheels **21** are driven from the shaft **23** by means of an electric motor and belt transmission **23***a*. Pivotally mounted on links of the chains **20** are U-shaped cradles **24** which are engaged by the ends of the shaft **3**, so that one vertical run **20***a* can pick up a barrel unit A whilst the other straight run **20***a* deposits the barrel unit A on the chain **13**. The speed of the chain **20** is such that a barrel unit is deposited at the station B, each time a barrel unit A has moved from the station B to the station C (Figure 1). A conveyor chain similar to **20** is arranged at the discharge end of the vat, so that a straight run **20***a* picks up a barrel unit A from the discharge end of the vat and deposits same from the other straight run **20***a*. The automatic discharge device is exactly the same as the feed device.

In a simple form of the invention, one barrel unit A is accommodated in a vat **10** and is not moved longitudinally in the vat, the chain **13** only effecting the rotation of a barrel **1**. A feature of the invention is that a shaft **15** on which are mounted sprockets **14** driving the chain **13** is driven by an electric motor and therefore the electric motor does not form part of the barrel unit A and is located clear of any fumes rising from the vat **10**.

The device can also be used for treating articles in the barrel **1** in any liquid contained in a vat **10**.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent, is:

1. Apparatus for electro-plating or treating articles in which the articles to be treated are contained in a rotating barrel immersed in a liquid contained in a vat, comprising a barrel self-contained unit formed of a frame, a shaft mounted on the frame, a barrel suspended from the

shaft, means for rotating the barrel from the shaft comprising belt pulleys on the shaft and the barrel, drive belts engaging the pulleys for rotating the barrel and suspending the barrel from the shaft, and chain sprocket wheels on the shaft, and an independent chain drive for driving said sprocket wheels and the shaft comprising an endless chain mounted on each side of the vat, ledges on the vat on which the upper runs of the chains are supported so that the sprocket wheels on the shaft of said barrel self contained unit are supported by the chains whereby the chains can carry said unit along the vat and whereby when the unit is held against longitudinal movement the chains rotate the barrel, and stops preventing the barrel self contained unit from traveling longitudinally of the vat, so that the chains rotate said shaft and the barrel, and means for releasing the stops so that the chains are free to carry the barrel unitary structure longitudinally along the vat.

2. Apparatus for electro-plating or treating articles in which the articles to be treated are contained in a rotating barrel immersed in a liquid contained in a vat, comprising a barrel self-contained unit formed of a frame, a shaft mounted on the frame, sprocket wheels on the shaft, all formed of electric conducting material, a barrel suspended from said shaft, means for rotating the barrel from the shaft comprising belt pulleys on the shaft and

the barrel, drive belts engaging the pulleys for rotating the barrel and supporting the barrel from the shaft and sprocket wheels on the shaft, and electric conducting bus bars mounted on said ledges and insulated from the sides of the vat on which said upper run of the chain slides, electrodes mounted on said frame and projecting inside the barrel and said frame of the barrel unit, said shaft mounted thereon and said sprocket wheels and chains engaging thereon forming electric conductors electrically connecting the bus bars to the electrodes so that said electrodes are in the charging electric circuit through the bus bars, driving chain, sprocket wheels and frame.

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