July 13, 1926. 1,592,727

F. ENGEL

PLATE PASTING MACHINE

Original Filed July 12, 1916 3 Sheets-Sheet 1

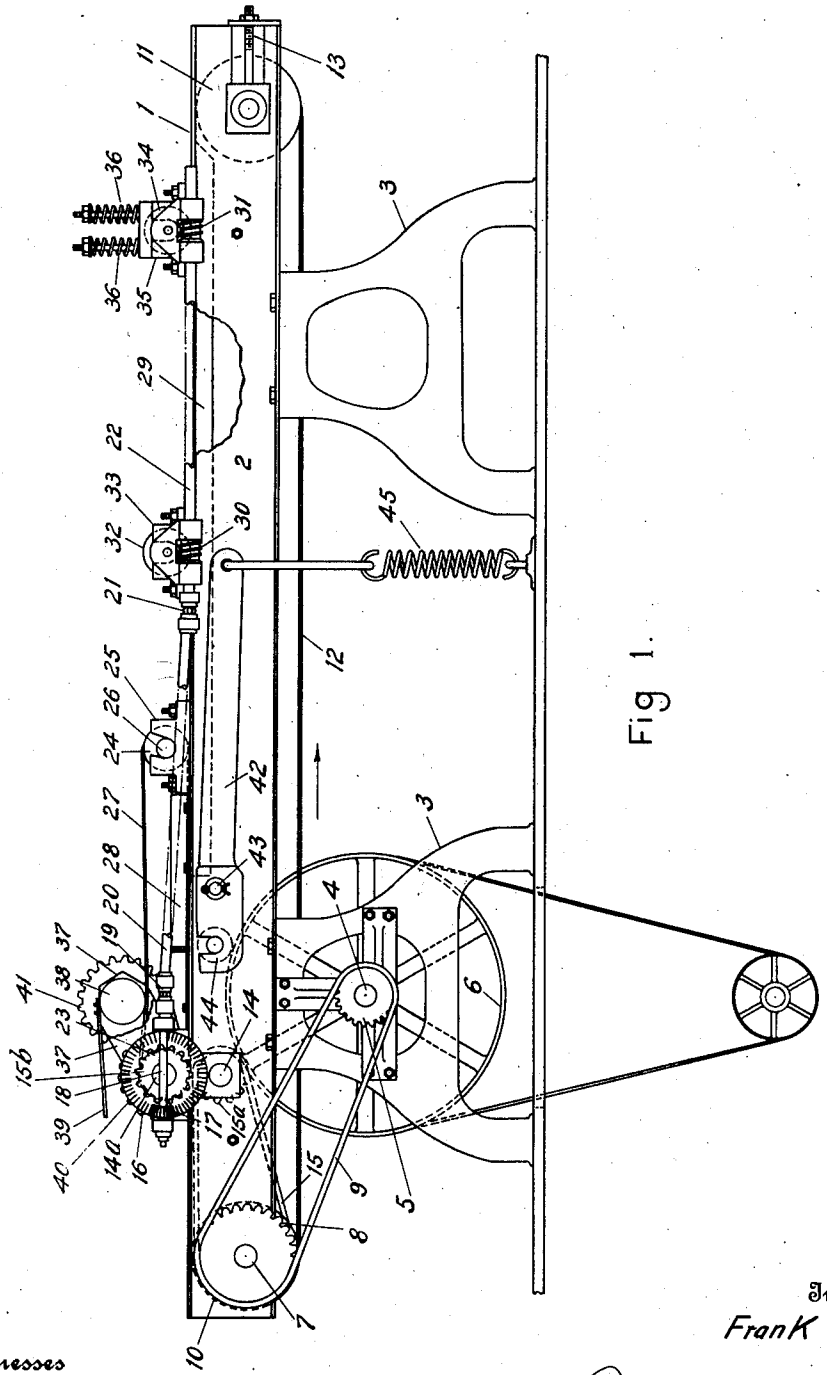


Fig 1.

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PLATE PASTING MACHINE

Original Filed July 12, 1916 3 Sheets-Sheet 2

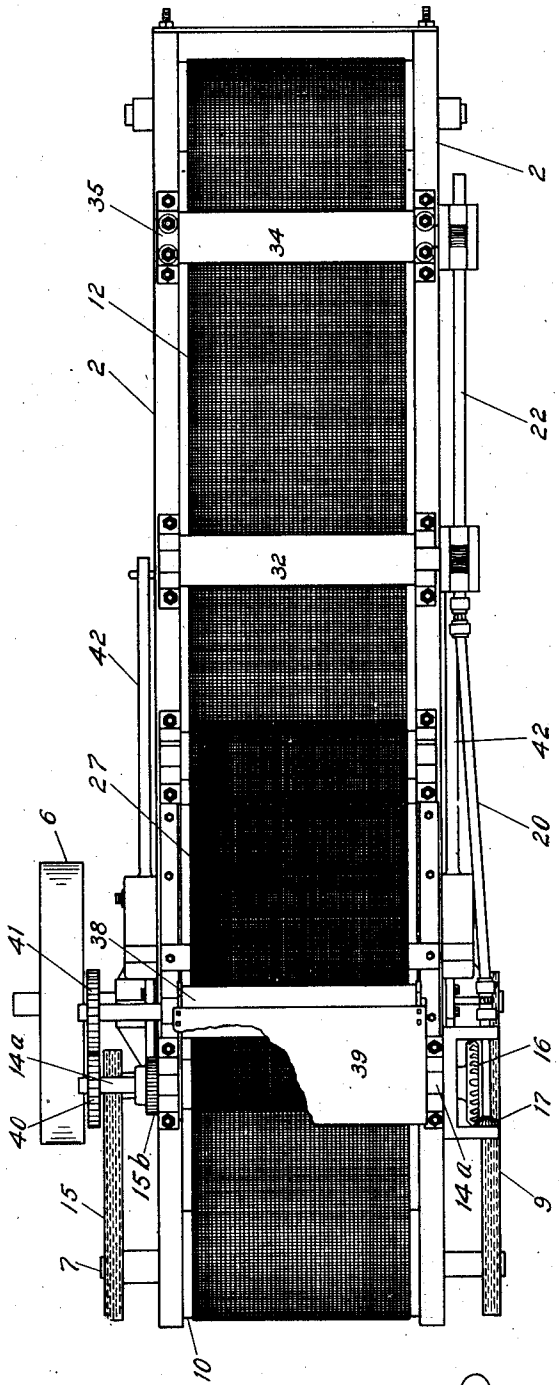


Fig 2

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PLATE PASTING MACHINE

Original Filed July 12, 1916 3 Sheets-Sheet 3

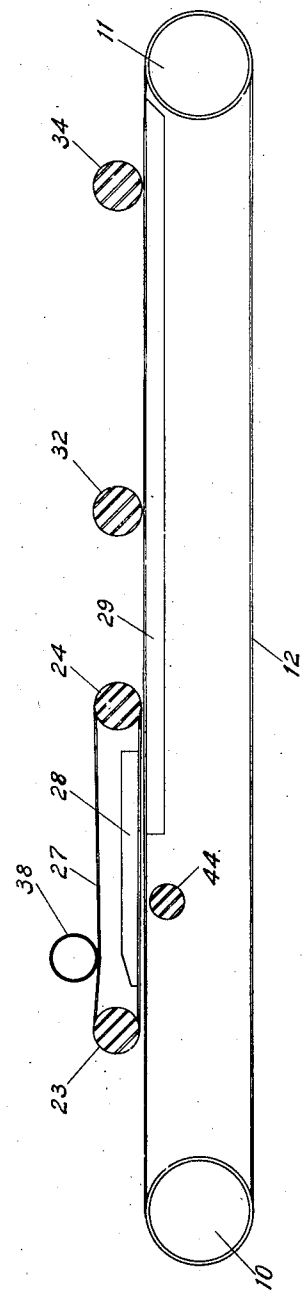


Fig. 3

Witnesses
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UNITED STATES PATENT OFFICE.

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PLATE-PASTING MACHINE.

Application filed July 12, 1916, Serial No. 108,947. Renewed August 25, 1925.

The present invention relates to plate pasting machines.

In the manufacture of storage battery plates of the Faure type, it has been the practice with many manufacturers to apply the paste to the battery grids by hand. This is a laborious and therefore an expensive process. Various machines have been designed and are being used for applying the paste to the grids. The present invention relates to improvements in machines for carrying out the process of applying the paste to the grids.

One of the objects of the present invention is to provide a plate pasting machine in which the paste will be applied to the grids under a uniform pressure, resulting in a uniform product.

A further object is to provide a machine which will not only completely and uniformly fill the grids, but will accomplish the operation of finishing the faces of the battery plate.

A further object is to provide a machine for pasting battery plates which is simple in construction and which will enable battery plates to be manufactured more expeditiously and cheaply than has heretofore been possible.

A further object is to provide a method of applying paste to battery grids wherein, should there be an incomplete filling of the grids, such deficiency will be at once apparent on inspection.

A further object is to provide an improved method of pasting and finishing battery plates.

Reference will now be made to the drawings in which—

Figure 1 represents one embodiment of the present invention.

Figure 2 represents a plan view.

Figure 3 is a diagrammatic view illustrating the principles of the invention.

Referring now particularly to Figure 1, the numeral 1 indicates the bed of the machine, which bed has side plates 2, 2. The bed 1 is firmly mounted upon legs 3, 3. One of said legs carries a shaft 4 which extends transversely of the machine. Said shaft 4 has mounted thereon a sprocket 5 on one side of the machine. Mounted on the shaft 4 on the opposite side of the machine, is a pulley 6, which is adapted to have belted connection with any suitable source of power. Mounted on the bed 1 is a transversely extending shaft 7, upon one end of which is a sprocket 8. A chain 9 is adapted to transmit power from the sprocket 5 to the sprocket 8. The shaft 7 is provided with a transversely extending drum 10. Mounted on the other end of the machine is a transversely extending and rotatably mounted drum 11, which will preferably be of the same dimensions as the drum 10. Mounted on the drums 10 and 11 is a belt 12 which may be of any suitable fabric, preferably canvas. If desired, the belt may consist of a suitable supporting material, as for instance, leather, which leather will be covered with fabric. The belt 12 should be held taut during service and for that purpose the adjusting bolts 13 are provided, by means of which the drum 11 may be adjusted longitudinally of the machine.

Extending transversely of the machine is a shaft 14, one end of which is connected by a suitable chain 15 with the shaft 7. Extending parallel with the shaft 14 is a shaft 14^a. Said shafts 14 and 14^a are connected by gears 15^a and 15^b. Mounted on the shaft 14^a, at the end of said shaft, opposite to the gear 15^b, is a bevel gear 16 adapted to co-operate with a second bevel gear 17. The bevel gear 17 is securely mounted on the shaft 18, which operates through a universal joint 19 to drive a shaft 20. The shaft 20 acts through a universal joint 21 to drive the shaft 22. Mounted on shaft 14^a is a drum 23. Co-operating with the drum 23 is another drum 24 which is adapted to rotate on trunnions 25 which are securely fastened to the bed 1. The drum 24 is provided with pins 26 which will ride in slots in the trunnions 25, whereby the drum 24 may yield in a vertical direction to allow for inequalities in the thickness of the battery grids passing thereunder. The drums 23 and 24 carry a belt 27 of any suitable fabric, preferably canvas. Mounted within the confines of the belt 27 is a board 28. The belt 27, in the lowermost part of its travel, is adapted to contact with the lower side of said board 28. Mounted within the confines of the belt 12 is a board 29. In the upper part of its travel, the belt 12 will contact with the upper side of the board 29.

The shaft 22 is provided with worms 30 and 31. The worm 30 is adapted to drive the roller 32 through a suitable worm-wheel. The roller 32 is mounted in trunnions 33.

The trunnions 33 will be provided with slots which will permit of a vertical movement of the roller 32. The worm 31 is adapted to drive the roller 34 through a suitable worm-wheel. The roller 34 is mounted in trunnions 35. These trunnions 35 will also be provided with slots, permitting the vertical movement of the roller 34. Preferably, the roller 34 will be spring-pressed by springs 36, 36, to its lowermost position. The roller 32 may be similarly spring-pressed to its lowermost position, if desired. The driving means for the roller 34 will preferably be so designed that the peripheral speed of said roller is less than the speed of translation of the belt 12, whereby said roller will effectively pack paste into the grids.

Pivotally mounted on either side of the bed 1, preferably on the shaft 14^a, are two bracket members 37, 37. Said brackets are adapted to carry a roller 38 which will be positively driven from the shaft 14^a by suitable transmission means, illustrated in Fig. 2 as a pair of gears 40 and 41. The roller 38 is adapted to contact with the belt 27 and will scrape off any excess of paste adhering to said belt 27. Also mounted on the brackets 37, 37 is the scraper 39 which will engage the roller 38 to scrape off the paste from said roller. The paste may be collected from the scraper 39 in any suitable way. The rollers 32, 34 and 38 which are intended to come in direct contact with the paste, will preferably be made of brass, or at least have a brass surface. The rollers 23, 24, 10 and 11 may be of any suitable material, preferably hardened steel.

Mounted on both sides of the bed are levers 42, 42, pivoted to the transversely extending shaft 43. Rotatably mounted in suitable slots in said levers 42 is a roller 44. The other ends of said levers 42 are spring-held downwardly by means of springs 45, 45. It will be evident that the action of the springs 45, 45, will urge the roller 44 up against the inside surface of the belt 12, urging belts 12 and 27 together. The board 28 will act as an abutment.

A mode of operation of the above described embodiment of the present invention is substantially as follows. Power will be communicated to the pulley 6 acting through the sprocket 5, chain 9, sprocket 8, to rotate the drum 10. Rotation of the drum 10 will drive the belt 12 in the direction indicated by the arrow in Fig. 1. Rotation will also be communicated through the chain 15 and gears 15^a and 15^b, to the drum 23, which will drive the belt 27. Furthermore, motion will be communicated from the shaft 14, bevel gears 16 and 17 and shaft 20 to the shaft 22. Rotation of the shaft 22 acting through worms 30 and 31 will drive the rollers 32 and 34. Battery grids will be placed on the moving belt at the right hand end of the machine as viewed in Fig. 1. At the same time, paste will be applied at the roller 34. As the belt 12 feeds the grids underneath the roller 34, said roller 34 will pack the paste into the grids. The belt 12, acting against the board 29, will act as a perfectly flat surface upon which the packing is done. After passing under the roller 34, the grids will be carried by the belt 12 in a left hand direction, as viewed in Fig. 1, under the roller 32. The roller 32, acting against the belt which is supported by the board 29, will further pack the paste into the grids. As the belt 12 carries the grids farther to the left, they will come between the belts 12 and 27. At this point the board 28 will act as an abutment against which pressure will be communicated by the roller 44. The two belts will be firmly pressed against the two sides of the grids, finishing the surfaces thereof. It will be noted that the rollers which serve to exert pressure against the grids as they pass along the firmly mounted abutments, will all yield to allow for inequalities in the thickness of the grids. It will be noted that boards 28 and 29 are shown as overlapping. These boards will be spaced apart a sufficient distance to permit of the passage between them of the thickest grids which it is desired to use in the machine. As the grids pass out from between the belts 27 and 12 at the left hand end of the machine, they will have been firmly packed with paste and the surfaces of the paste will have been finished.

The belt 27 may, in service, collect considerable paste. This paste will be collected from the belt 27 by the roller 38, from which it will be scraped off by the scraper 39.

Not only will the roller 38 act as a means for collecting paste from the belt 27, but it will also serve to keep the belt 27 taut.

It will be apparent that by the machine and the method disclosed, any size grid up to the capacity of the machine, or a plurality of grids may be fed into the machine. Furthermore, due to the fact that the various rollers have a yielding action, various sizes of grids may be used without changing the adjustment of the various parts. When the plates leave the machine, they will be perfectly finished, requiring no further operation upon their surfaces. Furthermore, should there be any incomplete filling of the grids, as through any defect in the paste, such deficiency will at once show up on the bottom side of the grids. This is a decided advantage for the following reasons. When paste is applied to the grids from the two sides, the material, meeting in the center, it will frequently occur that there will be a distinct line of cleavage down the center of the plate and perhaps an open space therein. Such deficiencies will not be apparent upon inspection for the reason that an in-

spection of the two surfaces would indicate a perfectly filled grid. According to this invention, however, wherein the paste is applied from one side against an abutment and the sides being thereafter subjected to a finishing operation, any deficiency in the filling of the grid will at once be apparent upon an inspection of the bottom side thereof.

One embodiment of the present invention has been described in detail. Various modifications may be made therein without departing from the scope of the invention. This case is intended to cover all such modifications falling within the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States is:—

1. A machine for pasting storage battery grids comprising a pair of belts mounted to engage the two sides of a storage battery grid, said belts being instrumental in forcing active material into the grids.

2. A plate pasting machine comprising belt means mounted to engage the two sides of a storage battery grid, and means for forcing paste into said grid, said belts cooperating in pressing active material into the grid.

3. A plate pasting machine comprising fabric belt means mounted to engage the two sides of a storage battery grid, and means for forcing paste into said grid, said forcing means including as a part thereof abutment means mounted within said belt means.

4. A machine for pasting storage battery grids comprising a pair of fabric belts mounted to engage the two sides of a storage battery grid, and means for urging said belts together whereby paste will be firmly packed within the confines of said grid.

5. In a plate pasting machine, in combination, pressure exerting means for applying paste to a grid and a pair of pressure exerting fabric belts mounted to engage the two sides of said grid for finishing both sides of said paste.

6. In combination, a belt adapted to carry a grid, means for driving said belt, a roller adjacent said belt for packing paste into said grid, and means for driving said roller at a lower peripheral speed than the speed of translation of said belt.

7. In a plate pasting machine, in combination, a traveling belt adapted to carry battery grids, yieldably mounted rolls adapted to pack paste into said grids between said rolls and said belt, a second belt adapted with the first mentioned belt to embrace said battery grids, and yieldable means for urging said belts together to finish the surface of said paste.

8. In a grid pasting machine, in combination, a traveling belt, rolling means adapted to contact directly with a grid cooperating therewith to pack paste into said grid, and other means exerting pressure against said belt for applying a finished surface to said paste.

9. The method of finishing pasted battery plates which consists of subjecting freshly packed grids to pressure between fabric members.

10. The method of finishing pasted battery plates which consists of inserting freshly packed grids between fabric members and applying pressure thereto with a rolling action.

11. In a plate pasting machine, in combination, means for packing paste into a grid, and fabric means and rolling means for subjecting the packed grid to pressure between said fabric means.

12. In a plate pasting machine, grid transporting means, roller paste packing means, means for driving said transporting means, and means for driving said roller means at a lower peripheral speed than the speed of translation of said transporting means.

13. The method of pasting grids which consists of subjecting a grid to a movement of translation, and packing paste into said grid with a rolling movement, the peripheral speed of said rolling movement being less than the speed of translation of said grid.

14. In combination, a belt adapted to carry a grid, means for driving said belt, means for packing paste into a grid with a rolling motion, and means for driving said packing means at a lower speed than the speed of translation of said belt.

15. In a plate pasting machine, in combination, a grid conveying belt, means for packing paste into a grid with a rolling motion, fabric means for applying a finishing surface to said paste, and means for driving said packing means at a lower speed than the speed of translation of said belt.

In witness whereof, I have hereunto subscribed my name.

FRANK ENGEL.