May 25, 1937. H. WILLSHAW ET AL 2,081,442

APPARATUS FOR PAINTING OR SIMILARLY TREATING OBJECTS SUCH AS GOLF BALLS

Filed Aug. 11, 1936 2 Sheets-Sheet 1

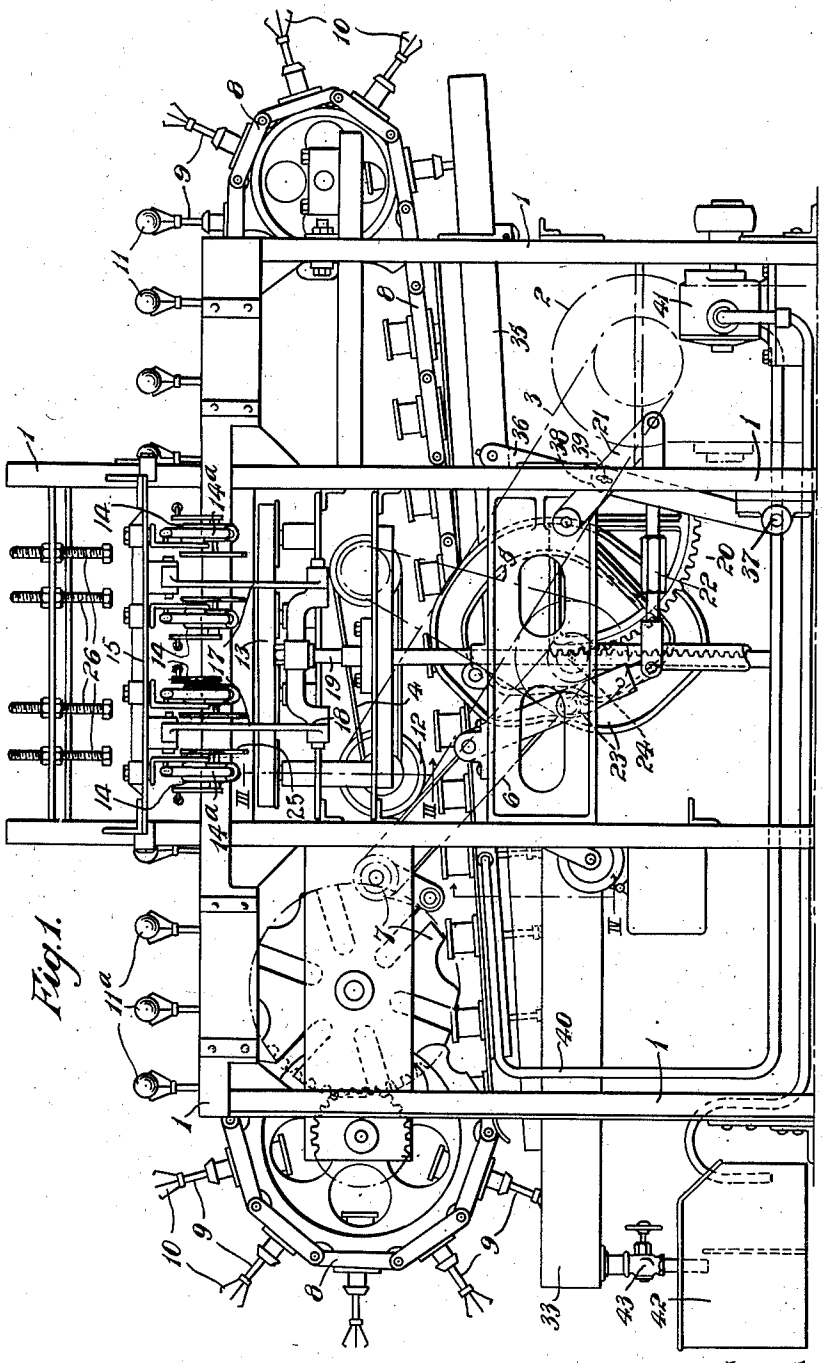


Fig. 1.

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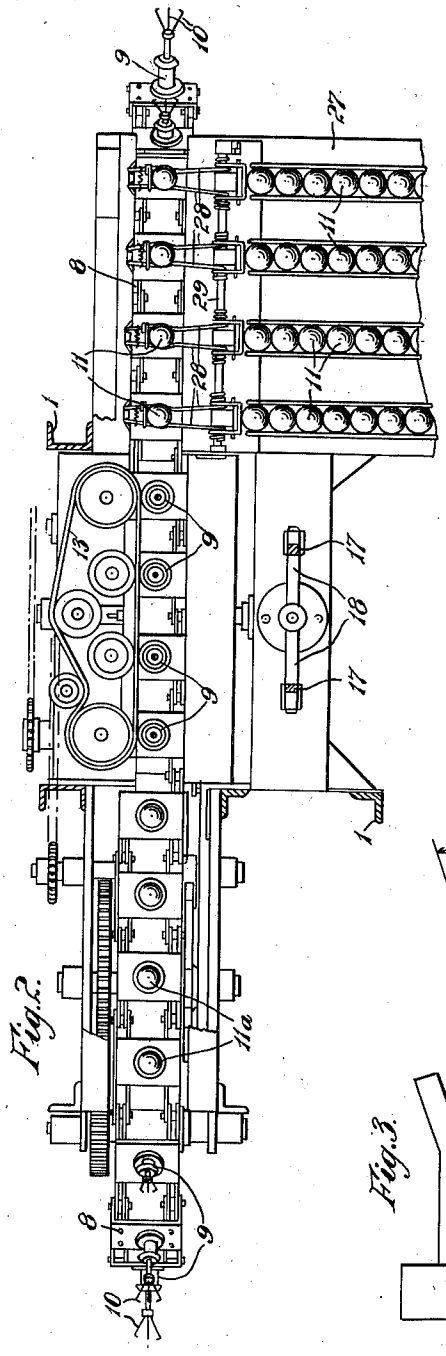


Fig. 2.

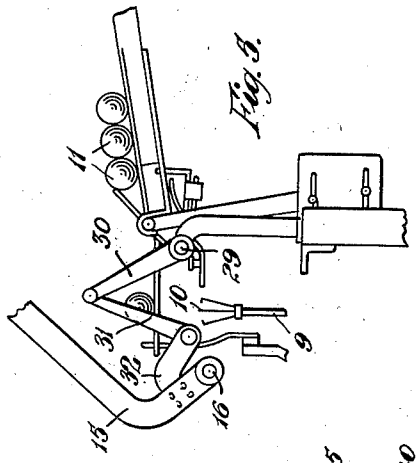


Fig. 5.

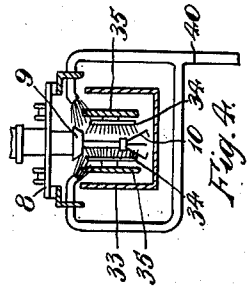


Fig. 4.

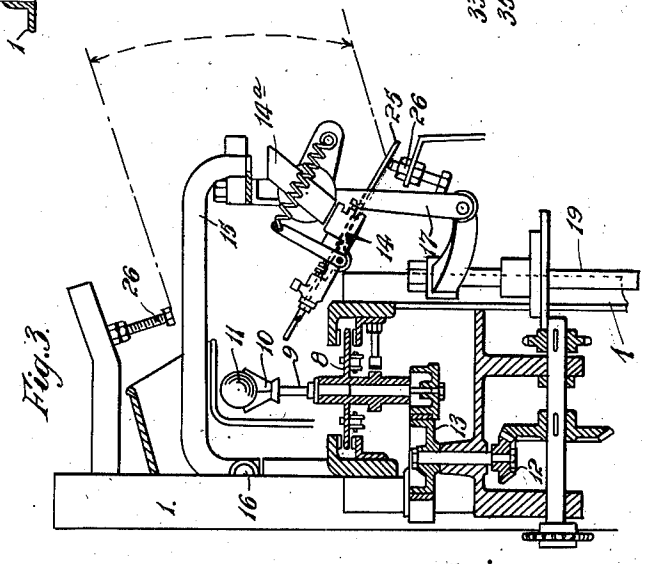


Fig. 3.

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UNITED STATES PATENT OFFICE

2,081,442

APPARATUS FOR PAINTING OR SIMILARLY TREATING OBJECTS SUCH AS GOLF BALLS

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Application August 11, 1936, Serial No. 95,350
In Great Britain July 1, 1935

8 Claims. (Cl. 91—45)

This invention relates to improvements in apparatus for painting or similarly treating objects such as golf balls, particularly where the paint is to be applied to the whole of the external surface of an object of spherical or similar shape.

Our present invention provides apparatus wherein an even and uniform coating of paint is applied to the objects to be painted by mechanical means operating automatically and in correlated sequence so that it is only necessary to supply and remove the articles with a consequent minimum labor requirement.

According to our invention, apparatus for painting or similarly treating objects, such as golf balls, comprises upstanding object supporting or carrying devices rotatably mounted in a horizontally disposed endless conveyor adapted to be mechanically driven to travel intermittently so as to bring repeatedly a selected number of said object supporting devices to a position whereat automatically the latter are rotated by mechanical means correlated with and operated through gears driven from the same source of power as that driving the mechanism operating the conveyor.

Coincidentally, further mechanism correlated with and driven from the same source of power as that already referred to operates during predetermined intermittently repeated intervals to move paint spraying (or other treatment) guns relatively to the rotated object supporting devices, the arrangement being such that throughout their movement, or substantially so, the guns are free to discharge paint or other fluid onto the rotated objects and that while stationary the discharge of paint is automatically precluded.

The objects to be painted or otherwise treated may be fed in automatically continued intermittent sequence to the supporting or carrying devices through mechanism functioning in conjunction or synchronized with the moving mechanism.

An embodiment of the invention comprises apparatus for spray painting golf balls, and in order that the invention may be more clearly understood and readily carried into practical effect, it is illustrated by way of example in the accompanying drawings wherein—

Fig. 1 is a view, in side elevation, of a machine constructed to operate in accordance with this invention.

Fig. 2 is a plan view of parts of the machine shown in Fig. 1 with the addition thereto of the automatic feed arrangements.

Fig. 3 is a sectional view on the line 3—3 of Fig. 1.

Fig. 4 is a sectional view on the line 4—4 of Fig. 1.

Fig. 5 is a fragmentary detail view showing the connection from the mechanism operating to move the spray guns, to operate the mechanism of the loading device.

Referring to the drawings, in association with a suitable machine frame 1 is a power motor 2 from which power for operating the machine is transmitted through a series of transmissions 3, 4, 5, 6 to a Geneva mechanism 7. The Geneva mechanism 7 functions to traverse in an intermittent travel an endless chain conveyor 8 disposed in a top and bottom flight horizontally of the machine frame. From the face of the conveyor 8 project, upstandingly, a plurality of ball supporting devices 9 rotatably mounted in mutually spaced relation and each comprising a plurality of suitably mounted wire fingers 10 for supporting the balls 11.

In addition to the transmission 4, the transmission 3 drives, through suitable bevel gear 12 (Fig. 3) an endless band 13, the arrangement of which may be particularly understood from Fig. 2 where the band 13 is seen in frictional driving contact with four of the rotatably mounted ball supporting devices 9. The endless band 13 is continuously driven.

Four spray painting guns 14 are mounted in the positions 14a (Fig. 1) adjacent and parallel with the center part of the top flight of the conveyor 8. The guns 14 are collectively mounted and carried by a frame 15 in which they are arranged in mutually spaced relationship corresponding to that of the ball supporting devices 9. The frame 15 is mounted to pivot at 16 in the machine frame 1 by which the said frame 15 is adapted in operation to move the guns 14 through an arc, the extent and direction of which is indicated on Fig. 3 of the drawings.

Movement of the frame 15 about its pivot 16 is effected through arms 17 carried on a member 18 on a vertically disposed rod 19, the latter having toothed engagement with a quadrant 20 moved by a lever 21 which is connected, through the adjustment rod 22, with the usual cam and roller mechanism 23 rotating on the drive spindle 24.

The arrangement of the cam and roller mechanism 23 is such that, automatically, the speed of movement of the gun carrying frame 15 is varied as the latter travels between the limits of the arc referred to so that at or about the center thereof the speed is reduced compatible with the variation in ball area at which the guns are directed.

The functioning of the cam and roller mechanism 23 operating to move the paint guns 14 is synchronized with the intervals between movement of the conveyor 8 so that the paint guns are stationary at their starting positions during movement of the chain conveyor 8 and the ball supporting devices 9 are at rest in correct position for painting during movement of the paint guns.

Automatic control of discharge of paint from the guns is effected by operation of the gun valves through a part 25 moving under contact with stops 26 at each limit of the arc movement to close the valves against spring action operating on freedom of the part from contact, to maintain the valves open. As the paint guns are at the starting position during movement of the conveyor 8, the stops 28 prevent the spraying during this interval of movement.

The balls 11 are automatically fed to the ball supporting devices 9 from a gravity feed tray 27 (Fig. 2) whereon the balls are placed by the operator. Any suitable feed mechanism may be employed.

As shown, the gravity feed is to four points spaced to agree with the spacing of the ball supporting devices. At each of these four points a ball is received by mechanism whereby, in continued or repeated intermittent predetermined time sequence, it is supported immediately over the respective ball supporting device 9, spaced wires 28 adapted upon operation through link mechanism to be moved apart to allow the ball to drop onto the ball supporting device. The moving apart of the spaced members is effected through their contact with a plate, tapered and suitably positioned to this end as described in said co-pending application.

The link mechanism operating the mechanism of the gravity feed is operated from and in correlation with the mechanism operating to move the paint guns 14 and so indirectly from the main drive of the machine. As shown in Fig. 5, the main spindle 29 of the gravity feed mechanism is operated through links 30, 31, and an arm 32, which latter is fixed on the gun frame 15 and moves with it.

Means are provided for automatically subjecting the ball supporting devices to a cleaning operation subsequent to the painting operation. Such means are conveniently located to operate in the lower return flight of the conveyor where the ball supporting devices 9 are carried, by the conveyor 8, through a trough 33 (Figs. 1 and 4) where brushes 34 are arranged to contact operatively with the ball supporting devices 9 as the latter are carried along by the conveyor 8. The brushes 34 are mounted on brackets 35 adapted to be slidably reciprocated by mechanism comprising a lever 36 pivoted on the spindle 37 and moving with a lever 38 connected at 39 in the lever 21.

A paint solvent, such as turpentine, to cooperate with the cleaning brushes is supplied by a pipe 40 from a pump 41, which circulates from the sump 42 into which the trough 33 drains through the cock 43.

Briefly, the sequence of operation is as follows: A supply of balls 11 to be painted is placed by the operator upon the gravity feed tray 27, this supply being renewed from time to time. The machine is set in motion and the balls 11 are automatically fed, four at a time, onto the ball supporting devices 9 carried by the intermittently moving conveyor 8, the intermittent movement being of course to the extent of carrying the four ball supporting devices 9 clear of the automatic feed to the painting station and bringing four more empty ball supporting devices 9 to their loading stations.

Immediately the loaded ball supporting devices 9 enter, and during their stay in the painting station, they are rotated through the flexible band friction drive 13 and simultaneously the paint guns 14 are moved through the arc movement or movements by the frame 15 and its mechanism and discharge paint onto the balls, there being an interval in the movement of the conveyor 8 during which the second four ball supporting devices 9 are loaded.

On completion of the arc movement or movements, the number of which is selected by adjustment of the cam arrangements, and in this case can be taken as two, the conveyor 8 moves to carry the painted balls 11*a* clear of the painting station and bring thereto four further loaded ball supporting devices 9.

The operator may now remove the painted balls 11*a* from the ball supporting devices 9 and the latter, on further subsequent movement of the conveyor 8, are carried ultimately to the cleaning brushes 34 in the lower flight of the conveyor 8 from which they are carried to the top flight of the conveyor 8 to participate in a repetition of the operations.

It will be understood that the invention is not restricted to the spray painting of golf balls, and that the apparatus may be adapted to deal with analogous objects and for other treatment than painting without departing from the spirit of the invention.

What we claim is:—

1. Apparatus for painting or superficially treating objects such as golf balls which comprises a horizontally disposed endless chain conveyor, upstanding object supporting devices at spaced intervals in said conveyor, means for successively loading groups of said supporting devices, the individual devices of said groups being simultaneously loaded, means to drive said conveyor intermittently to bring said loaded groups of the object supporting devices successively to treating position, means to rotate said supporting devices about an axis of the supported objects while at said treating position, spraying means corresponding in number to the supporting devices of a group and located at predetermined positions relative to the respective supporting means, means common to all said spraying means for simultaneously swinging them in an arc centered on the respective supported objects while said objects are in treating position and means to render said spraying means inoperative while the conveyor is moving the object supporting devices to the treating position.

2. The apparatus of claim 1, wherein the spray means includes a control lever resiliently urged toward open position, and respective stops effective to close said lever at the two extreme positions of its arcuate travel.

3. The apparatus of claim 1, wherein the loading means includes mechanism synchronized with the intermittently driven conveyor to position articles on said supporting devices in advance of said sprayer.

4. Apparatus for painting or superficially treating objects such as golf balls which comprises a horizontally disposed endless chain conveyor, upstanding object supporting devices at spaced intervals in said conveyor, means for successively

loading groups of said supporting devices, the individual devices of said groups being simultaneously loaded, means to drive said conveyor intermittently to bring said loaded groups of the object supporting devices successively to treating position, means to rotate said supporting devices about an axis of the supported objects while at said treating position, spraying means corresponding in number to the supporting devices of a group and located at predetermined positions relative to the respective supporting means, means common to all said spraying means for simultaneously swinging them in an arc while said objects are in treating position, and means to maintain said spraying means operative in all positions of the arc except the starting and stopping positions thereof.

5. The apparatus of claim 4 having means to move said spraying means more slowly at the central part of the arc than near the ends.

6. The apparatus of claim 4 and a cam mechanism effective to move the spraying devices more slowly toward the midpoint of the arc than at the ends thereof.

7. The apparatus of claim 4 having means to wash said supporting devices after passing the spraying station.

8. The apparatus of claim 4 and means comprising brushes and a solvent trough for removing the paint from the supporting devices after the latter pass the spraying station.

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