C. L. BURDICK.

PAINTING MACHINE.

APPLICATION FILED FEB. 1, 1918.

1,313,670.

Patented Aug. 19, 1919.

3 SHEETS—SHEET 1.

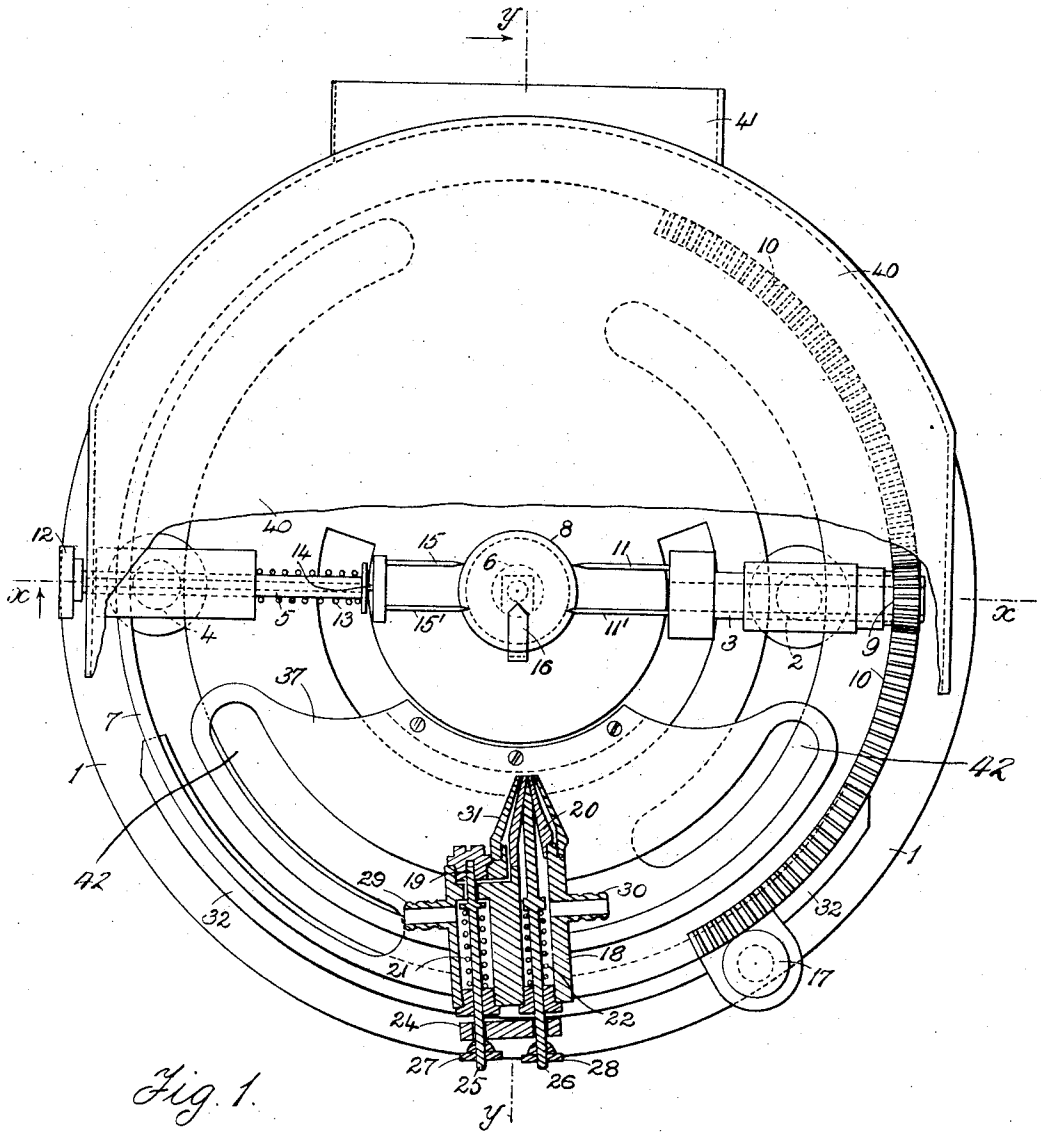


Fig. 1.

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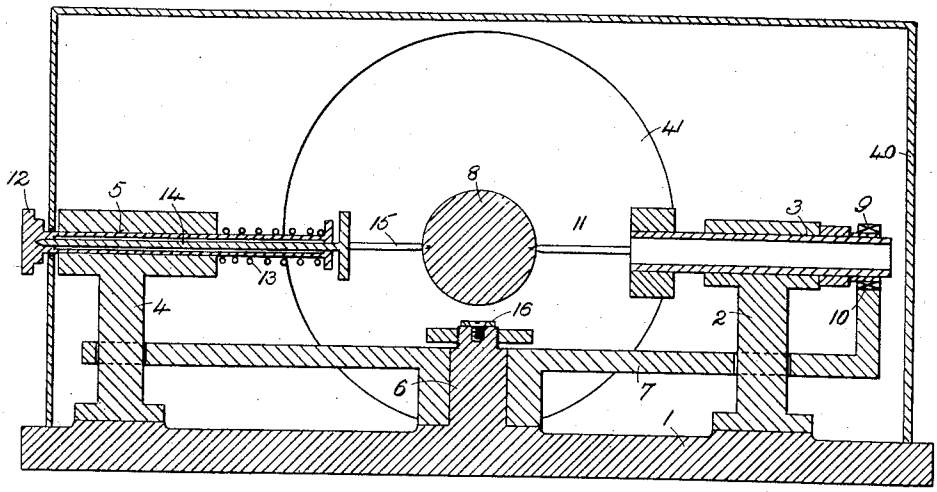


Fig. 2.

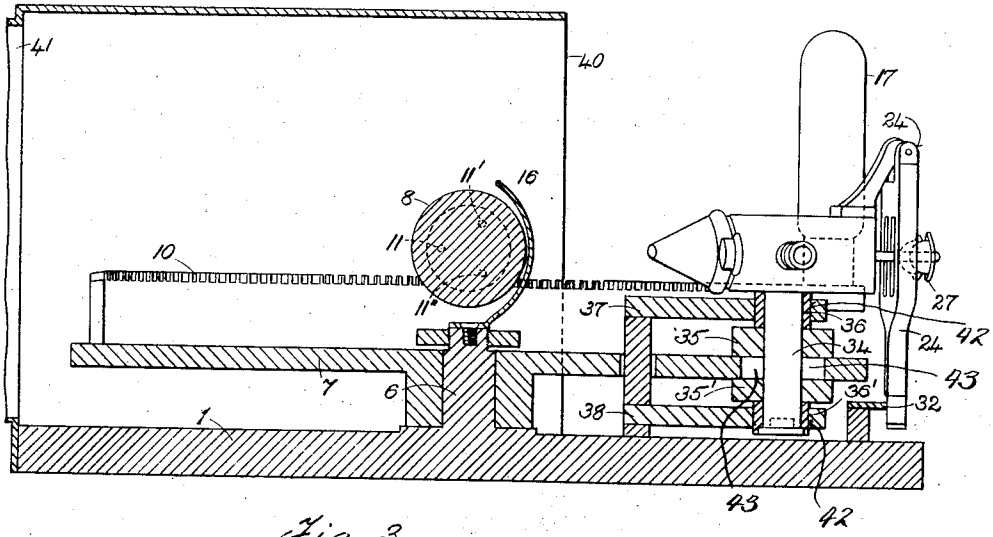


Fig. 3.

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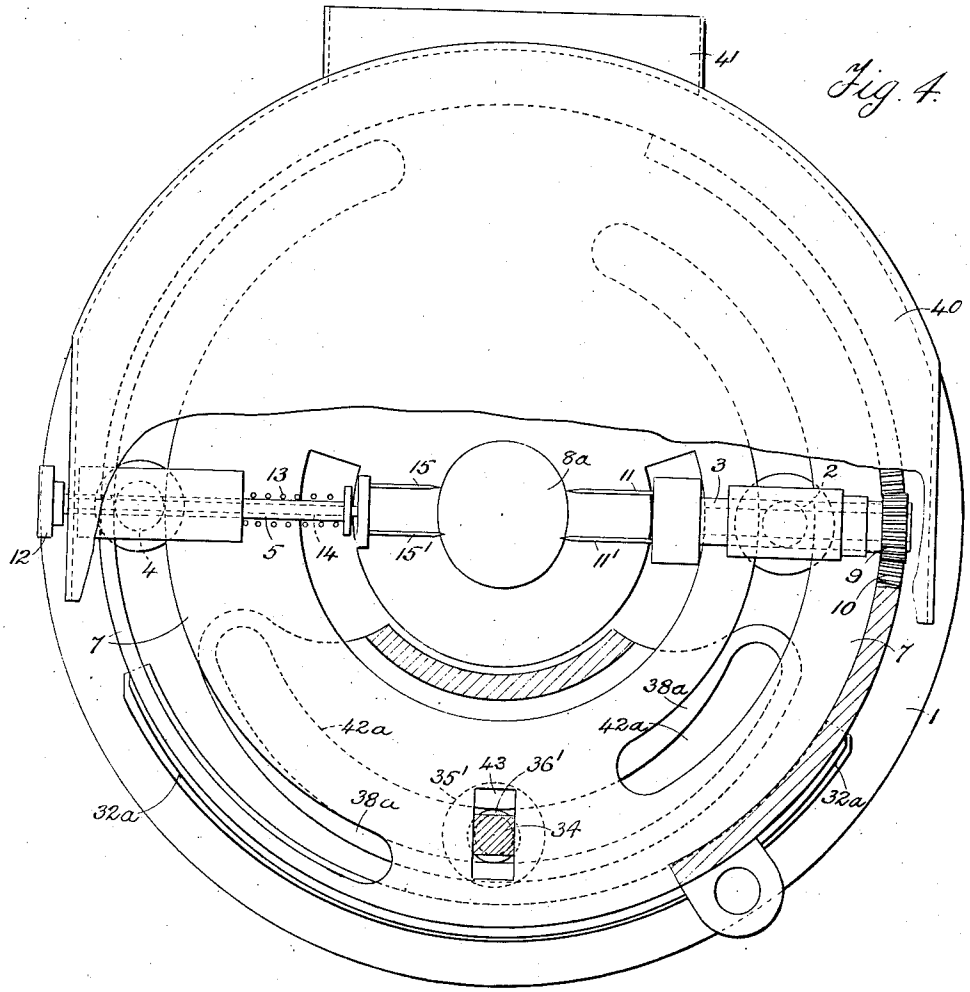
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3 SHEETS—SHEET 3.

Fig. 4.



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UNITED STATES PATENT OFFICE.

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PAINTING-MACHINE.

1,313,670. Specification of Letters Patent. Patented Aug. 19, 1919.

Application filed February 1, 1918. Serial No. 214,932.

To all whom it may concern:

Be it known that I, CHARLES LAURENCE BURDICK, a citizen of the United States, residing at Wood Green, in the county of London, England, have invented new and useful Improvements in Painting-Machines, of which the following is a specification.

My invention relates to machines designed for painting golf balls or other round or cylindrical objects. It may be used for distributing any liquid as oil, paint, lacquer, varnish and the like.

When small objects of this class are painted by hand there is considerable difficulty (owing to inconvenience of holding and turning the object) in obtaining a uniform coat.

I overcome this difficulty by rotating the ball or object and cause the paint to be deposited by means of a spraying instrument or instruments.

The spraying instrument is mounted on a pivoted frame-work in such a manner that it is kept in radial alinement with the object being painted, and is moved through the arc of a circle or any eccentric path in a manner permitting the paint to be blown on to the article from various angles, or varying positions.

By a convenient form of construction I provide that the article may be rotated in opposite directions in order to coat equally any projections from or unevenness of the surface painted.

By synchronizing the rotation of the object with the movement of the spraying instrument small articles are quickly and evenly coated.

I provide means for regulating the volume of paint distributed, for regulating the quantity delivered to any particular section of the article being painted, means for masking a portion of the article, special apparatus for holding the article and means for taking care of the dust or fumes from the spray.

My invention will be more fully set forth by reference to the accompanying drawings, in which—

Figure 1 is a diagrammatic plan view of one form of the invention showing details of the spraying mechanism in section.

Fig. 2 is a sectional view on the line X—X of Fig. 1.

Fig. 3 is a sectional view mainly on the line Y—Y of Fig. 1, but showing the spraying mechanism in elevation.

Fig. 4 is a view, similar to Fig. 1, with some of the parts removed, illustrating a modified arrangement.

As shown in the drawings, 1 is a base or platform; 2 is a standard mounted on the base and carrying a journaled spindle or shaft 3; 4 is a similar standard carrying a tail stock 5; 6 is a stud on which is mounted a disk 7; 8 may represent any article to be painted, varnished or otherwise treated.

A small pinion wheel 9 mounted on the shaft 3 engages with a rack 10 or segment of a gear wheel which is secured to or integral with the disk 7.

The spindle 3 is provided with a head carrying three taper pins 11, 11′, 11″ which in this case are used to hold the article to be painted, but I wish to point out that this spindle may be provided with any of the well known chucks or devices which are used to hold articles in machine tools.

The tail stock is provided with a spring actuated spindle 5 having a knob 12 which enables the operator to quickly remove the painted article.

The spring 13 keeps the pressure normally on the article being painted; in order to avoid the friction consequent on rotating the spindle 5 with its spring, I provide a more slender interior shaft 14 having a head in which are mounted three taper pins, 15, 15′ 15″ which engage the article.

A mask 16 may be so positioned as to protect any part of the article from the paint.

17 is a handle for operating the machine.

The spraying apparatus 18 may be of any convenient form; it is provided with an air valve at 19 and a paint or liquid valve in the taper point of the conical piece 20; these valves are respectively actuated by springs 21 and 22 which normally keep the valves closed; they are opened to set the sprayer in action by means of the lever 24, this lever engages nuts 27 and 28 adjustably secured to the valve stems 25 and 26 respectively.

The lever 24 is provided with a friction roller which engages the edge of a cam-

shaped piece 32 which according to its shape and position controls the delivery of the paint from the sprayer.

Compressed air is led into the sprayer through the pipe or nipple 29 and paint is introduced through the nipple 30.

A cap or nozzle 31 with a circular opening is positioned over the paint discharge nozzle 20 so that a ring of escaping air surrounds the inner nozzle at the point of discharge.

In Figs. 1 to 3 the article to be painted is shown as circular in configuration, but in some instances the article might have an eccentric form as shown in Fig. 4 and it would be desirable to move the sprayer along a correspondingly eccentric path; to enable this to be done I mount the sprayer on a shaft 34 which may be provided with rollers 36, 36′ and disks or washers 35, 35′.

Mounted on the framework or base 1 are pieces 37 and 38 having slots or openings 42 or 42ª shaped in accordance with the path along which it is desired that the sprayer shall move and these pieces serve as cams to engage the rollers 36, 36′ respectively.

The shaft 34 passes through a radial slot 43 in the disk 7; the pieces 35, 35′ serving to keep the shaft upright.

When the piece 7 is rotated on its pivot the sprayer will be advanced in a movement conforming to the slots 42 in the pieces 37 and 38, while maintaining its radial alinement with the article to be painted. Since the article to be painted is spherical in the case illustrated in Figs. 1 to 3, the slots 42 are, in that case, made circular. When the article has a contour which is not circular the slot is made of a corresponding shape and then, as the shaft 34 is moved along such slot, the slot 43 permits the shaft 34 to follow said first-named slot.

By suitably shaping the cam 32, which engages the lever 24, more or less paint may be distributed at any point in its path of movement while by regulating the set nut 28 on the sprayer a general control of the paint is obtainable.

In painting a perfectly spherical article the sprayer may be rigidly secured to the disk 7 and the shaft 34 and pieces 37 and 38 dispensed with.

In the arrangement shown in Fig. 1 the article to be painted is spherical, and consequently the slots 42 are circular and concentric to the disk 7. In Fig. 4 the article to be painted is shown as substantially elliptical and the slots 42ª are, in such case, eccentric to the disk 7. The shaft 34 is flattened where it passes through the slot 43. In Fig. 4 the upper one of the two parts in which the slots 42ª are formed has been removed and only the lower part 38ª is shown. The cam 32ª operating the lever 24 of the spraying apparatus is also eccentric to the disk 7 and, as before stated, may or may not be concentric to the slot 42ª, according to whether it is necessary to give a constant or variable opening to the air and paint valves, the relation between these valves and the lever 24 being adjusted, if necessary, by means of the nuts 27 and 28.

The machine may be provided with a partial or complete covering and means for taking away by suction or exhaust air any loose spray or fumes from the paint. In the drawing, 40 is a partial covering or hood provided with an opening 41 from which the air is to be exhausted.

It will be obvious that more than one sprayer could be mounted on the machine. Instead of the machine being hand operated reciprocal movement might be communicated to it from any convenient source of power.

The operation of the machine is as follows:—

Compressed air being supplied through a flexible pipe to the nipple 29 and paint being inducted through the nipple 30, the article is placed in the chuck or holder; the disk 7 is then rotated by means of the handle 17 through the segment of a circle, say 100 degrees; the spindle 3 will be rapidly rotated and as soon as the lever 24 arrives at the end of the cam 32 it is pressed back by contact with the cam; the sprayer will then be set in operation and paint will be blown on to one side or end of the rotating article, the sprayer moving through the segment of a circle will finish at the other end of the article; and the lever 24 being then released by passing off the other end of the cam 32 the spraying will cease. If one simple movement is sufficient to give the desired coating the article is removed and another one placed in the machine for painting on the return stroke. In some instances it may be desirable to paint the article with a second coat applied in the reverse way, as in this way small projections from the article would catch the paint on opposite sides as it is being rotated in opposite directions.

It will be obvious that if a higher speed in rotating the article is required motion may be communicated from the rack 10 to the pinion 9 through intermediate gear wheels.

What I claim is:

1. In a painting machine, means for holding and rotating an article to be painted, a sprayer, and means for moving the sprayer along curved and radial paths simultaneously such that the resultant path of movement of the sprayer is similar to the contour of the article to be painted.

2. In a painting machine, means for holding and rotating an article to be painted, a

sprayer, means for moving the sprayer along curved and radial paths simultaneously such that the resultant path of movement of the sprayer is similar to the contour of the article to be painted and means for maintaining the sprayer in alinement with the said radial path while it is thus moved.

3. In a painting machine, means for holding and rotating an article to be painted, a sprayer, means for moving the sprayer along curved and radial paths simultaneously such that the resultant path of movement of the sprayer is similar to the contour of the article held in the machine to be painted and at a uniform distance from the exterior surface of the said article from end to end.

4. In a painting machine, means for holding and rotating an article to be painted, a sprayer, means for moving the sprayer along curved and radial paths simultaneously such that the resultant path of movement of the sprayer is similar to the contour of the article to be painted and at a uniform distance from the exterior surface of the said article held in the machine, and means for maintaining the sprayer in alinement with the said radial path while thus moved.

5. In a painting machine, means for holding and rotating an article to be painted, a sprayer, and means for moving the sprayer simultaneously along a curved path and a radial path rotatable about an axis passing transversely through the axis about which the article is rotated.

6. In a painting machine, rotatable means for holding an article to be painted, a sprayer, means for moving the sprayer along curved and radial paths simultaneously, and a motion transmitting gearing connecting the means for moving the sprayer with the rotatable means for holding the said article.

7. In a painting machine, rotatable means for holding an article to be painted, a sprayer, means for moving the sprayer simultaneously along a curved path and a radial path rotatable about an axis passing transversely through the axis about which the article is rotated, and a motion transmitting gearing connecting the means for moving the sprayer with the rotatable means for holding the said article.

8. In a painting machine, rotatable means for holding an article to be painted, a sprayer, means for moving the sprayer in both directions along a path similar to the contour of the article to be painted, and means for transmitting motion between the sprayer moving means and the article holding means the said motion transmitting means being arranged so that the direction of rotation of the article is reversed when the movement of the sprayer is reversed.

9. In a painting machine, means for rotatably holding an article to be painted, a sprayer, means for imparting an oscillatory movement to the sprayer along curved and radial paths simultaneously, and motion-transmitting gearing connecting the sprayer moving means and the article holding means.

10. In a painting machine, means for rotatably holding an article to be painted, a sprayer, means for imparting an oscillatory movement of the sprayer along curved and radial paths simultaneously, means for maintaining the sprayer in position to direct a spray radially on to the said article, and gearing connecting the said sprayer moving means and the article holding means.

11. In a painting machine, means for holding and rotating an article to be painted, a sprayer, means for moving the sprayer along a path similar to the contour of the article to be painted, and means operated consequentially by the movement of the sprayer for putting the sprayer into and out of operation.

12. In a painting machine, means for holding and rotating an article to be painted, a sprayer, means for moving the sprayer along a path similar to the contour of the article to be painted, separate regulable devices governing the ejection of air and liquid respectively from the sprayer, and means operated consequentially by the movement of the sprayer for putting the said devices into and out of operation.

13. In a painting machine, means for holding and rotating an article to be painted, a sprayer, means for moving the sprayer along a path similar to the contour of the article to be painted, and means operated consequentially by the movement of the sprayer to put the sprayer into operation after it has commenced to move along this path from one end thereof, and to put the sprayer out of operation before it reaches the other end of this path.

14. In a painting machine, means for holding and rotating an article to be painted, a sprayer, means for moving the said sprayer along a curved path and a radial path simultaneously, and a covering preventing uncontrolled escape of fumes from the spray delivered by the sprayer.

15. In a painting machine, a rotary spindle, a second rotary spindle in alinement with the first mentioned spindle, a spring urging the second spindle toward the first mentioned spindle, work-holding elements at the adjacent ends of these spindles, a rotatable disk and a sprayer carried by the said disk.

16. In a painting machine, a rotary work-holding spindle, a disk rotatable about an axis transverse to the said spindle, a cam plate having a guide slot formed therein, and a sprayer mounted on the said disk and movable along the said guide slot.

17. In a painting machine, a rotary work-holding spindle, a disk having a radial slot therein and rotatable about an axis transverse to the said spindle, a cam plate having a guide slot formed therein, and a sprayer slidably held in the slot in the disk and movable along the said guide slot.

18. In a painting machine, a rotary work-holding spindle, a pinion on the said spindle, a rotary disk, a sprayer carried by the said disk, and a rack on the disk gearing with the said pinion.

19. In a painting machine, a rotary work-holding spindle, a pinion on the said spindle, a disk having a radial slot therein and rotatable about an axis transverse to the said spindle, a cam plate having a guide slot formed therein, a sprayer slidably held in the slot in the disk and movable along the said guide slot, and a rack on the disk gearing with the said pinion.

20. In a painting machine, a rotary work-holding spindle, a cam plate having a guide slot therein, a sprayer movable along the said guide slot, levers carried by and controlling the operation of the sprayer, and a cam plate actuating the levers as the sprayer is moved along the said guide slot.

21. In a painting machine, a rotary work-holding spindle, a movable sprayer, a lever controlling the operation of the sprayer and a cam plate actuating the lever as the sprayer is moved.

22. In a painting machine, a rotary work-holding spindle, a movable sprayer, levers adjustably connected to separate valves controlling the ejection of air and liquid respectively from the sprayer, and a cam plate actuating the lever as the sprayer is moved.

23. In a painting machine, a rotary work-holding spindle, a pinion on the said spindle, a disk having a radial slot therein, a rack on said disk gearing with the said pinion, a cam plate having a guide slot formed therein, a sprayer carried in the slot in the disk and movable along the said guide slot, levers carried by and controlling the operation of the sprayer, and a cam plate actuating the levers as the sprayer is moved along the guide slot.

24. In a painting machine, a rotary work-holding spindle, a sprayer, and a mask supported in position to screen part of an article held by said spindle from a spray discharged from the said sprayer.

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