C. S. BUCKLIN.

CAN LACQUERING OR COATING MACHINE.

APPLICATION FILED APR. 15, 1908.

932,678. Patented Aug. 31, 1909.

5 SHEETS—SHEET 1.

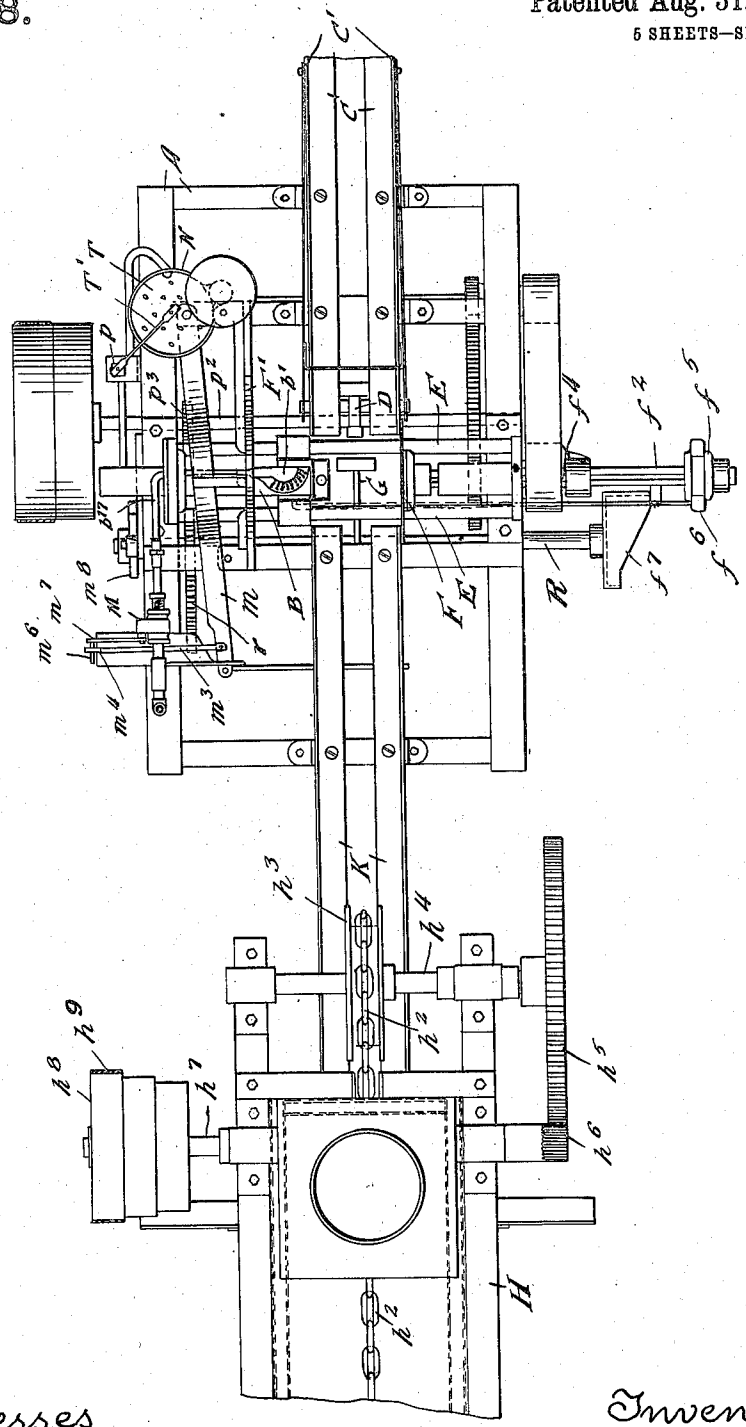

Fig. 1

Witnesses

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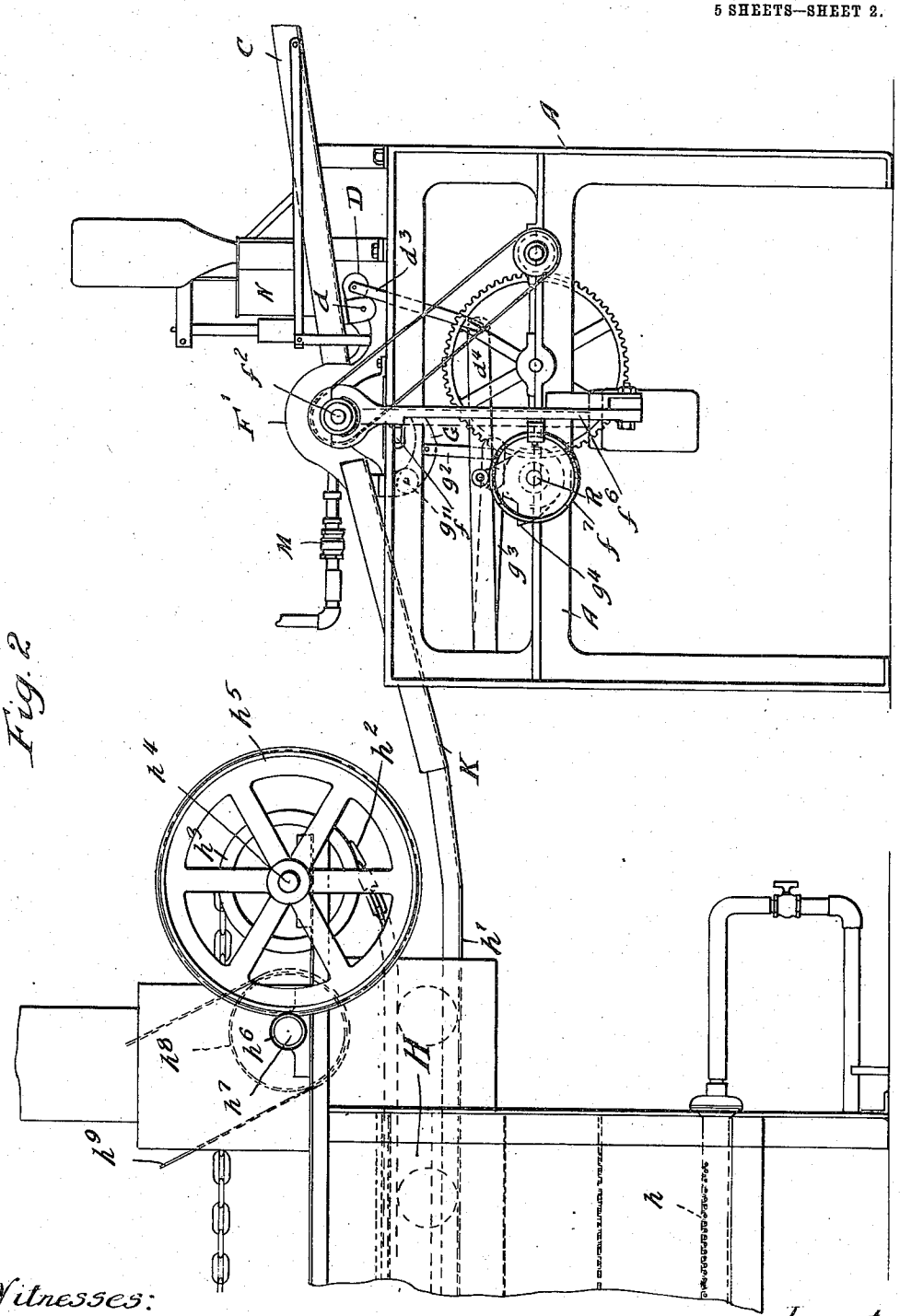
5 SHEETS—SHEET 2.

Fig. 2



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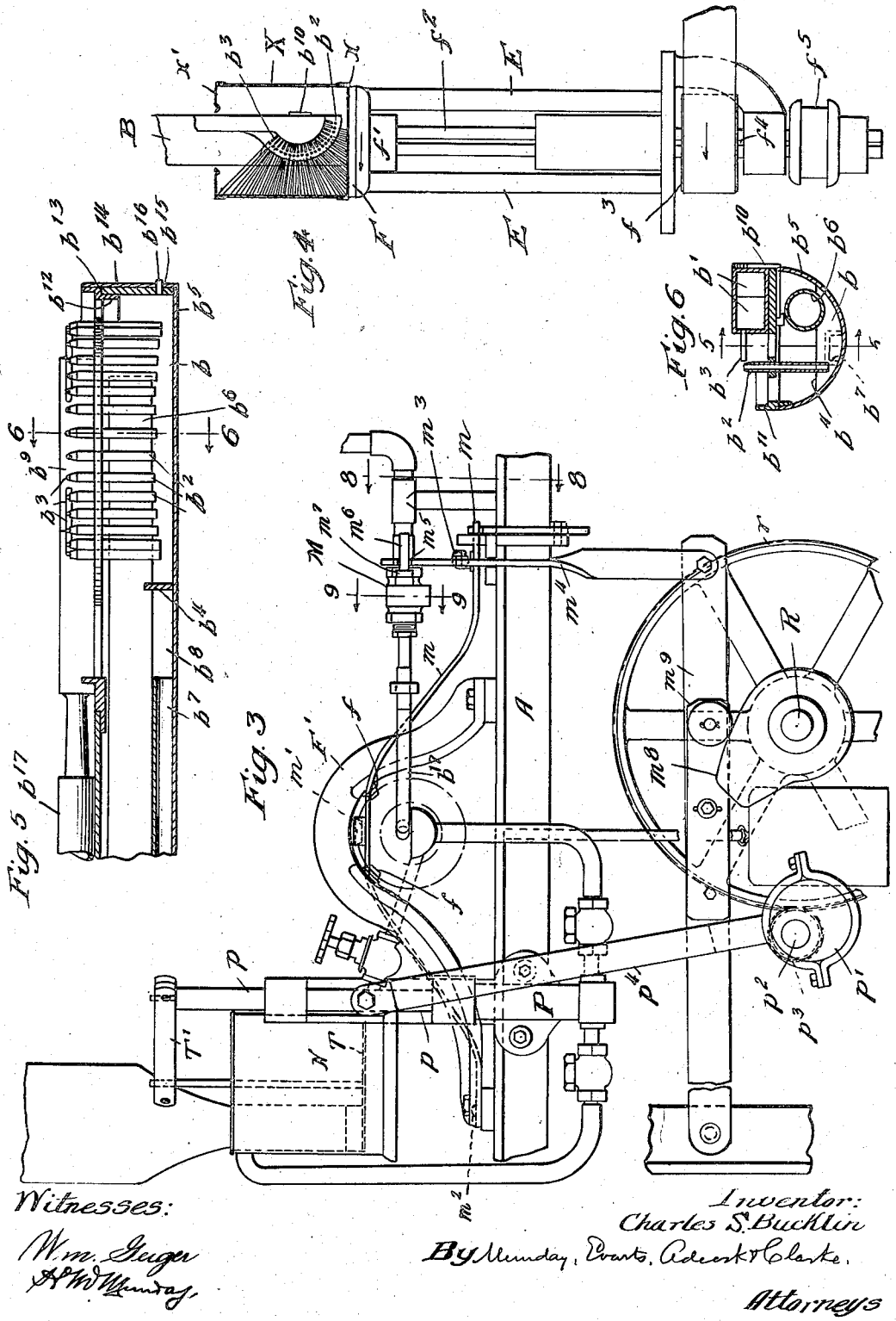

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5 SHEETS—SHEET 4.

Fig. 7

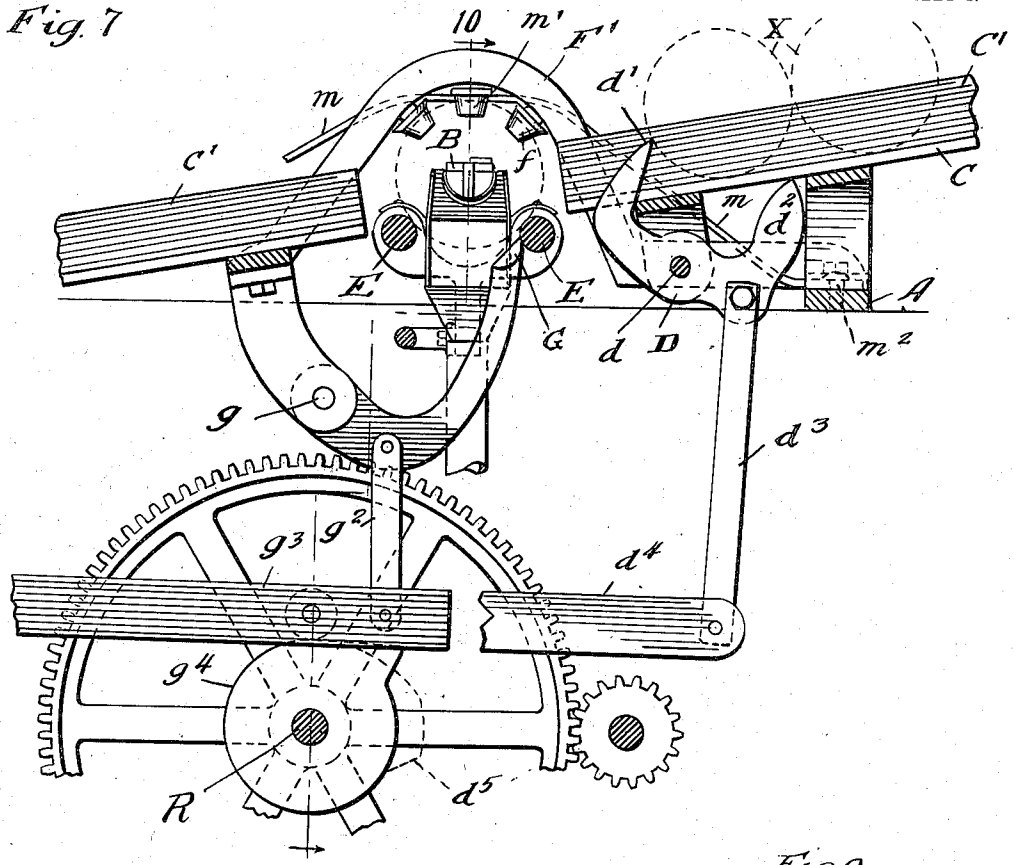


Fig. 8

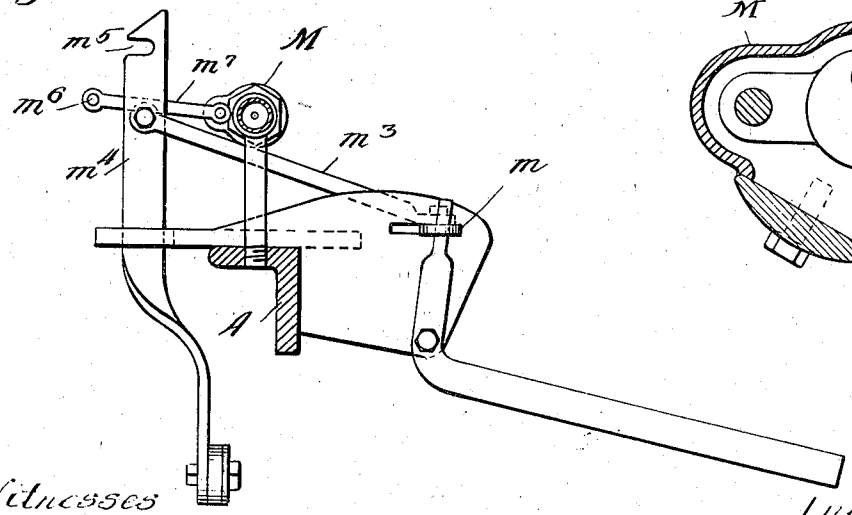
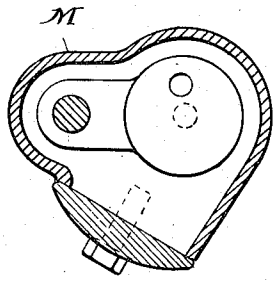


Fig. 9



Witnesses

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5 SHEETS—SHEET 5.

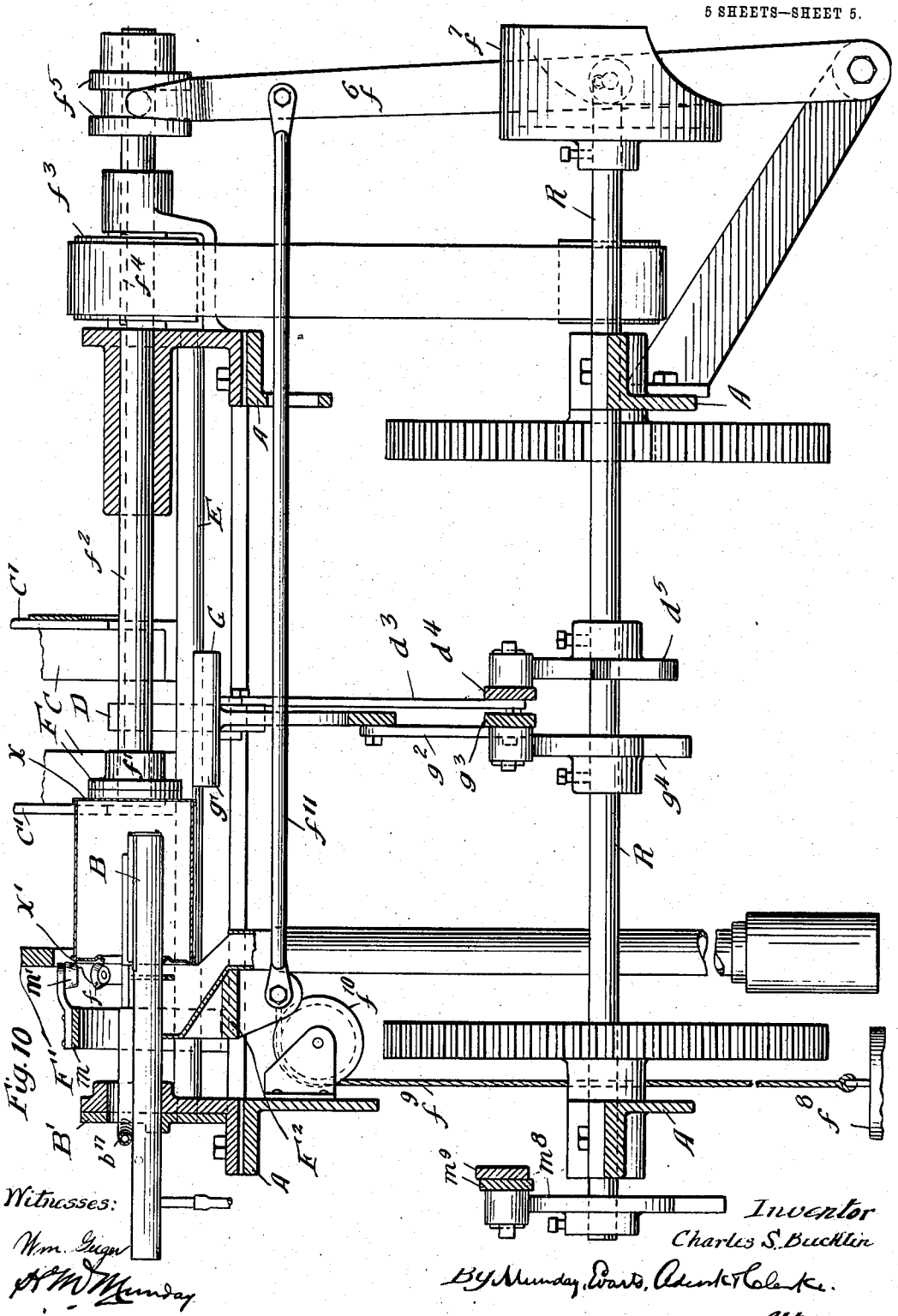

Fig. 10

Witnesses:

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UNITED STATES PATENT OFFICE.

CHARLES S. BUCKLIN, OF BALTIMORE, MARYLAND, ASSIGNOR TO AMERICAN CAN COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

CAN LACQUERING OR COATING MACHINE.

932,678. Specification of Letters Patent. Patented Aug. 31, 1909.

Application filed April 15, 1908. Serial No. 427,105.

To all whom it may concern:

Be it known that I, CHARLES S. BUCKLIN, a citizen of the United States, residing in Baltimore, in the State of Maryland, have invented a new and useful Improvement in Can Lacquering or Coating Machines, of which the following is a specification.

My invention relates to improvements in machines for lacquering or applying to the interior surface of sheet metal preserving cans a protective coating.

The object of my invention is to provide an automatic machine by means of which sheet metal preserving cans may be rapidly and cheaply lacquered or lined on the inside with a preservative coating.

My invention consists primarily in the combination with a spraying device, of means for rotating the cans and bringing them successively into operative relation with the spraying device inside the can, a feed device for the cans and a can drying mechanism and means for transferring or conveying the freshly coated cans from the coating mechanism to the drying device and keeping them under rotation while being so transferred or conveyed and while moving through the drying device so that the lacquer or coating will remain evenly distributed over the entire interior surface of the can until it is dried and rendered hard and firmly adherent.

My invention further consists in the novel construction of parts and devices and in the novel combinations of parts and devices herein shown and described, and more particularly specified in the claims.

In the accompanying drawing forming a part of this specification, Figure 1 is a plan view of a can lacquering or coating machine embodying my invention, a portion of the drying chamber being broken away. Fig. 2 is a side elevation. Fig. 3 is an end elevation. Fig. 4 is an enlarged detail plan view of the spraying device. Fig. 5 is a detail longitudinal section of the spraying device on the broken line 5—5 of Fig. 6. Fig. 6 is a cross section of the spraying device on line 6—6 of Fig. 5. Fig. 7 is a detail elevation, partly in vertical section, showing the can feed device and other parts. Fig. 8 is a detail elevation, partly in vertical section on line 8—8 of Fig. 3. Fig. 9 is a detail section on line 9—9 of Fig. 3. Fig. 10 is a vertical longitudinal section on the broken line 10—10 of Fig. 7.

In the drawing, A represents the frame of the machine, B the spray head, C the feed chute for the cans, D the can feeder, E a can supporting device along which the cans may be pushed one by one to bring them into a position surrounding the spray head B, F a rotating and reciprocating can holder chuck for pushing the cans along the way or support E over the spray head and rotating and supporting the cans about the spray head in conjunction with the opposing anti-friction rollers f on the opposing or stationary head F^1.

G is an ejector for the freshly coated or sprayed cans, H a drying chamber, K an inclined runway for transferring or conveying the cans by a rolling movement from the coating mechanism to the drying chamber and M the device for automatically regulating and controlling the amount of liquid lacquer or coating material sprayed upon the interior surface of each can, N a supply tank for the liquid lacquer or coating material and P a pump for conveying the surplus lacquer or coating liquid from the overflow chamber of the spray head back to the supply tank.

In the drawing, I have shown the preferred construction of each of the parts or devices forming part of the machine embodying my invention.

The spray head B consists essentially of a liquid chamber b, an air chamber b^1 and a series of vertically disposed liquid nozzles or nipples b^2 and a corresponding series of horizontally disposed and divergent air-blast nozzles b^3, the liquid nozzles being preferably arranged in a curved row about as illustrated in the drawing. The liquid chamber b has an overflow partition b^4 so that the liquid lacquer or coating material may be maintained at a constant level in respect to the lower ends of the liquid nozzles b^2. The lower ends of the liquid nozzles are adjusted or arranged so that they project a little below the level of the lacquer or coating liquid in the liquid chamber b, and they are preferably so arranged, as illustrated in Fig. 5, that the liquid nozzles b^2 at the middle portion of the series do not project quite so deep into the liquid as those at the end portions of the series. The liquid chamber of the

spray head is preferably formed by a semi-cylindric casing b^5 into which the liquid supply pipe b^6 leads and which is furnished with an overflow pipe or passage b^7 leading from the overflow chamber b^8.

The air chamber b^1 of the spray head preferably consists of a flat or rectangular casing in cross section, having a curved nozzle face b^9 in which the air nozzles b^3 are rigidly secured, the air chamber casing being itself removably secured by an angle clamp b^{10} to the liquid nozzle holder or plate b^{11} which is removably secured to the upwardly open section of the semi-cylindric liquid chamber casing b^5. The nozzle holder b^{11} is furnished with a guide lip b^{12} at its end, which fits in a suitable socket b^{13} in the casing b^5 of the liquid chamber. The holder b^{11} is also provided at its outer end with a spring clamp b^{14} having a hole b^{15} engaging a pin or projection b^{16} on the end of the casing b^5 to further lock the liquid nozzle holder in place on the casing b^5.

The air chamber b^1 of the spray head is connected preferably by a flexible air pipe b^{17} with a suitable compressed air supply. The main casing b^5 is preferably soldered or otherwise secured to an upright bracket or plate B^1 which is removably secured to the stationary frame of the machine and which also receives and supports the outer ends of the can guide rods or supports E E.

The liquid lacquer or coating material overflowing from the liquid chamber b of the spray head into the overflow compartment b^8 is returned to the supply tank N through the return pipes n by means of the pump P.

The can feed runway C is furnished preferably with side rails or guides C^1 and inclined at such angle that the cans will roll automatically along the same by their own gravity.

The can feed device or feeder D preferably consists of a vibrating arm pivoted to the main frame at d, and having a pair of stop arms or fingers d^1 d^2, which alternately project up into the cam runway sufficiently to arrest the downward rolling movement of the cans, the feed arms being spaced apart sufficiently to receive only a single can between them. The feeder D is automatically operated at intervals as required, by means of a link d^3 and cam lever d^4 operated by a suitable cam d^5 on the cam shaft R.

The can way or supporting device E preferably consists of a pair of rods or guides extending horizontally and arranged parallel to each other at a suitable distance apart to support the can X between them while permitting it to be readily pushed along these guide rods onto or into a position surrounding the spray head B.

The means or device F for pushing the can X onto the spray head and for rotating it, preferably consists of a rotating and reciprocating can holder chuck or disk, preferably of rubber or other yielding material adapted to exert a gripping action upon the end or head x of the can X. It is secured to or carried by a metal head f^1 on the rotating and reciprocating shaft f^2 which is furnished with a pulley f^3 for rotating it and connected with the shaft by a spline f^4 so that the shaft may reciprocate through the pulley, and provided with a grooved collar f^5 for reciprocating it as required by engagement with the fork lever f^6 which is operated by a cam f^7 on the cam shaft R. The cam f^7 preferably operates to reciprocate or move the lever f^6 in the direction to retract the can transferring and rotating device F and its shaft f^2 and the same are preferably moved in the opposite direction by means of a weight f^8 and a flexible connection f^9 which passes over a pulley f^{10} and is connected to the head F^2. To permit the can to freely rotate under action of the rotating can holder chuck F, the opposing stationary chuck F^1 is furnished with a plurality of conical anti-friction rollers f and which engage the annular shoulder x^1 of the can at the opposite end from the rotating holder or chuck F. As the conical rollers f only tangentially engage the extreme annular shoulder or corner of the can, they will not smear or soil the end of the can to any appreciable extent with the sticky lacquer or coating material, although these can engaging conical rollers f may themselves become more or less coated with the lacquer by reason of their proximity to the spray head B.

After the spraying operation has been completed upon the can, the can is withdrawn from its position surrounding the spray head (so that it may be ejected or discharged from the can supports E) by means of a reciprocating head or slide F^2, which preferably slides upon the can supporting rods E, and which engages the end of the can below the spray head B. This head or slide F^2 is preferably reciprocated as required by a connecting link f^{11} extending between said slide F^2 and the lever f^6 by which the rotating can holder or chuck F is reciprocated.

The can ejector G which serves to eject or discharge the freshly sprayed or coated can from the can supports E and rotating can holder chuck F after said chuck is withdrawn, preferably consists of a curved arm or lever pivotally connected to the frame of the machine at g, and having a forked or widened end g^1 for engagement with the can, and which is operated intermittently or at intervals as required, by means of a link g^2, and a cam lever g^3 operated by a cam g^4 on the cam shaft R.

The drying chamber H preferably consists of a closed chamber preferably furnished with gas burners or other heaters h,

and a track or runway h^1 along which the cans may be rolled continuously by means of an endless conveyer h^2, preferably a chain, the lower loop of which rests upon the cans. The can rotating chain or conveyer h^2 is operated by pulleys h^3, the shaft h^4 of one of which is furnished with a gear h^5 which meshes with a gear h^6 on the shaft h^7, which has a pulley h^8 for operating it through a suitable driving belt h^9.

The freshly coated cans X, after being operated upon by the spray head B and ejected from the can supporting rods or guides E E, are conveyed by a rolling movement into the drier H, preferably by a connecting inclined runway K.

The device M for automatically regulating and controlling the amount of liquid lacquer or coating material sprayed upon the interior surface of each can in turn as it is brought into operative relation with the spray head and rotated in respect thereto, preferably consists of a valve in the compressed air supply pipe, which is momentarily and automatically opened and closed so that the blast of compressed air is projected through the air nozzle b^3 of the spray head for just the required short period of time necessary for properly spraying the interior surface of each can as it is rotated in coöperative relation with the spray head. This controlling device or valve M is preferably automatically operated as required by means of a lever m, carrying a roller m^1 adapted to be engaged by the can when it is pushed into operative relation with the spray head by the rotating and reciprocating can transferring device F, and which lever m is pivoted to the frame at m^2 and is connected by a link m^3 with a movable link or arm m^4 having a notch m^5 adapted to engage a pin m^6 on the valve operating lever or arm m^7 so that when said cam operated link or arm m^4 is moved by said can operated lever m into position for the notch m^5 to engage the pin of the valve operating arm or lever, the cam m^8 on the cam shaft R, through a lever m^9 connected with said link or arm m^4, will automatically operate or open and close the air valve M at the intervals required to spray upon the interior surface of each can just the required amount of lacquer or coating material.

The piston p of the pump P is preferably operated by an eccentric p^1 on the shaft p^2 which has a gear p^3, meshing with a gear r on the shaft R, the eccentric being connected with the pump piston by a link p^4.

The supply tank N for the liquid lacquer is preferably furnished with an agitator or dasher T which is operated by a connection T^1 from the piston rod p of the pump P.

I claim:—

1. In a machine for lacquering or coating the interior surfaces of cans, the combination with a spray head, of a can feed runway, a can feeder, a can rotating and reciprocating device, a can ejecting device, a drier and means for conveying and rotating the cans from the spraying mechanism to the drier and while passing through the drier, substantially as specified.

2. In a can coating or lacquering machine, the combination with a can rotating device, of a spraying device, a can feed device and a drier into and through which the freshly sprayed cans directly pass, substantially as specified.

3. In a can coating or lacquering machine, the combination with a can rotating device, of a spraying device, a can feed device, a drier into and through which the freshly sprayed cans directly pass, and means for rolling the cans to the drier, substantially as specified.

4. In a can coating or lacquering machine, the combination with a can rotating device, of a spraying device, a can feed device, a drier into and through which the freshly sprayed cans directly pass, means for rolling the cans to the drier, and means for rolling the cans through the drier, substantially as specified.

5. A can lining machine comprising in combination means for rotating the cans, means for feeding the cans one by one to the can rotating mechanism, a spraying device, means for intermittently and automatically controlling the operation of the spraying device, and a drier into and through which the freshly sprayed cans directly pass, substantially as specified.

6. A can lining machine comprising in combination means for rotating the cans, means for feeding the cans one by one to the can rotating mechanism, a spraying device, means for intermittently and automatically controlling the operation of the spraying device, a drier, and means for rotating the cans while passing through the drier, substantially as specified.

7. A can lining machine comprising in combination means for rotating the cans, means for feeding the cans one by one to the can rotating mechanism, a spraying device, means for intermittently and automatically controlling the operation of the spraying device, a drier, means for rotating the cans while passing through the drier, and means for rotating the cans as they are being transferred from the spraying mechanism to the drier, substantially as specified.

8. The combination with a spray head, of a can rotating mechanism having a stationary head with anti-friction rollers adapted to tangentially engage the annular shoulder at the end of the can, substantially as specified.

9. The combination with a spray head, of a can rotating mechanism having a station-

ary head with anti-friction rollers adapted to tangentially engage the annular shoulder at the end of the can, and a reciprocating and rotating can holder chuck engaging the opposite end of the can, substantially as specified.

10. In a can coating machine, the combination with a spray head, of a rotating and reciprocating can holder chuck, and an opposing chuck or head having anti-friction conical rollers adapted to engage the annular shoulder of the can, substantially as specified.

11. In a can coating machine, the combination with a spray head and means for rotating the can in relation to the spray head, of an air supply valve for the spray head and a movable device adapted to be engaged by the can while it is being rotated for controlling or setting in operation said air-blast valve, substantially as specified.

12. In a can coating machine, the combination with a spray head and means for rotating the can in relation to the spray head, of an air supply valve for the spray head and a movable device adapted to be engaged by the can while it is being rotated for controlling and setting in operation said air-blast valve, said movable device carrying an anti-friction roller for direct engagement with the rotating can, substantially as specified.

13. In a can coating machine, the combination with a spraying device, and means for rotating the can, and a device for controlling the compressed air supply of the spraying device and means engaged by the rotating can for actuating said controlling device, said spraying device being adapted to enter the can and project the coating liquid against the interior surfaces of the rotating can, substantially as specified.

14. In a can coating machine, the combination with a spraying device and can rotating means, of an air valve, valve operating mechanism and a movable device engaged by the can to be sprayed for setting said valve operating mechanism in action, said spraying device being adapted to enter the can and project the coating liquid against the interior surfaces of the rotating can, substantially as specified.

15. In a can coating machine, the combination with a spraying device and can rotating means, of an air valve, valve operating mechanism and a movable device engaged by the can to be sprayed for setting said valve operating mechanism in action and can feed mechanism, said spraying device being adapted to enter the can and project the coating liquid against the interior surfaces of the rotating can, substantially as specified.

16. In a can coating machine, the combination with a spraying device and can rotating means, of an air valve, valve operating mechanism, a movable device engaged by the can to be sprayed for setting said valve operating mechanism in action, can feed mechanism and a can ejector, said spraying device being adapted to enter the can and project the coating liquid against the interior surfaces of the rotating can, substantially as specified.

17. In a can coating machine, the combination with a spraying device and can rotating means, of an air valve, valve operating mechanism, a movable device engaged by the can to be sprayed for setting said valve operating mechanism in action, can feed mechanism and a can discharge runway, said spraying device being adapted to enter the can and project the coating liquid against the interior surfaces of the rotating can, substantially as specified.

18. In a can coating machine, the combination with a spraying device and can rotating means, of an air valve, valve operating mechanism, a movable device engaged by the can to be sprayed for setting said valve operating mechanism in action, can feed mechanism, a can discharge runway and a drying chamber having a can runway extending through it, substantially as specified.

19. In a can coating machine, the combination with a spraying device and can rotating means, of an air valve, valve operating mechanism, a movable device engaged by the can to be sprayed for setting said valve operating mechanism in action, can feed mechanism, a can discharge runway, a drying chamber having a can runway extending through it and an endless conveyer for rolling the cans through the drying chamber, substantially as specified.

20. In a can coating machine, a spraying device comprising a liquid chamber casing having an overflow partition, an air chamber casing, a series of upright liquid nozzles arranged in a curved row, a series of divergent air nozzles, and a holder for said liquid nozzles removably secured to said liquid chamber casing to facilitate their removal for cleaning or repairs and replacement and adjustment, substantially as specified.

21. In a can coating machine, a spraying device comprising a liquid chamber casing having an overflow partition, an air chamber casing, a series of upright liquid nozzles arranged in a curved row, a series of divergent air nozzles, and a holder for said liquid nozzles removably secured to said liquid chamber casing, said nozzle holder having a guide lip at one end and a guide clamp at the other, substantially as specified.

22. In a can coating machine, a spraying device comprising a liquid chamber casing having an overflow partition, an air chamber casing, a series of upright liquid nozzles

arranged in a curved row, a series of divergent air nozzles, and a holder for said liquid nozzles removably secured to said liquid chamber casing, said air chamber casing being removably secured to said liquid chamber casing, substantially as specified.

23. In a can coating machine, a spraying device comprising a liquid chamber casing having an overflow partition, an air chamber casing, a series of upright liquid nozzles arranged in a curved row, a series of divergent air nozzles, and a holder for said liquid nozzles removably secured to said liquid chamber casing and an angle clamp for removably securing said air chamber casing to said liquid nozzle holder, substantially as specified.

24. In a can coating machine, a spraying device comprising a liquid chamber casing having an overflow partition, an air chamber casing, a series of upright liquid nozzles arranged in a curved row, a series of divergent air nozzles, and a holder for said liquid nozzles removably secured to said liquid chamber casing, said series of upright liquid nozzles having their lower ends projecting deeper into the liquid chamber at the end portions of the series than at the middle portion thereof, substantially as specified.

25. In a can coating machine, a spraying device comprising a liquid chamber casing having an overflow partition, an air chamber casing, a series of upright liquid nozzles arranged in a curved row, a series of divergent nozzles, and a holder for said liquid nozzles removably secured to said liquid chamber casing, in combination with a liquid supply pipe and return pipe, a liquid supply tank and a pump for returning the overflow liquid to the supply tank, substantially as specified.

26. In a can coating machine, a spraying device comprising a liquid chamber casing having an overflow partition, an air chamber casing, a series of upright liquid nozzles arranged in a curved row, a series of divergent nozzles, and a holder for said liquid nozzles removably secured to said liquid chamber casing, in combination with a liquid supply pipe and return pipe, a liquid supply tank, a pump for returning the overflow liquid to the supply tank, a compressed air supply pipe, a valve therefor and means for automatically operating said valve, substantially as specified.

27. In a can coating machine, a spraying device comprising a liquid chamber casing having an overflow partition, an air chamber casing, a series of upright liquid nozzles arranged in a curved row, a series of divergent nozzles, and a holder for said liquid nozzles removably secured to said liquid chamber casing, in combination with a liquid supply pipe and return pipe, a liquid supply tank, a pump for returning the overflow liquid to the supply tank, a compressed air supply pipe, a valve therefor, means for automatically operating said valve and means for rotating the can being sprayed, substantially as specified.

28. In a can coating machine, a spraying device comprising a liquid chamber casing having an overflow partition, an air chamber casing, a series of upright liquid nozzles arranged in a curved row, a series of divergent nozzles, and a holder for said liquid nozzles removably secured to said liquid chamber casing, in combination with a liquid supply pipe and return pipe, a liquid supply tank, a pump for returning the overflow liquid to the supply tank, a compressed air supply pipe, a valve therefor, means for automatically operating said valve, means for rotating the can being sprayed, and means for automatically delivering the cans one by one to said can rotating means, substantially as specified.

29. In a can coating machine, a spraying device comprising a liquid chamber casing having an overflow partition, an air chamber casing, a series of upright liquid nozzles arranged in a curved row, a series of divergent nozzles, and a holder for said liquid nozzles removably secured to said liquid chamber casing, in combination with a liquid supply pipe and return pipe, a liquid supply tank, a pump for returning the overflow liquid to the supply tank, a compressed air supply pipe, a valve therefor, means for automatically operating said valve, means for rotating the can being sprayed, means for automatically delivering the cans one by one to said can rotating means and means for withdrawing the can from the spraying device, substantially as specified.

30. In a can coating machine, a spraying device comprising a liquid chamber having an overflow partition, an air chamber casing, a series of upright liquid nozzles arranged in a curved row, a series of divergent nozzles, and a holder for said liquid nozzles removably secured to said liquid chamber casing, in combination with a liquid supply pipe and return pipe, a liquid supply tank, a pump for returning the overflow liquid to the supply tank, a compressed air supply pipe, a valve therefor, means for automatically operating said valve, means for rotating the can being sprayed, means for automatically delivering the cans one by one to said can rotating means, means for withdrawing the can from the spraying device, a drying chamber having a can runway and a connecting runway extending from the drying chamber to the spraying and can rotating devices, substantially as specified.

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Witnesses:
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H. M. LAWS.