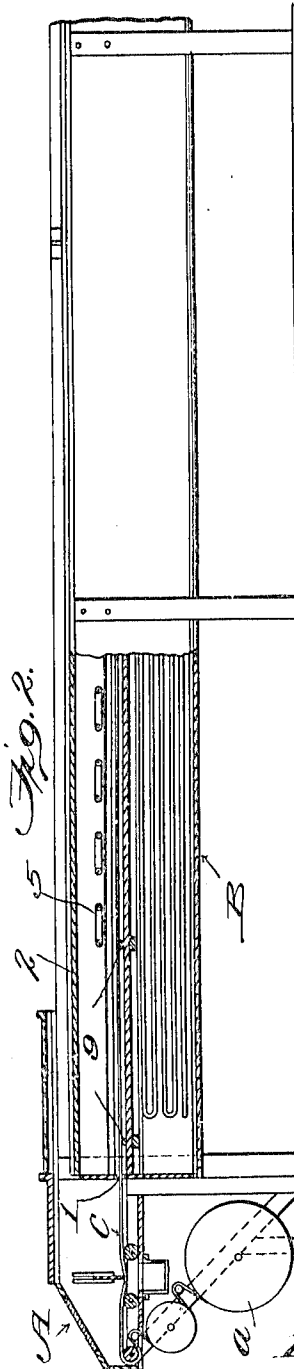
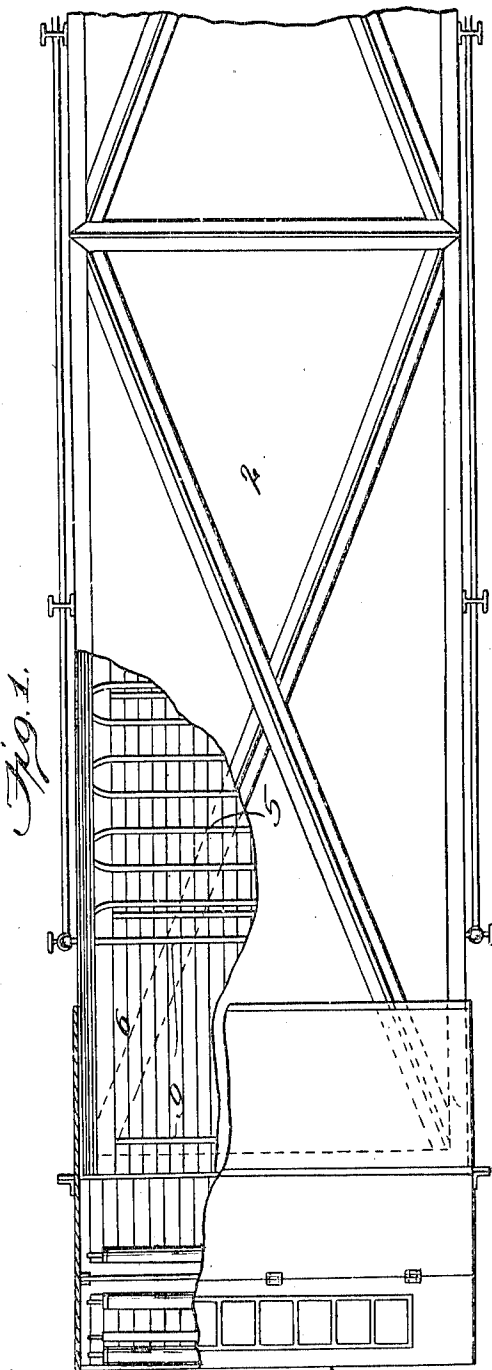


1,090,336.



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A. S. O'NEIL.
COATING MACHINE.

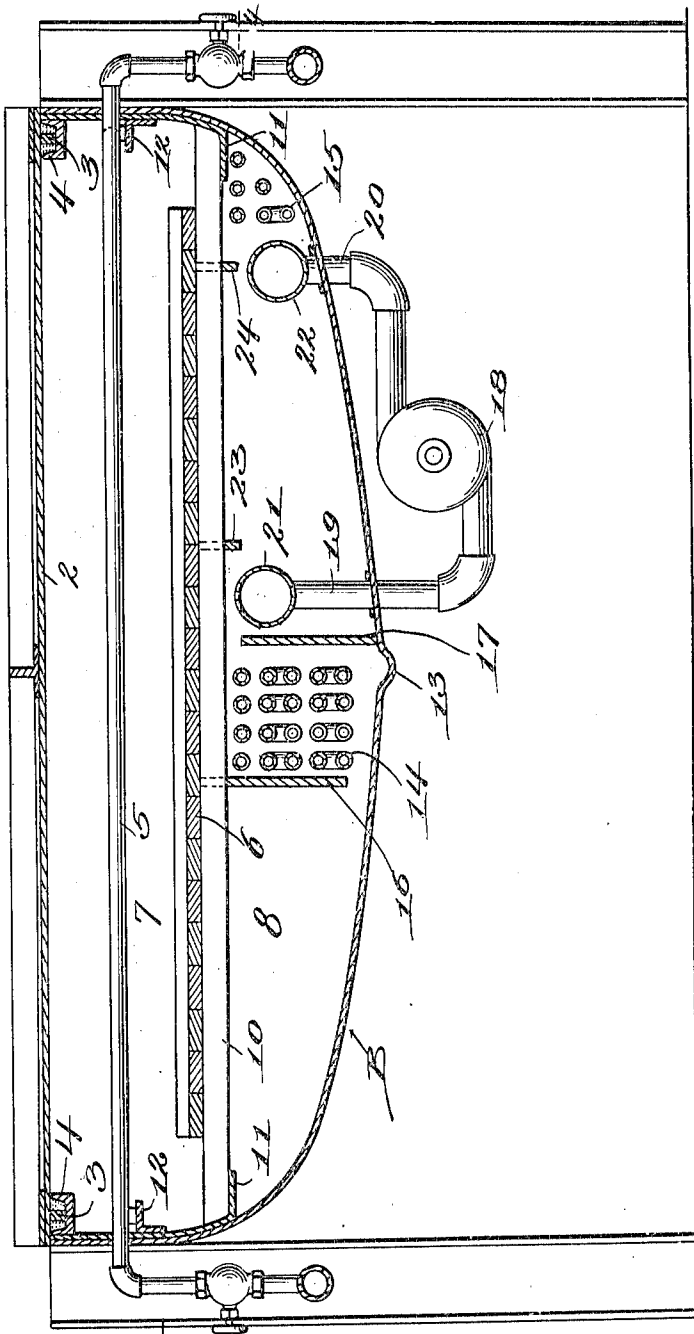
APPLICATION FILED APR. 3, 1913.

Patented Mar. 17, 1914.

3 SHEETS-SHEET 2.

1,090,336.

Fig. 3.



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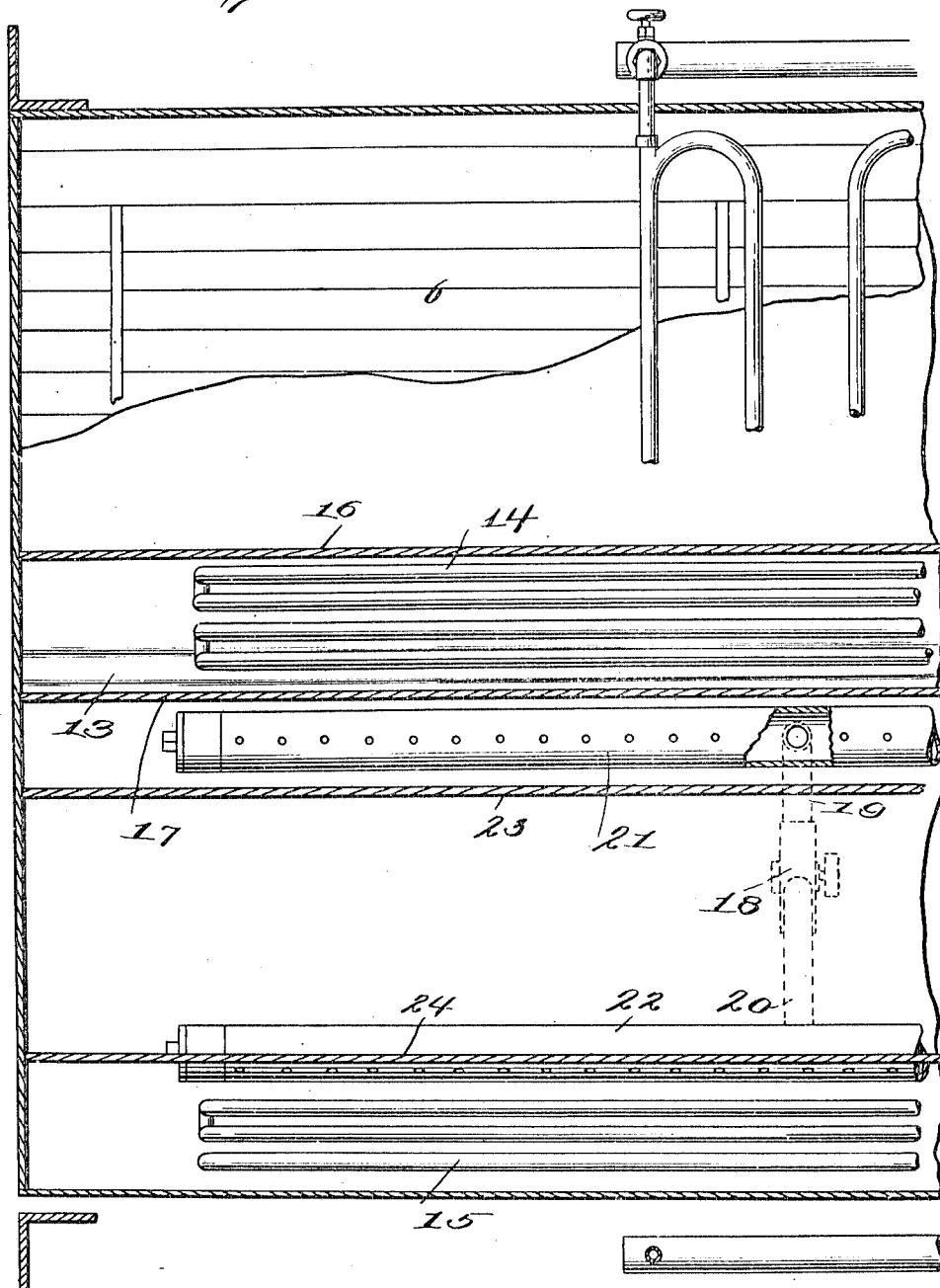
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3 SHEETS-SHEET 3.

Fig. 4.



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UNITED STATES PATENT OFFICE.

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COATING-MACHINE.

1,090,336.

Specification of Letters Patent.

Patented Mar. 17, 1914.

Application filed April 3, 1913. Serial No. 758,649.

To all whom it may concern:

Be it known that I, ARTHUR S. O'NEIL, a citizen of the United States, residing at Warren, in the county of Warren and State of Pennsylvania, have invented new and useful Improvements in Coating-Machines, of which the following is a specification.

This invention relates to improvements in coating machines applicable to the treatment of leather, fabrics, and other materials and it is directed more particularly to the recovery of solvents and other liquids incorporated in the bath or coating mixture, in relation to which the material to be dried is passed.

The ultimate purposes of the invention are to facilitate the coating operation by providing for an efficient drying of the fabric or other material which has been coated and to effect an economy in operation by providing for the thorough recovery of the solvents and other liquids which may be liberated during, or consequent to, the operation of drying the coated material.

The principal object of the invention is to provide means of simple and inexpensive character for effecting a thorough and facile recovery of the solvents and other liquids incorporated in the coating mixture and liberated during the drying operation, continuously with said drying operation, and, in effect, as a part thereof.

Having the above object in view, the invention includes essentially a drying chamber through which the coated material is passed and in which said material is subjected to heat, and instrumentalities in said chamber for effecting an induced, internal circulation of air in a definite direction, and for recovering from said air any vapors liberated by the drying heat and carried over by the air in its circulation.

Other objects and advantages will appear as the description proceeds.

What is now regarded as a preferred embodiment of the invention is illustrated in the accompanying drawings, wherein:

Figure 1 is a top plan view of a coating machine in which the features of the invention are incorporated. In this figure the cover is shown as partly broken away to expose to view certain of the inclosed parts. Fig. 2 is a central longitudinal sectional view of the said machine; Fig. 3 is a cross sectional view thereof; Fig. 4 is an en-

larged detail fragmentary sectional view on the line 4—4 of Fig. 3.

Similar characters of reference designate corresponding parts throughout the several views.

The coating mechanism may be of any desired character and is shown in the drawing at A. As herein shown, the material to be treated is unwound from a reel *a* and passes in relation to the coating mechanism A. The latter is arranged at one end of a relatively long drying chamber B having an opening 1 in its end wall adjoining said coating mechanism and through which the material C passes. At the other end of the drying chamber any suitable rewinding apparatus may be provided.

The chamber B is preferably made of sheet metal, suitably reinforced, braced, or stiffened, where necessary, and is of sufficient length to insure that the coating applied to the material C shall be thoroughly dried during the passage of said material through said chamber. To secure the best results, the chamber B should be substantially air tight, and therefore, said chamber has no openings except the opening 1, through which the material C is introduced, and the opening at the opposite end of the machine, through which said material is removed. Access to the interior of the chamber is had, when necessary, by removing the cover, which is preferably made in a convenient number of sections 2. In order that the cover may be associated with the chamber in an air tight manner, each section 2 has at its sides depending flanges 3 which engage in channels 4 secured to the sides of the chamber B within said chamber, and extending longitudinally thereof. The channels 4 serve to contain oil which establishes a seal against the passage of air into or from the chamber B. The material C, as it passes through the chamber B, is subjected to the action of heat, for the purpose of drying the coating applied thereto by the mechanism A, and such heat is preferably generated by an arrangement of steam coils 5 which are located in the upper portion of the chamber B, throughout the extent thereof.

For the purpose of defining passage-ways through which the air confined within the chamber B may circulate, a false floor 6 is arranged horizontally throughout the ex-

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tent of said chamber, and in a plane midway of the top and bottom thereof. The floor 6 is of less width than the chamber, and defines upper and lower air passages 5 7 and 8, which communicate with one another through the spaces intervening between the sides of the floor 6 and the adjacent side walls of the chamber B. The floor 6 is arranged below the material C and in the particular embodiment shown, serves the further purpose of furnishing support for said material in its passage through the chamber B, toward this end being provided at suitable intervals with cleats, rollers, or 15 other suitable projections 9 upon which the material C rests and which suitably space said material from said floor. The floor 6 may be of any suitable construction, whereby the passages 7 and 8 are heat insulated. 20 The support for the floor 6 may conveniently consist of transverse bars 10, arranged at suitable intervals and supported at their ends by ledges 11. Longitudinal angle irons 12, arranged at the sides of the chamber B, may be conveniently used as the support for the coils 5, which are preferably disposed in a horizontal plane and transversely of said chamber.

The bottom of the chamber B serves for 30 the collection of the solvents and other liquids which are precipitated in said chamber, and for this purpose said bottom has a somewhat trough-shaped cross section, and is preferably provided with a centrally arranged longitudinal channel 13, along which 35 the condensed liquids pass to any suitable and suitably located means of egress.

The recovery of the vapors which are liberated from the coating by the heat in 40 the passage 7 is effected in the passage 8, preferably by the agency of condensing coils 14, which are conveniently located somewhat at one side of the longitudinal center of said passage, and are disposed 45 through the extent thereof.

The invention includes means for effecting an induced circulation of the air internal to the chamber B and in a definite direction. Thus, a series of steam pipes or 50 coils 15 are arranged through the longitudinal extent of the chamber B, and at one side of the passage 8, immediately adjacent the open space through which the passage 8 communicates with passage 7. In the drawings, the pipes or coils 15 are arranged at 55 the right side of the passage 8 and the air in the chamber B circulates in the passage 7 from right to left, and in the passage 8 from left to right. In order that the air circulating through the passage 8 may be thoroughly exposed to the coils 14, baffles 16 and 17 are arranged at opposite sides of the coils 14 and extend longitudinally of the passage 8, the baffle 16 at the left side of 65 said coils depending from the floor 6 and

terminating short of the bottom of the chamber B, and the baffle 17 at the right side of said coils projecting from the bottom of the chamber B and terminating short of the floor 6. Thus, the air in its circulation 70 through the passage 8 first passes under the baffle 16 and then rises uniformly through the coils 14, finally passing over the baffle 17 toward the opposite side of the passage 8.

To aid in the circulation of air, it is preferred to employ a pump 18 which is arranged on the outside of the chamber, and has a suction branch 19 and a blast branch 20. The branches 19 and 20 project into the passage 8, and the branch 19 carries at its inner end a suction pipe 21 which extends 80 longitudinally of the passage 8 and is located adjacent the baffle 17, being provided at its upper side with a row of closely associated small perforations through which 85 the air in the passage 8 is drawn. The branch 20 carries within the passage 8 a pipe 22, which extends longitudinally of said passage, being located adjacent the coils 15, and is provided with a row of closely 90 associated apertures through which the air is discharged in relation to the coils 15. Air deflectors 23 and 24 are preferably arranged adjacent the pipes 21 and 22.

From the foregoing description it will be 95 apparent that the circulation of air provided for in the embodiment shown is transverse to the chamber B. The heat generated by the coils 5 in the upper portion of said chamber liberates the readily volatile solvents and other volatile liquids incorporated in the coating, and the vapors thus liberated are taken up by the air in the passage 7. The super-saturated air, being 100 heavy with vapors, passes downwardly into the passage 8 and in its circulation through the passage 8, passes in relation to the coils 14, through which cold water or some other agent suitable for condensing purposes, is circulating. The coils 14 effect the condensation of the vapors in the air circulating 110 through the passage 8, and after the vapors have been precipitated, the air passes in relation to the coils 15, by which it is heated. The air thus heated by the coils 15 passes 115 upwardly into the passage 7 for reuse. It is thus apparent that the air in the chamber B is used over and over again, for the purpose of taking up the moisture liberated by the heat in the passage 7, and of carrying 120 the vapors in relation to the condensing agent.

It will be observed that the coils 15 are located only at one side of the chamber B, the space at the other side of said chamber, 125 through which the passages 7 and 8 communicate, being unobstructed. In this way, the air is caused to have a definite direction of movement, and the internal circulation thereof is reliably induced. 130

It will be apparent that the features of construction and arrangement herein-described provide for a thorough drying of the material C in its passage through the drying chamber, provide for a thorough recovery of solvents and other volatile liquids incorporated in the coating, enable the recovery of the solvents and other liquids to be, in effect, a part of the drying operation, and, of course, continuous with said operation, and insure that the results stated are accomplished with facility, in a simple manner, and by means of inexpensive character.

Having fully described my invention, I claim:

1. In a coating machine, a substantially air-tight drying chamber through which the coated material is passed, a false floor above which said material passes and which defines upper and lower air circulation passages communicating at their ends, heat supplying means located in the upper passage, vapor condensing means located in the lower passage, and means for inducing a circulation of air, internal to said chamber, in a definite direction whereby the air first takes up the liberated moisture in the upper passage and then carries such moisture in relation to the condensing means in the lower passage.

2. In a coating machine, a substantially air-tight drying chamber through which the coated material is passed, a false floor above which said material passes and which defines upper and lower air circulation passages communicating at their ends, heat supplying means located in the upper passage, vapor condensing means located in the lower passage, and air re-heating means located adjacent communicating ends of said passages, the communication of said passages at their other ends being unobstructed.

3. In a coating machine, a substantially air-tight drying chamber through which the coated material is passed, a false floor above which said material passes, and which defines upper and lower air circulation passages communicating at their ends, heat supplying means located in the upper passage, vapor condensing means located in the lower passage, an air pump, a suction pipe connected at one side of said pump and located adjacent said vapor condensing means, and a blast pipe connected at the other side of said pump and located adjacent the ends of the passages at the same side of the condensing means as the suction pipe.

4. In a coating machine, a substantially air-tight drying chamber through which the coated material is passed, a false floor above which said material passes and which defines upper and lower air circulating passages communicating at their ends, heat supplying means located in the upper passage,

vapor condensing means located in the lower passage, an air pump, a suction pipe connected at one side of said pump and located adjacent said vapor condensing means, a blast pipe connected at the other side of said pump and located adjacent the ends of the passages at the same side of the condensing means as the suction pipe, and air re-heating means located between the blast pipe and the adjacent communicating ends of the passages, the communication of the passages at their other ends being unobstructed.

5. In a coating machine, a substantially air-tight drying chamber through which the coated material is passed, a false floor above which said material passes and which terminates short of the sides of said chamber, thereby defining upper and lower air circulation passages communicating with one another adjacent the sides of said chamber, heat supplying means arranged in the upper passages throughout the longitudinal extent of said chamber, vapor condensing means arranged in the lower passage throughout the longitudinal extent of said chamber, and means for inducing a circulation of air, internal to said chamber and in a definite direction through said passages transversely thereof, whereby the air first takes up the liberated moisture in the upper passage and then carries such moisture in relation to the condensing means in the lower passage.

6. In a coating machine, a substantially air-tight drying chamber through which the coated material is passed, a false floor above which said material passes and which terminates short of the sides of said chamber, thereby defining upper and lower air circulation passages communicating with one another adjacent the sides of said chamber, heat supplying means arranged in the upper passage throughout the longitudinal extent of said chamber, vapor condensing means arranged in the lower passage throughout the longitudinal extent of said chamber, longitudinal baffles arranged adjacent the vapor condensing means at opposite sides thereof, one baffle depending from the false floor and terminating short of the bottom of the chamber, and the other baffle projecting from the bottom of the chamber and terminating short of the false floor, and means for inducing a circulation of air, internal to said chamber and in a definite direction through said passages transversely thereof, whereby the air first takes up the liberated moisture in the upper passage and then carries such moisture in relation to the condensing means in the lower passage.

7. In a coating machine, a substantially air-tight drying chamber through which the coated material is passed, a false floor above which said material passes and which terminates short of the sides of said chamber, thereby defining upper and lower air cir-

5 culation passages communicating with one another adjacent the sides of said chamber, heat supplying means arranged in the upper passage throughout the longitudinal extent of said chamber, vapor condensing means arranged in the lower passage throughout the longitudinal extent of said chamber, and air re-heating means disposed longitudinally of the chamber and located in the lower passage closely adjacent one side of the chamber, the opposite ends of the passages being unobstructed.

8. In a coating machine, a substantially air-tight drying chamber through which the coated material is passed, a false floor above which said material passes and which terminates short of the sides of said chamber, thereby defining upper and lower air circulation passages communicating with one another adjacent the sides of said chamber, heat supplying means arranged in the upper passage throughout the longitudinal extent of said chamber, vapor condensing means arranged in the lower passage throughout the longitudinal extent of said chamber, an air pump, a longitudinally disposed suction pipe connected at one side of said pump and located adjacent said vapor condensing means, and a longitudinally disposed blast pipe connected at the other side of said pump and located adjacent the ends of the passages at the same time of the condensing means as the suction pipe.

9. In a coating machine, a substantially air-tight drying chamber through which the coated material is passed, a false floor above which said material passes and which terminates short of the sides of said chamber, thereby defining upper and lower air circulation passages communicating with one another adjacent the sides of said chamber, heat supplying means arranged in the upper passage throughout the longitudinal extent of said chamber, vapor condensing means arranged in the lower passage throughout the longitudinal extent of said chamber, an air pump, a longitudinally disposed suction pipe connected at one side of said pump and located adjacent said vapor condensing means, a longitudinally disposed blast pipe connected at the other side of said pump and located adjacent the ends of the passages at the same side of the condensing means as the suction pipe, and air re-heating means disposed longitudinally of the chamber and located between the blast pipe and the adjacent communicating ends of the passages, the communication of the passages at their other ends being unobstructed.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ARTHUR S. O'NEIL.

Witnesses:

ROSE H. DAVIS,
C. W. ROGERS.

Correction in Letters Patent No. 1,090,336.

It is hereby certified that in Letters Patent No. 1,090,336, granted March 17, 1914, upon the application of Arthur S. O'Neil, of Warren, Pennsylvania, for an improvement in "Coating-Machines," an error appears in the printed specification requiring correction as follows: Page 4, line 32, for the word "time" read *side*; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 4th day of August, A. D., 1914.

[SEAL.]

J. T. NEWTON,

Acting Commissioner of Patents.