July 31, 1923. 1,463,542

A. A. ANGELL

METHOD AND APPARATUS FOR FINISHING LEATHER

Filed Oct. 24, 1921 4 Sheets-Sheet 1

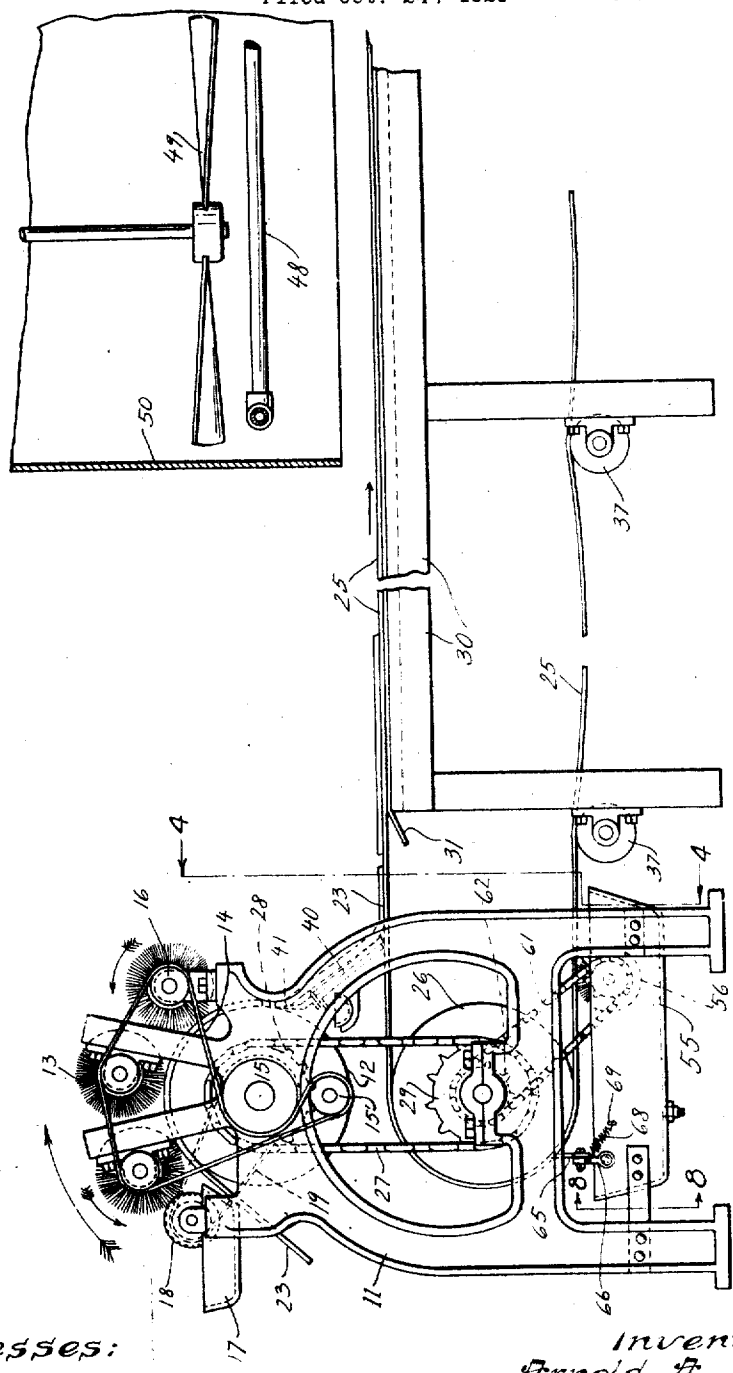


Fig. 1

Witnesses:
Wm. Schmalhardt
J. D. Stowe.

Inventor
Arnold A. Angell
By Joshua R. H. Potts
His Attorney

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A. A. ANGELL

METHOD AND APPARATUS FOR FINISHING LEATHER

Filed Oct 24, 1921 4 Sheets-Sheet 2

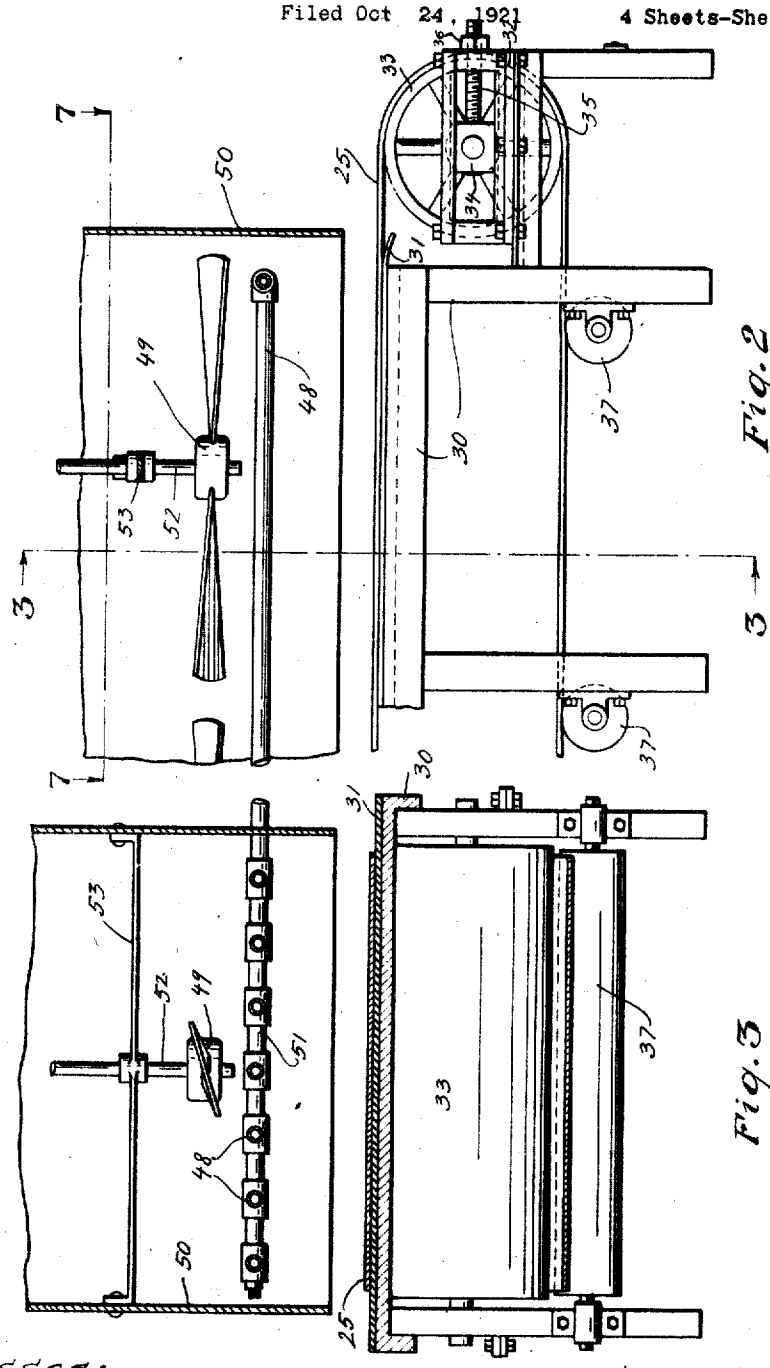


Fig. 2

Fig. 3

Witnesses:
Wm. Schmidthardt
J. D. Stuve

Inventor
Arnold A. Angell
By Joshua R. H. Howe
His Attorney

July 31, 1923. 1,463,542

A. A. ANGELL

METHOD AND APPARATUS FOR FINISHING LEATHER

Filed Oct. 24, 1921 4 Sheets-Sheet 3

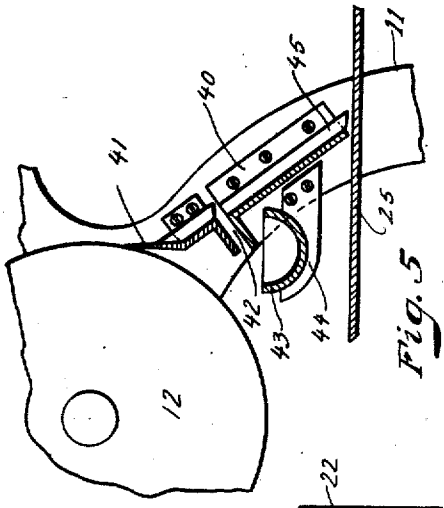


Fig. 5

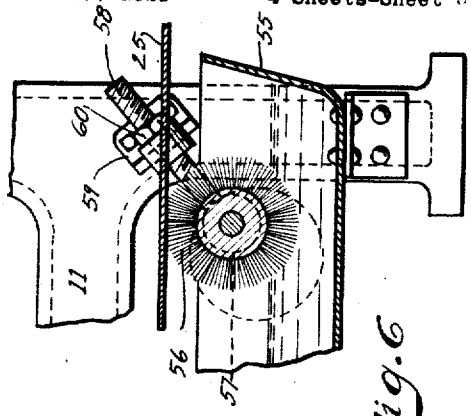


Fig. 6

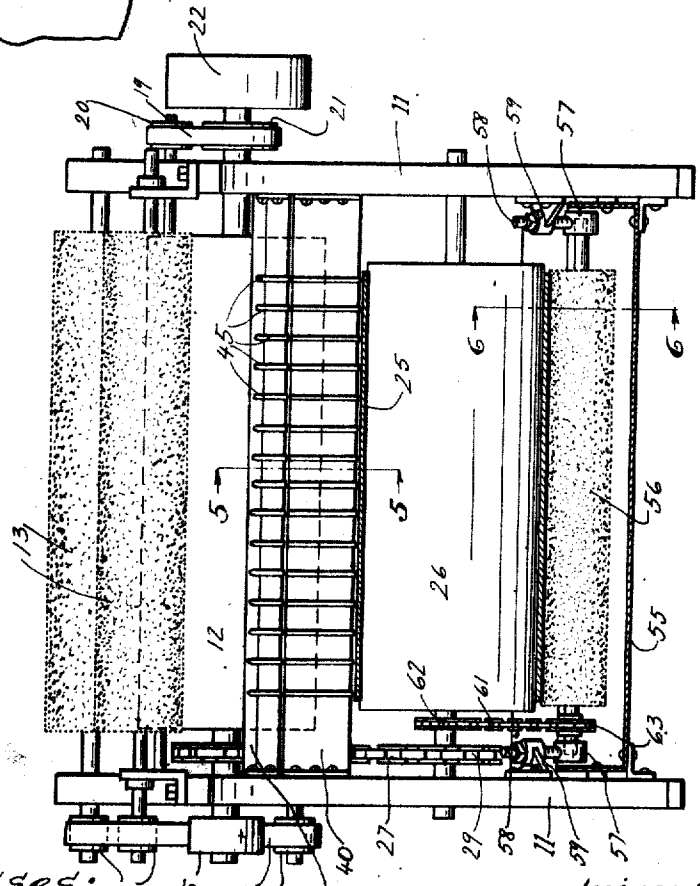


Fig. 4

Witnesses:
Wm. Schmidhardt
J. D. Stowe

Inventor
Arnold A. Angell.
By Joshua R. H. Howe
His Attorney

July 31, 1923. 1,463,542

A. A. ANGELL

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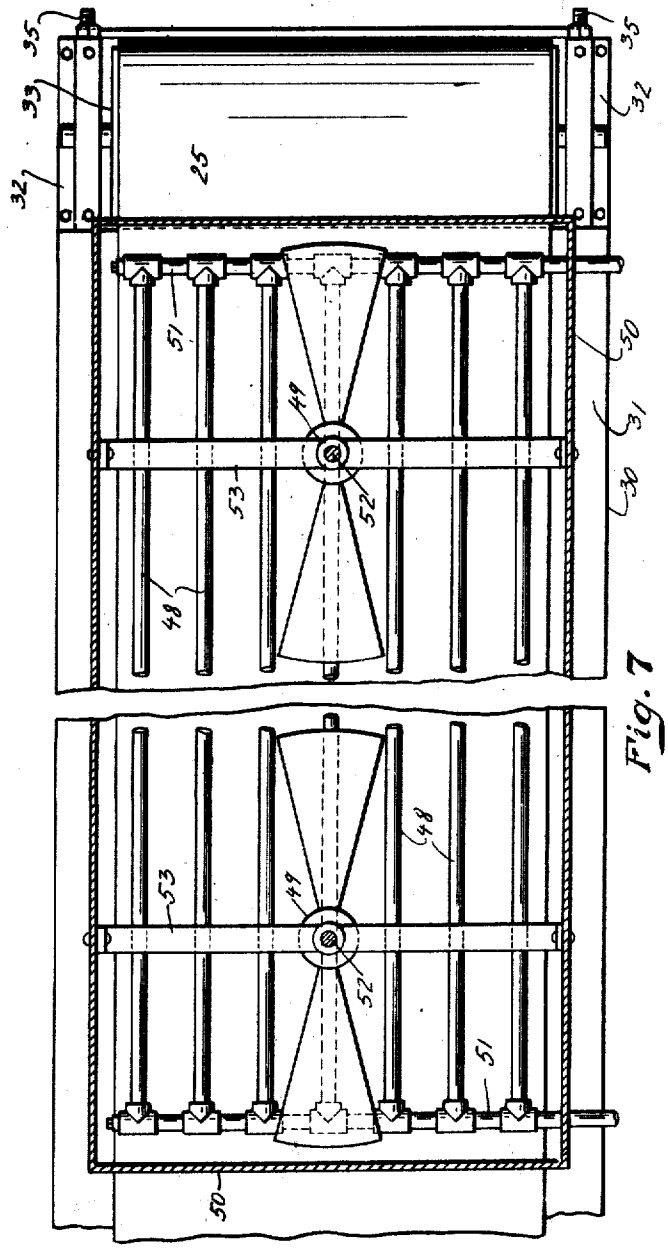


Fig. 7

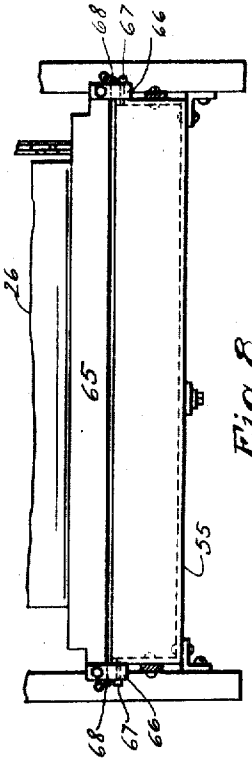


Fig. 8

Witnesses:
Wm. Schnellhardt.
J. D. Stuwe

Inventor
Arnold A. Angell
By Joshua R. H. Cox
His Attorney

Patented July 31, 1923. 1,463,542

UNITED STATES PATENT OFFICE.

ARNOLD A. ANGELL, OF CHICAGO, ILLINOIS.

METHOD AND APPARATUS FOR FINISHING LEATHER.

Application filed October 24, 1921. Serial No. 510,010.

To all whom it may concern:

Be it known that I, ARNOLD A. ANGELL, a citizen of the United States, and a resident of the city of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Methods and Apparatus for Finishing Leather, of which the following is a specification.

My invention relates to the art of finishing leather, and the principal object of the invention is to us mechanical means in applying all the coats of finishing material to leather, and to apply heavier coats than has heretofore been possible.

Another object is to prevent running of the coating material, by drying the same before such running can occur.

Another object is to provide means which will allow the leather stock to lie in a flat, horizontal position during the initial drying process, in order to prevent running of the finishing coats.

Another object is to provide conveying mechanism for the coated leather stock which will permit the convenient and thorough hand-swabbing of the stock during its travel from the coat-applying mechanism to the delivery end of the machine.

A further object is to provide special means for assuring the proper initial drying of the leather stock.

Other objects will appear hereinafter.

In the past, the finishing coats on leather have generally been applied by hand, by means of a brush or swab dipped into a pan of the finishing material, and the final finishing coats were applied by hand even though the first or under coats had been applied by machine. The finishing coats were therefore very often unevenly applied. After the coats were so applied, the finish was swabbed off, to remove the brush marks, by means of a hand swab covered with plush or velvet. The leather was then hung up on racks for drying. My machine applies these finishing coats evenly on the leather, and then by means of a belt conveyor traveling over a supporting table, the leather is carried in a flat, horizontal position allowing the workman, who also acts as inspector, to swab off the leather as it passes by him. The belt conveyor carries the leather in the horizontal position long enough to allow it to dry sufficiently to prevent running of the coating when the leather is subsequently piled down on trucks and transported or hung up for further drying. In order to assure the proper and thorough initial drying of the leather while passing over the conveyor belt, I prefer to provide drying means in the form of heat coils and rotary fans directing a current of air onto the leather on the belt. This makes it possible to use a shorter belt.

The invention further consists in the combinations and arrangements of parts hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawings forming a part of this specification, in which,

Fig. 1 is a side view of the finish-applying end of my improved leather finishing machine, fragmentary parts of the conveyor mechanism and drying mechanism being shown;

Fig. 2 is a side view of the drying and delivery end of the machine, the portion omitted in Fig. 1;

Fig. 3 is a cross-sectional view on line 3—3 of Fig. 2;

Fig. 4 is a cross-sectional view on line 4—4 of Fig. 1, showing the finish-applying and the cleaning mechanism;

Fig. 5 is a fragmentary sectional view of the take-off apron and drip means, taken on line 5—5 of Fig. 4;

Fig. 6 is a fragmentary sectional view on line 6—6 of Fig. 4, showing the means for washing the conveyor belt;

Fig. 7 is a partial horizontal sectional view taken on line 7—7 of Fig. 2, showing the drying mechanism; and

Fig. 8 is an end view of the wash tray and squeegee or belt cleaner blade, taken on line 8—8 of Fig. 1.

In the drawings, numeral 11 denotes the main frame of my leather finishing machine, which has a rotatable drum 12 mounted at its upper end, and a plurality of rotary brushes 13 mounted above said drum. The brushes are driven to rotate with said drum, as by means of a belt 14 running on pulleys 15 and 16 connected to the drum and brushes respectively, and over an idler pulley 15′ mounted on the frame, adjacent pulley 15, as shown in Figs. 1 and 4, or said brushes may be driven in any suitable manner, the drum and brushes rotating in the same directions at their engaging surfaces,

providing for thorough and complete coating and spreading of the finishing material over the leather. The finishing material is transferred from a pan 17 to the first of the series of brushes 13 by means of a feed roller 18 which is corrugated or grooved on its periphery for the proper transfer of material from the pan to the adjacent brush, said feed roller being driven from the drum by a suitable belt 19 running on pulleys 20 and 21 connected to the feed roller and drum respectively (see Fig. 4). The drum is driven by applying a driving belt (not shown) to the pulley 22, shown in Fig. 4. The leather 23 is fed onto the finishing drum 12 by applying it thereto beneath the pan 17, as shown in Fig. 1. The plurality of brushes 13 spread the finishing material evenly and smoothly over the leather as it passes beneath them on the drum.

Finishing machines comprising a mechanism similar to the above have been in use for some time, but they were used for applying the rough or under coat to the leather, and the final finishing coats were applied by the old hand method, as briefly set forth above.

My complete leather finishing machine is provided with the above described mechanism for completely and thoroughly applying all coats of material, including the final finishing coats, and in addition to said finish-applying mechanism, I provide means for conveying the leather stock in a flat, horizontal position, permitting convenient and thorough hand swabbing thereof, and also permitting initial drying of the leather. This conveyor means comprises an endless belt 25, preferably of rubber, or of any similar suitable material. Said belt is driven by a roller or drum 26 mounted in the frame 11, beneath the drum 12, said drums 12 and 26 being geared to run at equal peripheral speed in order that the articles or pieces of leather may travel at equal speed on the drum 12 and belt 25 to avoid bunching of said leather. The driving connections shown comprise a chain 27 and sprockets 28 and 29 fastened on the drums 12 and 26 respectively, but may consist of any convenient driving means. The belt is provided with a flat, horizontal supporting means, in the form of a flat table 30 having a smooth upper surface 31 preferably consisting of an anti-rust metal such as brass, bronze or the like. The bracket 32 is attached to the far end of the table and is provided with an adjustable bearing for the support of the outer belt wheel 33, said bearing comprising sliding journal blocks 34, bolts 35 and nuts 36, mounted in the sides of said bracket, the journal blocks supporting the shaft of the rotatable belt wheel 33 which supports the outer end of the belt 25. By this adjustable bearing, the proper tension may be retained in the belt. Suitable idler pulleys 37 are provided at the lower part of the table for the support of the returning lower portion of the belt.

The distance over the belt conveyor from the finish-applying mechanism to the outer wheel 33 is of the order of from 20 to 75 feet, according to the size and purpose of the machine, and with the flat supporting table extending substantially the entire length of the belt, a convenient space is provided for inspecting and hand-swabbing the leather which lies in a flat, horizontal position on and moves with the moving belt, and sufficient space is also provided for the initial drying of the leather whereby the running of the finishing coats is prevented when the leather is thereafter hung up for further drying. A man stands at the side of the table and swabs the leather, thereby smoothing and finishing the curling leather and touching up any uneven spots. This man thus acts as swabber, inspector and finisher. With a wide or large table, two or more men may be required, one or more on each side.

I also provide my machine with take-off means to remove the leather from the finishing drum and to place it on the conveyor in a level and horizontal position. This take-off means comprises an apron 40, which extends the length of the finishing drum 12 and is provided with a take off knife edge 41, as best shown in Figs. 4 and 5. Said apron extends diagonally downward adjacent to the conveyor belt, and in the form illustrated is constructed in an upper and a lower part, forming a drip slot or opening 42 between the two parts for the discharge of moisture or finishing solution which the knife edge takes with the leather from the drum 12. A drip pan 43 is mounted beneath said slot 42, as by mounting it removably on brackets 44, or in any suitable manner. Ribs or fingers 45 are mounted on said apron to extend outwardly, or corrugations may be formed thereon, to permit the leather to slide thereover and the moisture to run on the flat part of the apron and pass through the slot 42 into the drip pan.

My machine may be supplied with special means for insuring the rapid and thorough initial drying of the leather. In the form illustrated, such special drying means comprises heat coils 48 and rotatable fans 49, mounted above the belt and extending along the greater part of and over the outer portion of the table 30, beginning at a distance of about 15 feet away from the finish-applying mechanism, thus leaving sufficient space for hand-swabbing and inspecting. A hood or cap 50 is preferably provided around the coils and fans to guide the hot

air onto the leather on the belt, and may be supported in any manner to suit the location. The heating coils may consist of steam pipes running longitudinally over the table and connected to lateral supply and discharge pipes 51, or may be arranged in any suitable manner, and may be mounted on the hood or the wall, or in any suitable way. The fans 49, which may be of the usual two-blade variety, are mounted over the heat coils extending the width of the table, and a plurality of said fans is provided extending in a row longitudinally over said table, which fans force the air down onto the conveyor. The fans may be driven by means of shafts 52 rotatably mounted in brackets 53 fastened on the hood, or may be mounted and driven in any suitable manner. The fans may also be used alone without the heat coils, or the heat coils may be used alone without the fans.

Since during the swabbing operation, the swab overruns the leather and moisture gets on the belt, I provide means to clean the belt. This means comprises a pan 55 containing a cleaning solution, as a soap solution or the like. This pan is mounted on the frame 11 immediately beneath the belt, and a rotary brush 56 is positioned in said pan, its ends being mounted in collars 57 fastened on threaded rods 58 which are adjustably mounted in brackets 59 on the frame, said brush being raised and lowered into and out of contact with the belt by means of nuts 60 placed on said threaded rods 58 above said brackets. The brush is rotated by the drum 26 as by means of a chain 61 and sprockets 62 and 63 mounted on the drum 26 and brush 56 respectively. This cleaning means is further provided with means to dry the washed belt, which means consists in the present form of a plate or squeegee 65, pivotally mounted at the upper end of the pan 55, as by means of ears 66 and pins 67 and is held in contact with the belt 12 by means of springs 68 attached to said plate and pan, one end of each spring being removably fastened, as by providing hooks 69 on the pan. The washing and drying mechanisms are normally released from the belt and are put in operation about once or twice a day.

Without further elaboration, the foregoing will so fully explain the gist of my invention, that others may, by applying current knowledge, readily adapt the same for use under various conditions of service. It will, for instance, be obvious that some kinds of coating will dry in air with such rapidity that as soon as they are swabbed the material can be hung up or piled down without injury to the coating, in which case the drying means will be unnecessary; that other kinds of coating will need to be dried slowly, in which case the drying means will be superfluous but a full length conveyor should be employed; and that some kinds of coating will require no swabbing, in which case a flat support for the article when received from the coating means will be superfluous. These omissions, and many modifications and alterations may readily be made without eliminating certain items which may properly be said to constitute the essential items of novelty involved, which items are intended to be defined and secured to me by the following claims.

I claim:—

1. A combined apparatus for coating leather completely, comprising mechanical coating means, a conveyor arranged to take an article from said coating means and carry it in horizontal position past an operator, where the coating can be perfected manually, and means for partially drying the article while still in horizontal position.

2. In a leather finishing machine, in combination, a roller, a stripper and guide arranged to take an article from said roller, a conveyor arranged to take the article from said guide in horizontal position, mechanical coating means associated with said roller, and drip-catching means associated with said stripper and guide.

3. In a leather finishing machine, in combination, a roller, a stripper and guide arranged to take an article down from said roller, a conveyor arranged to take the article down from said guide in horizontal position, mechanical coating means associated with said roller, and drying means associated with said conveyor.

4. In a leather finishing machine, in combination, a roller, a stripper and guide arranged to take an article from said roller, and a conveyor arranged to take the article from said guide in horizontal position, coating means associated with said roller, drip-catching means associated with said stripper and guide, and drying means associated with said conveyor.

5. In a leather finishing machine, in combination, a roller, a stripper and guide arranged to take an article from said roller, and a conveyor arranged to take the article from said guide in horizontal position, coating means associated with said roller, drip-catching means associated with said stripper and guide, drying means associated with said conveyor, and cleaning means operating on a portion of said conveyor not engaging the article for removing material deposited on the conveyor.

6. The method of coating leather, which comprises, in combination, applying a coating mechanically, laying the material flat so that the coating will not run, and drying the material while it remains in flat horizontal position.

7. The method of coating leather which comprises, in combination, applying a coating mechanically, perfecting the coating manually, and drying the coating immediately enough to prevent it from running.

8. The method of coating leather which comprises, in combination, applying a coating mechanically, laying the material flat, perfecting the coating manually, and drying the coating while the material is flat, enough to prevent it from running in subsequent handling.

9. The method of finishing leather which comprises, in combination, applying all the coats of finishing material mechanically, perfecting each coat manually immediately after it has been mechanically applied, and drying each coat before it can run.

10. In a leather finishing machine, in combination, a roller, coating means associated therewith, a stationary stripper and guide, a conveyor arranged to move below said guide and take a piece of material therefrom, and means for driving said roll and conveyor at substantially the same surface speed.

11. In a leather finishing machine, in combination, means for operating on a piece of leather, a conveyor for carrying said leather past said means, a rigid stationary support underlying the portion of said conveyor adjacent said operating means, said support having a non-corrosive upper surface.

12. In a leather finishing machine, in combination, coating means, an endless conveyor comprising a flat web arranged to receive an article from said coating means, means for blowing hot air on the article on the conveyor to dry it, said blowing means overlying the delivery end of said conveyor only, the remainder of said conveyor being open to permit manual operation on the article and a flat support for said web for supporting said remainder to permit hand swabbing of the articles before they reach the blowing means.

13. In combination, mechanical coating means, receiving means for supporting material coming from said coating means in convenient condition for hand swabbing, said receiving means supporting the article in movement past the swabber's position and beyond the same, and means in addition to the natural drying action of the air on said material for hastening the drying process.

14. In combination, a frame, a drum journaled in the frame, rotary brushes for applying and spreading a coating material to skins passing over said drum, a conveyor pulley also journaled in the frame, an endless conveyor web having its top run extending horizontally from said pulley, a table having a flat top underlying the top run of said web, and means for driving said drum and said conveyor pulley in unison.

15. In combination, a frame, a drum journaled in the frame, rotary brushes for applying and spreading a coating material to skins passing over said drum, a conveyor pulley also journaled in the frame, an endless conveyor web having its top run extending horizontally from said pulley, a table having a flat top underlying the top run of said web, means for driving said drum and said conveyor pulley in unison, and a rotary power driven brush having a basin therefor below the return run of said web for washing the web.

16. In combination, a frame, a drum journaled in the frame, rotary brushes for applying and spreading a coating material to skins passing over said drum, a conveyor pulley also journaled in the frame, an endless conveyor web having its top run extending horizontally from said pulley, a table having a flat top underlying the top run of said web, supporting legs for the table, supporting rollers for the return run of the web mounted on said table legs, and means for driving said drum and said conveyor pulley in unison.

17. In combination, a frame, a drum journaled in the frame, brushes for applying a coating to sheets passing over the top of the drum, a conveyor comprising an endless flat web, a pulley for said conveyor, said pulley being journaled in the frame below said drum and means for driving the drum and pulley in unison, the pulley advancing the web at a surface speed slightly in excess of the surface speed of the sheet on the drum, and stripping and guiding means for stripping the sheets off of the drum and delivering them flat upon the conveyor.

18. In combination, a frame, a drum journaled in the frame, brushes for applying a coating to sheets passing over the top of the drum, a conveyor comprising an endless flat web, a pulley for said conveyor, said pulley being journaled in the frame below said drum and means for driving the drum and pulley in unison, the pulley advancing the web at a surface speed slightly in excess of the surface speed of the sheet on the drum, and stripping and guiding means for stripping the sheet off of the drum and delivering them flat upon the conveyor, and means for draining off moisture from the bottom side of the skins before they pass onto the web.

19. In combination, a relatively long swabbing table for swabbing freshly coated skins, a flat web of a suitable width supported flat on said swabbing table and being interposed between said skins and the swabbing table, means for moving said web with the skins thereon across said swabbing table for swabbing, and drying means extending over the latter end of the table for drying the coating on the skins to the point where they can be handled while they are still sup-

ported flat on the web and moving across the table.

20. The method of handling skins for swabbing and finishing which comprises, supporting the skins upon a flat web, drawing the web across a flat horizontal supporting surface, swabbing the skins on said moving web to perfect the coating, and drying the skins while still moving in the same position to the point where they can be handled.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ARNOLD A. ANGELL.

Witnesses:

JOSHUA R. H. POTTS,

FREDA C. APPLETON.