March 29, 1932. L. DAY ET AL 1,851,538

FORCED FEED TUBULAR DOPE BAR

Filed April 3, 1924 2 Sheets-Sheet 1

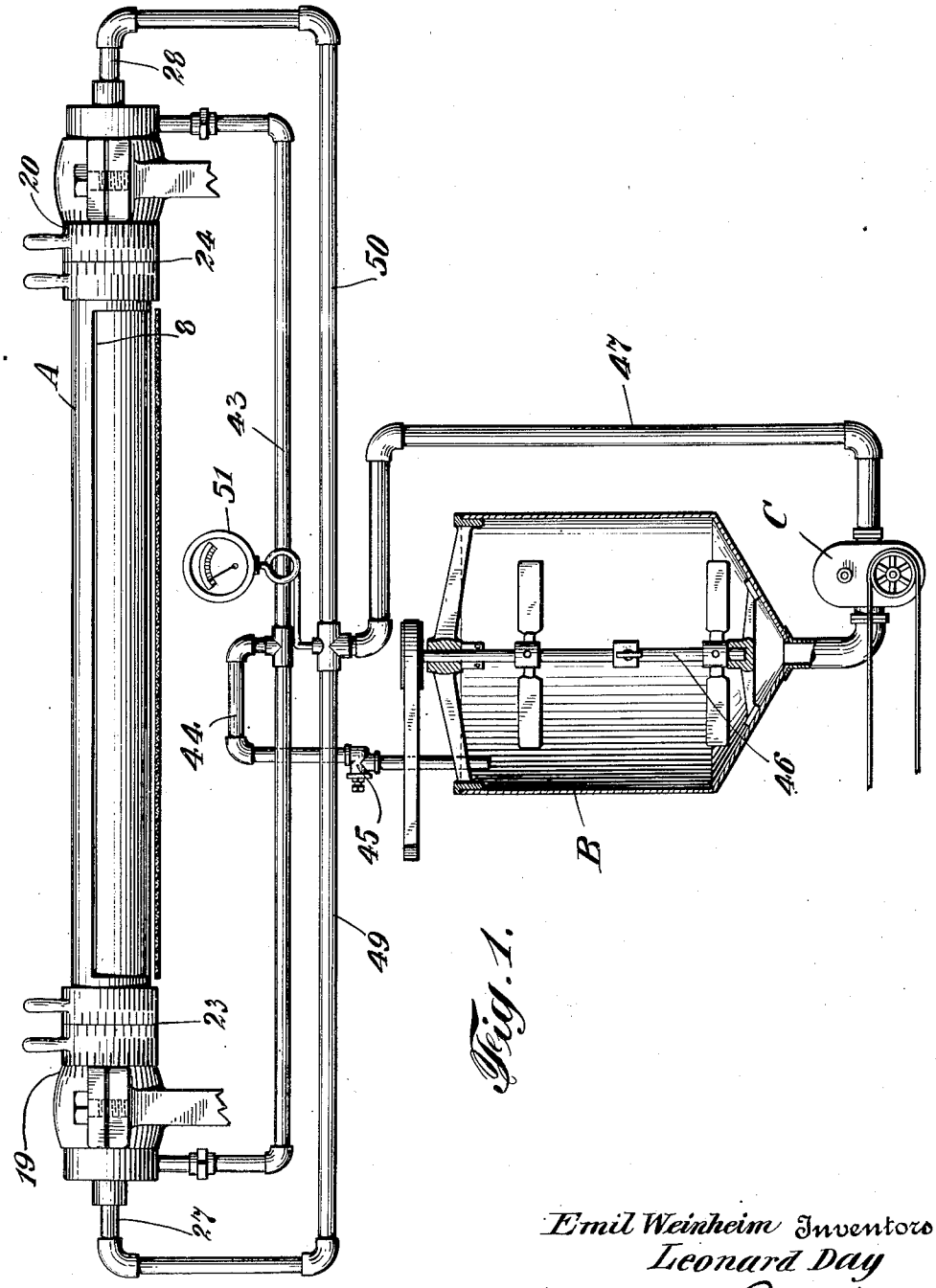


Fig. 1.

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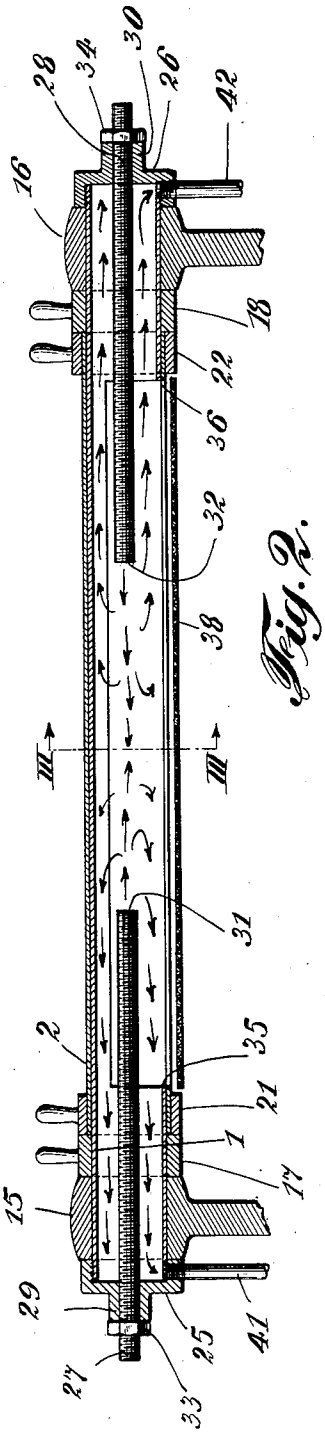
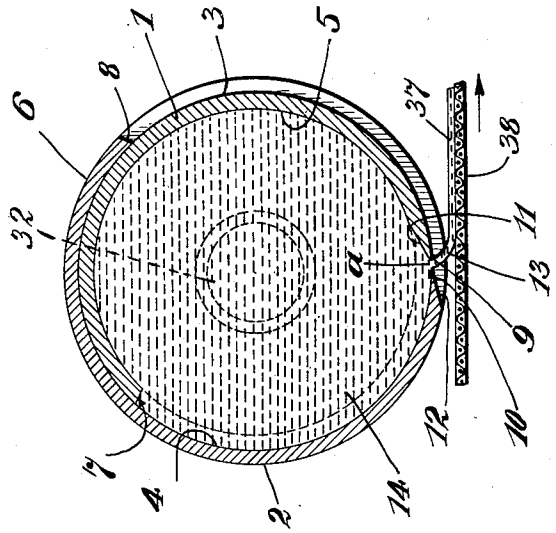



Fig. 2.

Fig. 3.

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Patented Mar. 29, 1932 1,851,538

# UNITED STATES PATENT OFFICE

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## FORCED FEED TUBULAR DOPE BAR

Application filed April 3, 1924. Serial No. 704,074.

This invention relates to apparatus useful in the production of substitute leather. In the majority of cases, substitute leathers heretofore have started with a body fabric which, itself, has sufficient tensile strength to withstand the application of dope by means of a scraping dope bar. In some instances, an attempt to apply the dope in a spray has been made; but this, of necessity, limits the dope to be employed to one containing a large amount of volatile solvent, which must be evaporated out of the body fabric causing blisters and generally being unsatisfactory for any purpose. Obviously, real leather does not comprise a textile fabric body, but consists of a body of matted fibres.

The present invention is directed to an apparatus particularly adapted for use in the practice of the newer process for making substitute leather invented by Emil Weinheim. This process employs a body fabric which may be without initial tensile strength sufficient to withstand the scraping action of the ordinary dope bar. The Weinheim process contemplates the extrusion or feeding by any means of a sheet of viscous dope directly upon a travelling body fabric, the feeding of the dope sheet being at the same rate of speed as the travel of the body fabric, so that there shall be no disturbance of the friable fragile substance composing the body fabric.

It is, therefore, an object of this invention to provide a forced feed dope bar of such a character that a sheet of viscous dope of uniform thickness may be extruded with convenience and dispatch and such that the dope bar itself may be adjusted in position and may be mounted readily above and transversely to a travelling strip of body fabric.

Further objects of the invention are to provide for the introduction and control of the supply of the dope and for the relief of the dope bar against excessive pressures, and also to conserve the dope employed.

This and further objects of the invention will better be understood by reference to the illustrative embodiment thereof, to which the claims are directed solely for purposes of illustration, and which is described in the following specification in connection with the accompanying drawings showing an embodiment of the invention merely for purposes of illustration and not limitation.

In the drawings, Fig. 1 is a diagrammatic vertical elevation with part shown in section;

Fig. 2 is a cross section relatively to a complete machine embodying the dope bar, and

Fig. 3 is an enlarged vertical longitudinal section through the dope bar itself.

A forced feed tubular dope bar A comprises two nesting tubes, an inner tube 1 and an outer tube 2. The outer surface 3 of the inner tube 1, which contacts with the inner surface 4 of the outer tube 2, being cylindrical as is the surface 4 of the outer tube, the one being circumscribed within the other. This description as to the cylindrical character of these surfaces only is made deliberately because of the fact that essentially the inner surface 5 of the inner tube 1 and the outer surface 6 of the outer tube 2 need not be cylindrical. For example, the inner surface of the inner tube may accommodate re-inforcements, ribs and the like; whereas, the outer surface 6 of the outer tube may likewise accommodate re-inforcements in the form of ribs or any other usual configurations for re-inforcements, against expansion. The mating circumscribed and inscribed surfaces 3 and 4, however, as it were, form a bearing and are capable of relative rotation, although it is to be understood that even this surface need not of necessity contact mutually throughout their entire extent, either circumferentially or longitudinally.

Each tube, inner and outer, is provided with a lengthwise positioned slot or orifice preferably of considerable circumferential extent. These slots are indicated by 7 for the inner tube and 8 for the outer tube. The limiting edge walls on one side of each of these slots are preferably straight and elemental, that is, corresponding with an element of the cylindrical surface. For example, the edge 9 of the slot 7 is straight and elemental and likewise the edge 10 of the slot 8 is straight and elemental. It is preferred also that the walls of the tubes cor-

responding in locality to these edges be bevelled off, that is, along the edge 9 the bevel 11 is provided, which is an internal bevel, and along the edge 10 an external bevel 12 is provided so that the actual orifice *a* is bounded by knife edges, the better to limit and define the thickness of the extruded sheet 13 of dope 14 from the interior of the bar.

Either the outer or the inner tube, as shown in the drawings the inner tube, is adjustably clamped in releasable clampable brackets 15 and 16 adapted to be mounted on the frame work of the substitute leather machine. In fact, these brackets may be substantially the same as ordinary trunnions for mounting the scraper of a dope bar. If desired, although not of necessity, a means such as the lever operated rings 17 and 18 may be fixed to the inner tube 1 rotatably to adjust it in the brackets 15 and 16. The actual adjustment can be indicated by the double scales 19 and 20 formed part on the brackets and part on the sleeves. Similar lever-operated sleeves 21 and 22 may be fixed to the ends of the outer tube for rotatably adjusting it relatively to the inner tube, the position of adjustment being readily indicated by double scales such as 23 and 24, formed part on the sleeves 17 and 18. Although these adjusting sleeves are shown necessitating the brackets 15 and 16, it is not considered that this is essential. There is nothing inherent in the design which prevents the application of the brackets inwardly relatively to the inner sleeves 21 and 22.

Means for closing the ends of the tube are shown in the form of caps 25 and 26 threaded on to the projecting ends of the inner tube. Dope supply ducts 27 and 28 are preferably mounted concentrically of the dope bar and are threaded throughout their entire extent and pass through internally threaded nipples 29 and 30 so that their discharge mouths 31 and 32 may be adjusted relatively to the dope bar by turning them relatively to the dope bar. The adjustment may be fixed by the jamb nuts 33 and 34. The preferred adjustment for the dope supply mouths 31 and 32 is one-fourth of the distance inwardly from the outer ends 35 and 36 of the extruding orifice *a*. This tends to insure the most nearly uniform pressure possible for effecting the extrusion of the sheet 13 of dope, which should be extruded so that when it lies horizontally as a layer 37 upon the carrier 38, it can travel in the direction of the arrow at the same speed as the underlying carrier fabric 38 without applying any forward dragging or retarding effect at the extrusion orifice, that is, without tending to change the configuration of the bend 13. This necessitates the same extrusion speed at the orifice *a* as is the travel of the fabric 38.

Obviously the tubes 1 and 2 may be rotated one on the other so as completely to close off the orifice *a*. In such event, it is desired that circulation be maintained within the dope bar because the type of dope usually desirable tends to solidify if it is allowed to cool off as would be the case upon exposure in the exposed dope bar without a renewal of the supply. To provide for this circulation, return ducts 41 and 42 are tapped into the ends of the bar or otherwise suitably connected therewith, and are preferably cross-connected by the duct 43, both branches of which disgorge into the return line 44 through a relief valve 45 back into the supply vat B. The two branch lines from the relief ducts 41 and 42 are made of the same length and preferably of the same type of piping so that the flow out of each end of the dope bar will be uniform. The relief valve 45 is adjusted preferably to maintain the same internal pressure within the bar A when the orifice is closed off as would be the case when the orifice was open and working, the different function being that the outward flow of dope is backed into the vat B.

This vat B may be of any suitable construction but it is preferred that it contain a mechanical mix-up 46. The force pump C taking its supply of dope from the vat B forces the dope through the supply duct 47, thence through to the dope resistant branches 49 and 50 to the end positioned dope supply ducts 27 and 28 previously described. A pressure gauge 51 may be employed as an indicator for the working pressure.

Note the disclosure in the application of Emil Weinheim for forced feed dope bar, Ser. No. 702,472, filed March 26, 1924.

Although the fabric upon which the extruded sheet of dope is to be applied as illustrated in the drawings is shown as a woven textile fabric, it is to be understood that this invention is more particularly adapted for the application of a sheet of dope to a more fragile fabric, which perforce, may be carried on a carrier, although it is likewise useful in applying the dope to a woven textile fabric such as that illustrated.

The inventive thought may have a variety of expressions as is contemplated in what we claim and desire to secure by United States Letters Patent as follows:

1. A hollow forced feed dope bar for delivering a sheet of dope having in combination two parts relatively rotatable about the same axis to provide an extrusion slot and a rotary adjustment for adjusting the width of said extrusion slot and means providing a rotary adjustment for adjusting the position of the extrusion slot, both said rotary adjustments being about the same axis.

2. A hollow forced feed dope bar comprising two modulated cylindrical shells adapted to nest one within the other, and providing

cooperative straight edges to form an extrusion slot; means for relatively rotating said shells; and means for rotating said shells as an entirety.

3. A forced feed tubular dope bar comprising a tube provided with a lengthwise extended extrusion slot; means for closing the ends of the tube; and a pair of dope supply ducts, the mouths of which disgorge intc the interior of said tube at localities approximating one-fourth of the distance in from each extremity of said slot; and exit ducts opening outwardly from approximately the ends of said hollow dope bar.

4. A forced feed tubular dope bar comprising two long nesting tubes, the nesting surfaces of which are cylindrical and each of which is provided with a longitudinal slot, one of the edges of which is elemental; separate means at each end of said dope bar for rotating said tubes relatively to each other to regulate the width of the orifice between said elemental edges, and independent means at each end of said dope bar for measuring the relative rotation at each end between the corresponding ends of said nesting tubes; and means for relatively fixing the ends of said two nesting tubes against relative rotation.

5. A forced feed tubular dope bar having a longitudinally extensive laterally positioned slot; means for closing the end of said bar; and threaded supply tubes having adjustable threaded engagement through the end closing means of said bar whereby a relative rotation between said supply tubes and said bar will effect an adjustment in position for the discharge mouth of said tubes relatively to said bar.

6. A hollow forced feed dope bar for delivering a sheet of dope, having in combination a rotary adjustment for adjusting the width of an extrusion slot and in addition, a rotary adjustment for adjusting the position of the extrusion slot, both said rotary adjustments being independent one of the other and both being about the same horizontal axis; and means for fixing the rotary adjustment of said dope bar as a whole.

In witness whereof, we have signed our names to this specification, this 10th day of November, 1923.

LEONARD DAY.
EMIL WEINHEIM.