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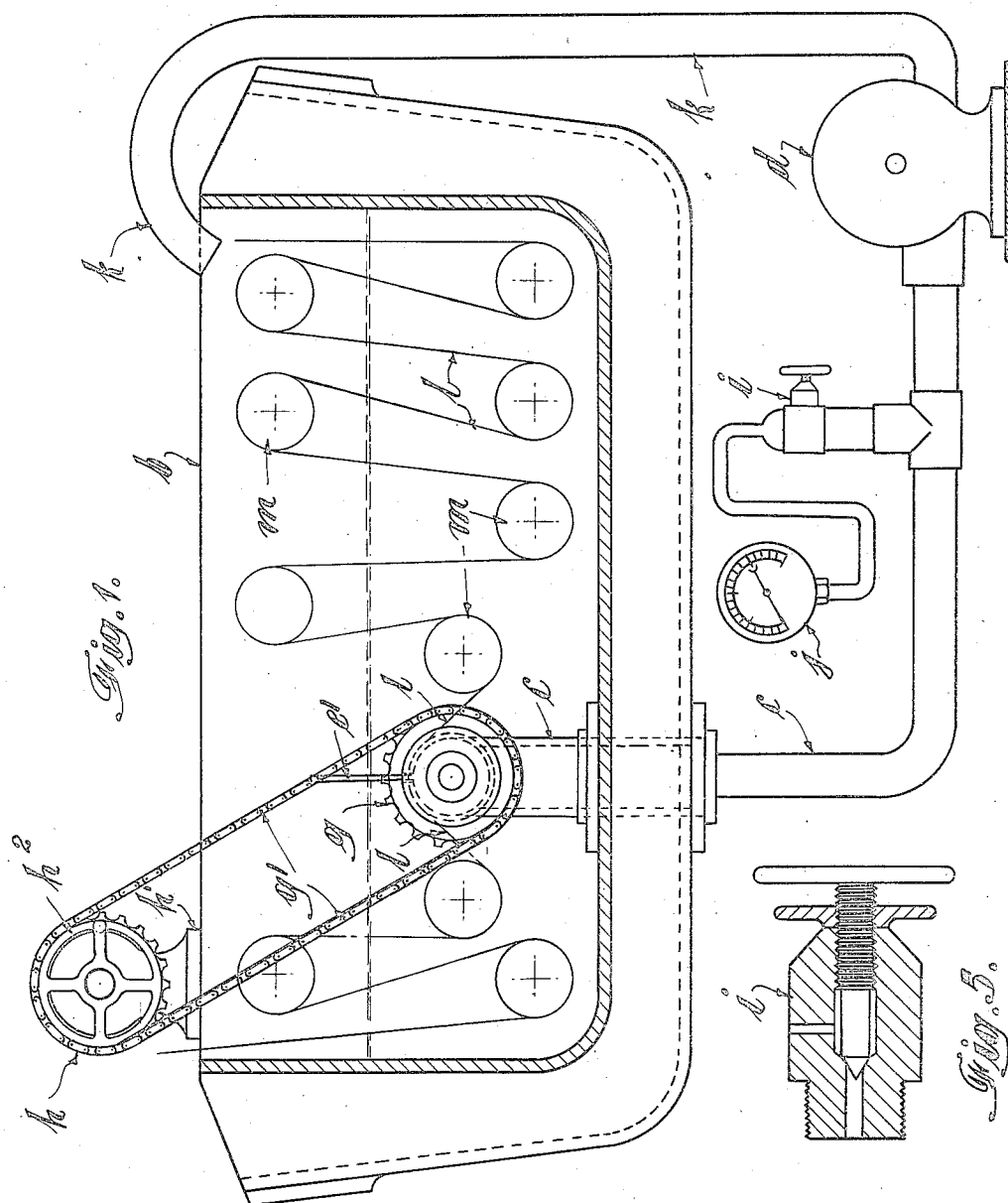
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APPARATUS FOR IMPREGNATING FABRICS WITH A MERCERIZING OR OTHER LIQUID

Filed March 13, 1923

2 Sheets-Sheet 1



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Ernest Farrell

By his Attorney: Walter Lunn

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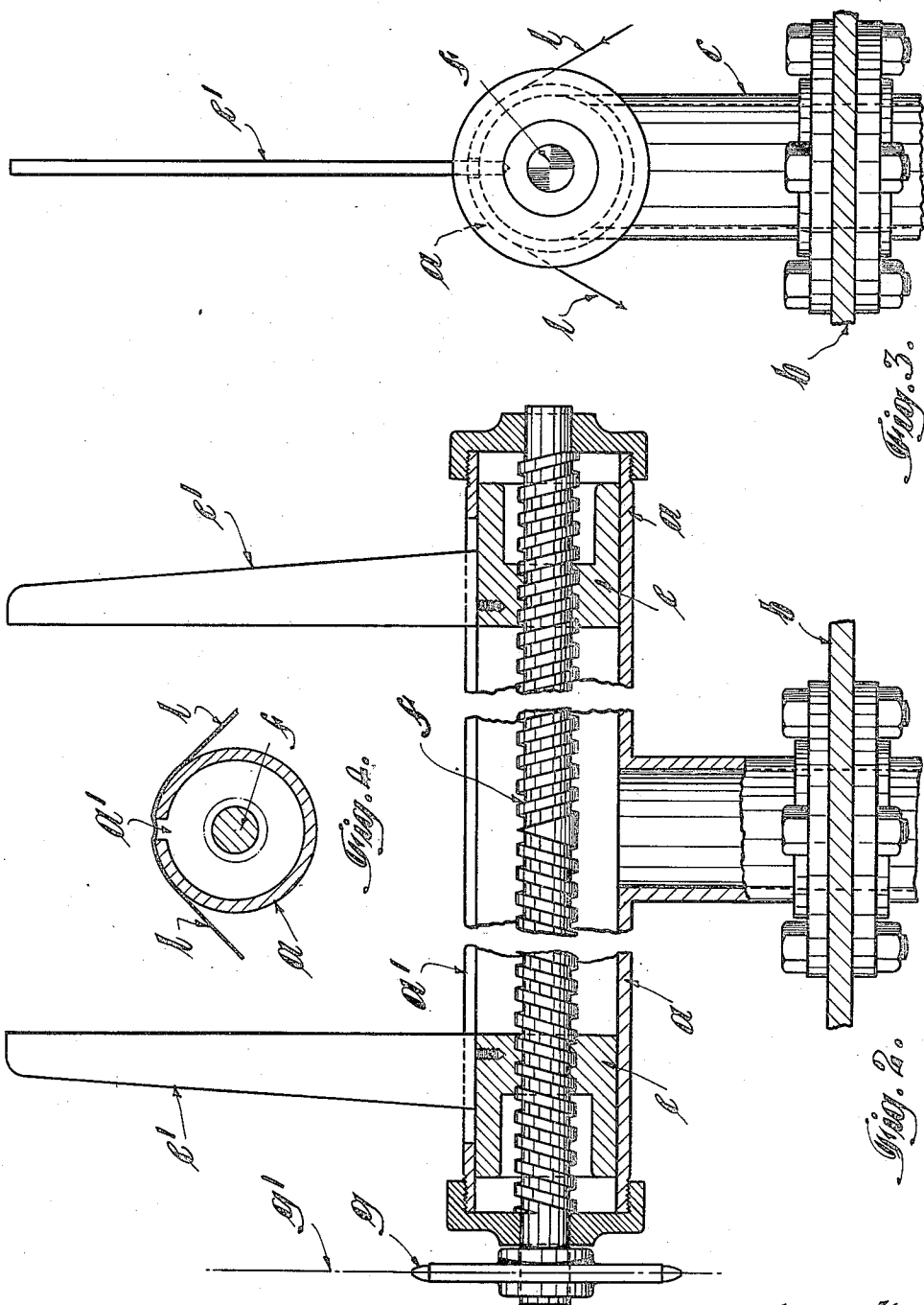
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UNITED STATES PATENT OFFICE.

ERNEST FARRELL, OF SALFORD, MANCHESTER, ENGLAND.

APPARATUS FOR IMPREGNATING FABRICS WITH A MERCERIZING OR OTHER LIQUID.

Application filed March 13, 1923. Serial No. 624,837.

To all whom it may concern:

Be it known that I, ERNEST FARRELL, a subject of the King of Great Britain and Ireland, residing at Salford, Manchester, England, have invented new and useful Improvements in Apparatus for Impregnating Fabrics with a Mercerizing or Other Liquid, of which the following is a specification.

This invention has for its object a new or improved construction of apparatus for enabling fabrics to be thoroughly and uniformly impregnated with a mercerizing or other liquor, the apparatus being adjustable to suit various widths of fabrics, and the degree or rate of impregnation being variable according to requirements.

According to the invention, the improved apparatus consists of a tank or open vat, wherein is mounted a long tube or pipe which extends across the vat to points near two of its opposite sides. Said pipe is supported from the floor of the vat by a vertical branch pipe, which lies central to the length of the pipe and communicates through an opening in the floor of the vat with an exhaust pump.

In the upper part of the said pipe is a slit extending the whole length of the pipe, whilst within the pipe at or near each end, is a circular bush or piston capable of sliding to and fro. Connected to each piston and extending through the slit is a plate, which extends upwards to a point where its extremity can be seen when the vat is filled with liquor. Said plates form guides for the fabric, and also serve to close those parts of the slit immediately beyond the edges of the fabric.

Within the pipe and extending from end to end is a right and left handed screw, said screw passing through the pistons, and at one end being journaled in a fixed closing cap on the pipe, and at the other end being fitted with a sprocket wheel, by which, and an endless chain and handwheel (the latter being arranged on a bracket above the level of the liquor), the screw may be rotated to adjust the guide plates, towards or away from each other.

In using the improved apparatus the fabric to be impregnated is guided through the liquor in the vat by rollers and over the top slitted face of the pipe; simultaneously, the liquor is drawn by the pump through the fabric and slit into the pipe, and from thence through the outlet branch and back

to the vat, the liquor circulating through the fabric and pipe continuously.

Owing to the narrowness of the slit, a considerable vacuum is formed in the pipe, which ensures of the liquor passing through the fabric uniformly at all points of its width.

In the said branch outlet may be a regulator for by-passing a portion of the liquor, or for partially destroying the vacuum in the pipe and thus modifying the degree or rate of impregnation.

The invention will be more particularly described by the aid of the accompanying drawings, wherein:

Fig. 1 is a tank or vat showing the invention applied.

Fig. 2 is a sectional view of the operative part of the invention drawn to an enlarged scale.

Fig. 3 is an end view of Fig. 2, and

Fig. 4 is a sectional view on the line 4—4 of Fig. 2 showing more particularly the position the fabric takes when passing over the slot.

Fig. 5 is a detail view of the relief valve.

Referring to the drawings, a comparatively long tube or pipe *a* is located in a vat *b* so as to lie immersed in the treating liquor. The pipe *a* extends across the vat and is supported from the floor of the vat by the vertical branch pipe *c*, located centrally of the pipe *a*. The pipe *c* extends below the vat and communicates with the suction of an exhaust pump *d*.

In the upper part of the pipe *a* is a slit *a'* extending the whole length of the pipe, and projecting through said slot are plate-like guides *e'* having cylindrical lower portions *e* slidably mounted in the tube. Said guides *e* are formed with right and left hand screw threads respectively to receive a screw *f* formed with right and left hand screw threads. The screw is journaled in bearings at the ends of the pipe, one end projecting beyond said pipe and being provided with a sprocket wheel *g* connected by the chain *g'* to a second sprocket wheel *h* on a spindle journaled in a bracket *h'* secured to the top of the tank, said spindle being provided with a manipulating handle *h'* so that the screw *f* can be readily rotated to adjust the guides *e'* to the required distance apart to suit the width of fabric.

On the suction side of the pump *d* is an air inlet valve *i* which can be regulated to

modify the vacuum in the pipe *a* to suit the fabric being impregnated. As shown in Fig. 4 the pressure on the top side of the fabric, when passing over the slot in the tube *a* causes said fabric to take a bowed form ensuring very thorough impregnation, but certain fabric will not withstand the maximum pressure, and, therefore the valve *i* can be manipulated to admit air and decrease the vacuum, the degree of vacuum being gauged by the gauge *j*.

The liquor drawn through the slot *a'* in the pipe *a* is returned to the vat via the pipe *k* from the delivery side of the pump.

In use, the fabric *l* is guided through the liquor over the rollers *m* and over the pipe *a*. That portion of the fabric passing over the slot *a'* is subjected to the full pressure of the atmosphere and any head of liquor in the tank above the pipe *a*, which forces said liquor through the fabric into the pipe *a*.

The improved apparatus is chiefly applicable for impregnating fabrics with mercerizing liquor, and for such and like purposes the pipe will preferably be made of steel, but the apparatus may also be used in the impregnating of fabrics with dye and other liquors, and the pipe be made of any other and suitable metal or material.

What I claim is:—

1. Apparatus for enabling fabrics to be impregnated with a mercerizing or other liquor comprising a vat, a series of guide rollers in said vat, a long pipe in said vat extending horizontally to points near two opposite sides and having a long narrow slot, the fabric to be impregnated passing around said guide rollers and over said slot in passing through the vat, a branch outlet pipe and an outlet opening in the vat with which the branch pipe communicates, guides in the long pipe, guide plates carried by said guides and extending upwards through the slot and well above the pipe, a spindle with right and left hand screw threads for adjusting the guides and guide plates, relatively to each other, and a pump for continuously extracting liquor from the long pipe through the branch pipe, and returning it to the vat, substantially as herein set forth.

2. Apparatus for enabling fabrics to be impregnated with a mercerizing or other liquor comprising a vat, a long pipe in said vat extending horizontally to points near two opposite sides, a branch outlet pipe supporting said long pipe from the floor of the vat in which is an opening, said long pipe having a long narrow slot in its top side, guides in said pipe one near each end and each bored and screw threaded, a spindle with right and left handed screw threads screwing through the guides which are correspondingly threaded, bearings at the ends of the long tube for said spindle, a guide

plate secured to each guide and extending upwards through the slot and well above the pipe, means for rotating the screwed spindle to cause the pistons and guide plates to approach or recede from each other, a pump for continuously extracting liquor from the long pipe through the branch pipe and returning it to the vat, substantially as herein set forth.

3. Apparatus for enabling fabrics to be impregnated with a mercerizing or other liquor comprising a vat, a long pipe in said vat extending horizontally to points near two opposite sides, a branch outlet pipe supporting said long pipe from the floor of the vat in which is an opening, said long pipe having a long narrow slot in its top side, guides in said pipe one near each end and each bored and screw threaded, a spindle with right and left handed screw threads screwing through the guides which are correspondingly threaded, bearings at the ends of the long tube for said spindle, a guide plate secured to each guide and extending upwards through the slot and well above the pipe, means for rotating the screwed spindle to cause the guides and guide plates to approach or recede from each other, a pump for continuously extracting liquor from the long pipe through the branch pipe and returning it to the vat, and an air inlet valve for modifying the vacuum in the long pipe, substantially as herein set forth.

4. Apparatus for enabling fabrics to be impregnated with a mercerizing or other liquor comprising a vat, a long pipe in said vat extending horizontally to points near two opposite sides, a branch outlet pipe supporting said long pipe from the floor of the vat in which is an opening, said long pipe having a long narrow slot in its top side, guides in said pipe one near each end and each bored and screw threaded, a spindle with right and left handed screw threads screwing through the guides which are correspondingly threaded, bearings at the ends of the long tube for said spindle, a guide plate secured to each guide and extending upwards through the slot and well above the pipe, a sprocket wheel on said spindle outside the pipe end, a further sprocket wheel at the upper part of the vat, and an endless chain encircling said sprocket wheels, a hand wheel for rotating the said wheels and spindle, and causing the guides and guide plates to approach or recede from each other, and a pump for continuously extracting liquor from the long pipe through the branch pipe and returning it to the vat, substantially as herein set forth.

In testimony whereof I have signed my name to this specification.

ERNEST FARRELL.