

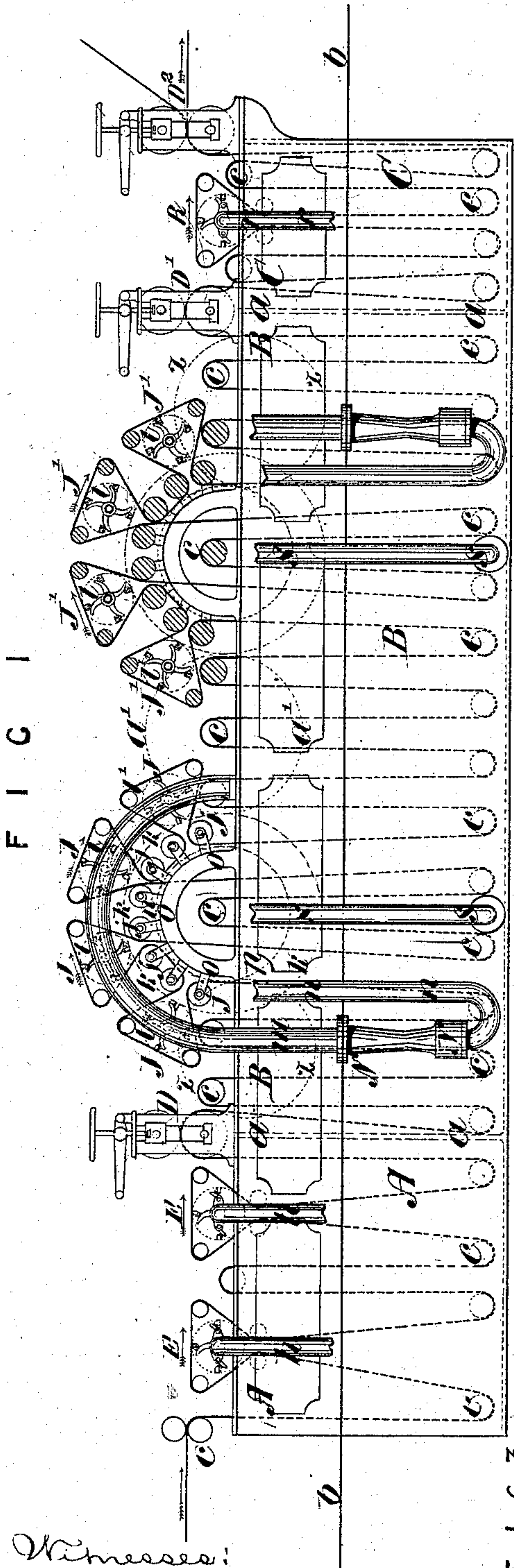
(No Model.)

J & P. HAWTHORN & J. P. LIDDELL.

APPARATUS FOR WASHING WOVEN FABRICS.

No. 274,766.

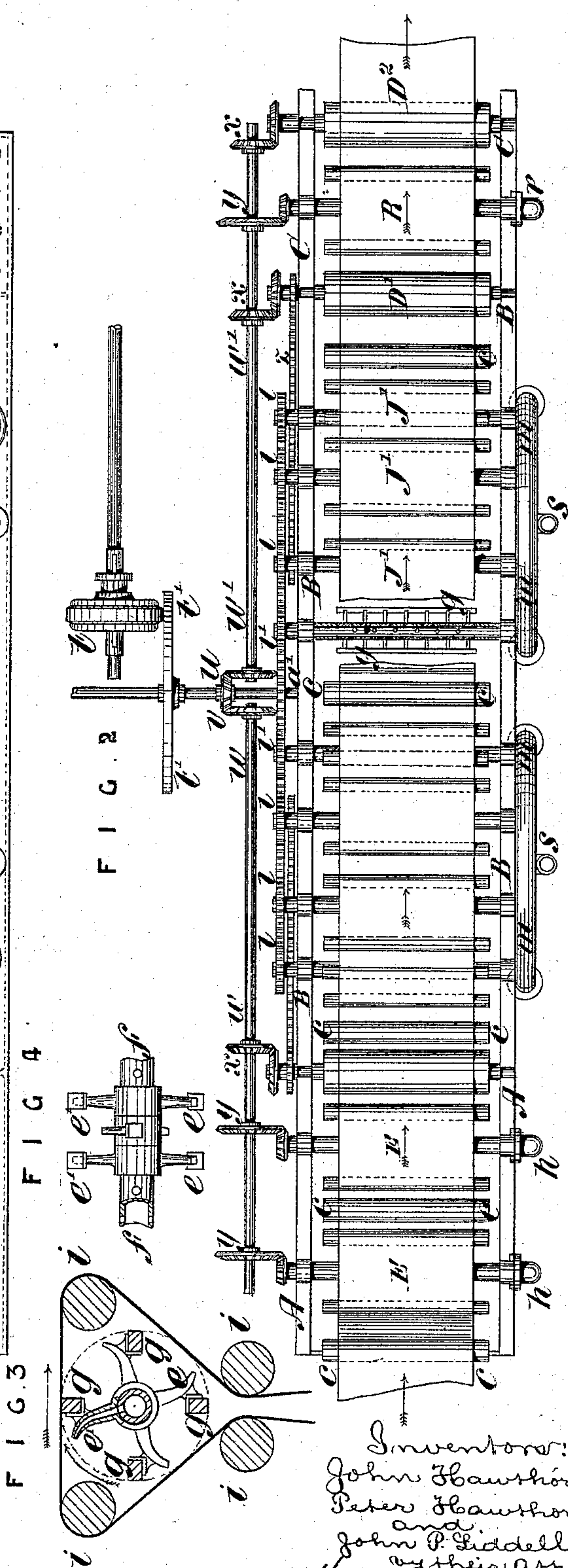
Patented Mar. 27, 1883.



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Witnesses:

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2-1-72

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UNITED STATES PATENT OFFICE.

JOHN HAWTHORN, PETER HAWTHORN, AND JOHN P. LIDDELL, OF NEW-TOWN, COUNTY OF CHESTER, ENGLAND.

APPARATUS FOR WASHING WOVEN FABRICS.

SPECIFICATION forming part of Letters Patent No. 274,766, dated March 27, 1883.

Application filed December 4, 1882. (No model.) Patented in England November 16, 1881, No. 5,016.

To all whom it may concern:

Be it known that we, JOHN HAWTHORN, PETER HAWTHORN, and JOHN PEMBERTON LIDDELL, residing at Newtown, in the county of Chester, and subjects of the Queen of Great Britain and Ireland, have invented certain Improvements in Apparatus for Soaping, Washing, or Treating Woven Fabrics, (for which we obtained a patent in Great Britain, No. 5,016, dated November 16, 1881,) of which the following is a specification.

Our invention relates to the machines principally employed in the soaping and washing of prints or other piece-goods, and has for its object to increase the efficiency and to reduce the proportions of such machines. We employ in the soaping operation centrifugal jets to discharge the lye upon the goods in conjunction with revolving beaters. The beater-shaft is hollow, and curved or suitably-shaped discharge-pipes are formed on or fixed to the said shaft. The cloth is led over rollers, so that it is brought three or any suitable number of times into contact with the beaters or rubbers. As the beater or rubber shaft revolves, the lye which is supplied to the hollow shaft is discharged onto the cloth and the beaters or rubbers act to loosen the dirt. We also arrange a number of sets of soaping apparatus in a semicircular or curved line, so as to economize space in the machine. This part of our invention is applicable in cases wherein other than our improved soaping beaters or rubbers are used. We prefer to lift or supply the lye to the beater or rubber shafts by means of steam-ejectors. We also employ for the washing operation apparatus consisting of discharging-jets and beaters or rubbers similar in construction and action to the apparatus used for soaping, as will be hereinafter more fully described.

The accompanying sheet of drawings is illustrative of a complete soaping and washing machine constructed in accordance with our invention.

Figure 1 represents a side elevation, and Fig. 2 a plan, of the machine. Fig. 3 is a part of Fig. 1 drawn to a larger scale, and Fig. 4 is a side view of the beater-shaft and jet-pipes seen in Fig. 3.

In the figures, A B C is a tank, divided by

partitions *a a* into compartments, so as to form a range of cisterns, which extend below the floor-line *b*, as is usual. In the example the cistern A is the washing-cistern, in which the goods are simply treated with water. B is the soaping-cistern, and C is the rinsing-cistern. The several cisterns are fitted with upper and lower conducting-rollers, *c c*, as is usual, and with ordinary or suitable squeezing-rollers, D D' D². To the cistern A we apply two sets, E E, of our centrifugal jets and beaters or rubbers. One of these, drawn to a larger scale, is represented in Figs. 3 and 4, wherein *e e* are two curved jet-pipes, which are cast together so that the combination can be keyed or secured upon a hollow shaft, *f*. Apertures formed in the shaft communicate with passages in the jet-pipes, as seen in the case of *e'*, which is represented in section. Several of these double jet-pipes are secured at intervals upon the shaft, as seen in Fig. 4. The jet-pipes are adapted to carry beating or rubbing bars *g g*, each alternate double jet-pipe being fixed upon the shaft at right angles to the intermediate pipes, whereby the pipes are adapted to carry four beater or rubber bars, as in the case of Fig. 3. The beater or rubber shaft is caused to revolve rapidly in the indicated direction, and is supplied with water by means of a pipe, *h*, as seen in Figs. 1 and 2, the mouth of the said pipe being provided with a suitable packed gland, in which the end of the shaft can revolve in a suitably water-tight manner. The form of the jet-pipes may be varied, and more than two may be cast or formed in one part, or they may be separately cast or formed, and also less or more than four beater or rubber bars may be carried by one shaft. The cloth is carried nearly around the beater or rubber shaft by means of four rollers, *i i*, which are so arranged as that the cloth is exposed three times to the action of the beaters or rubbers and of the jets of water, as will be clearly understood from an inspection of Fig. 3. We may modify this arrangement and vary the number of rollers, so that the cloth is exposed more or less than three times to the action of the beaters or rubbers and jets while passing each set E of beaters or rubbers and jet-pipes. The course of the cloth through the machine is indicated by full and dotted lines, whereby it will be

seen that it passes from the cistern A through a pair of squeezing-rollers in the soaping-cistern B, wherein it is conducted up and down in the lye a suitable number of times over the ordinary conducting-rollers, *c*, which may be varied in number as considered to be desirable. The cloth is conducted upward from the cistern to the first of four sets, J J, of beaters or rubbers and jet-pipes, which are similar to the sets E E, already described, but are supplied with lye instead of with water, and are arranged at equal distances from a central axis or point, in accordance with the second part of our invention, the said central point in this case being the axis of a spur-wheel, *k*, which gears with pinions *l l'*, which are secured upon the several shafts. The said shafts are carried by arched bearers on each side of the cistern. One of these bearers, *m*, is hollow and serves to supply lye to the shafts which enter packed glands in the hollow bearer. One end of this bearer is continued downward, and is connected with an ejector, N, which is supplied with steam by means of a pipe, (indicated by *n*.) Lye is admitted through a suitable connection from the cistern to the ejector, and is heated by the steam, and at the same time is lifted to the beater or rubber shafts, and by the centrifugal action of the jet-pipes is thrown forcibly against the cloth. We may employ an ejector and a hollow bearer on each side of the tank, so as to supply the lye to both ends of each beater or rubber shaft. Four rollers are employed to conduct the cloth nearly around each beater or rubber shaft, as in the cases of the washing beaters or rubbers E; but in the cases of the soaping beaters or rubbers arrangements are made for imparting positive motion to the rollers *i i* in each set of four. The rollers are mounted in bearings, which are carried by an arched bearer, *o*, and the axes of the said rollers are equidistant from the central axis of the wheel *k*. Upon the same axis is mounted a second spur-wheel, which is seen at *p* below the wheel *k* in Fig. 2, and is indicated by a dotted circle in Fig. 1. This wheel gears with pinions which are secured upon the axles of the rollers *j j*, whereby all the eight rollers can be rotated in the same direction, so as to aid in drawing or conducting the cloth through the machine. In order that the tension upon the cloth may be regulated, we arrange for the pinions upon the axles of the said rollers to be removable or to be readily thrown out of gear, so that when the tension is considered to be too great one or more of the said pinions can be removed or put out of gear. In practice we secure each pinion by means of a screw, and slide it upon its axle out of gear when the said screw has been relaxed. It will be seen that the cloth, after being subjected to the action of the first two beaters or rubbers, is passed to and fro in the lye in the cistern before being subjected to the action of the next two beaters or rubbers. After leaving this part of the machine the cloth is conducted to and fro through the lye, and is then subjected to

the action of another set of four centrifugal soaping beaters or rubbers, J', which in the example are in all respects similar to the beaters or rubbers J J, already described. The hollow bearer, which sustains the ends of the shafts of the beaters or rubbers J' and supplies them with lye, is left out of the drawings in Fig. 1, in order that the said beaters or rubbers, which are represented in section, may be seen more clearly. The cloth, after being subjected to the action of the four soaping beaters or rubbers J', is again led up and down through the lye, and is passed through a set of squeezing-rollers, D', into the rinsing-cistern, wherein it is passed up and down through the rinsing-water, and is further subjected to a centrifugal rinsing beater or rubber, R, which is similar in its construction to the beaters or rubbers E at the other end of the machine, and is supplied with water by means of a pipe, *r*. The cloth is led from the cistern through a set of squeezing-rollers, D², and is or may be passed through a suitable drying-machine. Steam for heating the lye is conveyed into the cistern B by means of pipes *s s*; but, if not considered to be essential, these pipes may be dispensed with and the ejectors alone be depended upon to maintain a suitable heat. Any suitable arrangement may be adopted for driving the rollers and shafts, which receive positive motion; but we will describe the arrangement indicated in the drawings. A friction-pinion, *t*, imparts motion to a disk, *t'*, which is fixed upon a cross-shaft, *u*. The speed of the said shaft can be varied by sliding the pinion *t* upon its shaft; or, instead of using the pinion *t* as a driver, the shaft *u* may be coupled direct to the motor and motion be imparted therefrom to the pinion *t* and shaft, so as to drive a further series of machinery. A bevel-pinion, *v*, gearing with the bevel-wheels upon two side shafts, *w* and *w'*, imparts motion to the said shafts, which are connected by the bevel-gearing *x x* with the squeezing-rollers, and by the bevel-gearing *y y* with the shafts of the beaters or rubbers E E and R. A spur-wheel upon the axle of one of the squeezing-rollers in each of the two sets D D' is connected by means of an intermediate wheel, Z, with the aforesaid spur-wheel *p*, whereby the rollers *j j* receive motion, as hereinbefore mentioned. A spur-wheel, *a'*, which is fixed upon the shaft *u*, gears with pinions *l l'*, which are fixed upon the shafts of the two beaters or rubbers which constitute the last of the series J and the first of the series J'. As the pinions also gear with the central wheels, *k*, these wheels are thereby caused to revolve and actuate the other three beaters or rubbers in each series, whereby all the eight soaping beaters or rubbers are caused to revolve in unison. It will be seen that as the cloth is conducted through the machine the centrifugal soaping beaters or rubbers, by their rotation, which should be sufficiently rapid for the purpose, cause the lye to be discharged upon the cloth, which is acted upon in three different parts by the one revolving beater or

rubber, as hereinbefore mentioned; and it will also be seen that the rubbing action of the beater or rubber bars follows immediately, so that by the combined actions of the jets of lye and the rubbing action of the beater or rubber bars the dirt or foreign matter is quickly loosened and discharged. In the example selected for illustration the cloth would be acted upon by the soaping beaters or rubbers in twenty-four different places at the same time. By this multiple action of the beaters or rubbers, combined with the curved or semicircular arrangement of the beaters or rubbers, we are enabled to shorten the machine considerably as compared with the ordinary machines; or, if the machines are made of the ordinary length, we could pass through a greater quantity of cloth in a given time. We may use less or more than four soaping beaters or rubbers in each series, and we may apply more than two of the series of such beaters or rubbers, or we may apply only one series arranged in a curve or semicircle, as indicated; and, further, in cases wherein we do not combine the second part of our invention with the first, we should arrange the axles of all the beaters or centrifugal washers, soapers, and rinsers in a straight line, or adopt any other suitable arrangement. We may employ more than one soaping-cistern and less or more than three cisterns or compartments. The term "lye," herein used for the sake of brevity, must be understood to refer to any liquid which may be used in such a machine in the treatment of woven fabrics.

Ordinary beaters or rubbers or any suitable description of beaters or rubbers may be arranged in a "semicircle"—that is to say, may be as set forth and indicated with reference to the beaters J J'.

We are aware that lye has been pumped through fixed perforated pipes, and so discharged against cloth, previously to our invention; but we do not consider the effect of such jets to be so beneficial nor so rapidly obtained as in the case of our combined beaters or rubbers and centrifugal jet-pipes.

We claim as our invention—

1. In a machine for soaping, washing, or treating fabrics, the hollow revolving shafts, in combination with jet-pipes mounted on said hollow shafts, for discharging liquid onto the fabric, and with beaters, also mounted on said shaft, all substantially as described.

2. A soaping or washing machine for fabrics, consisting of a series of tanks and conducting-rollers, with hollow revolving shafts and injectors therefor, and jet-pipes and beaters mounted on said hollow shafts, substantially as set forth.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

JOHN HAWTHORN.
PETER HAWTHORN.
JOHN P. LIDDELL.

Witnesses:

EDWARD K. DUTTON,
DAVID FULTON.