

F. L. SMITH AND H. P. HARRIS.
LAUNDRY APPARATUS.

APPLICATION FILED FEB. 14, 1918. RENEWED MAY 24, 1921.

1,402,020.

Patented Jan. 3, 1922

2 SHEETS—SHEET 1.

Fig. 1.

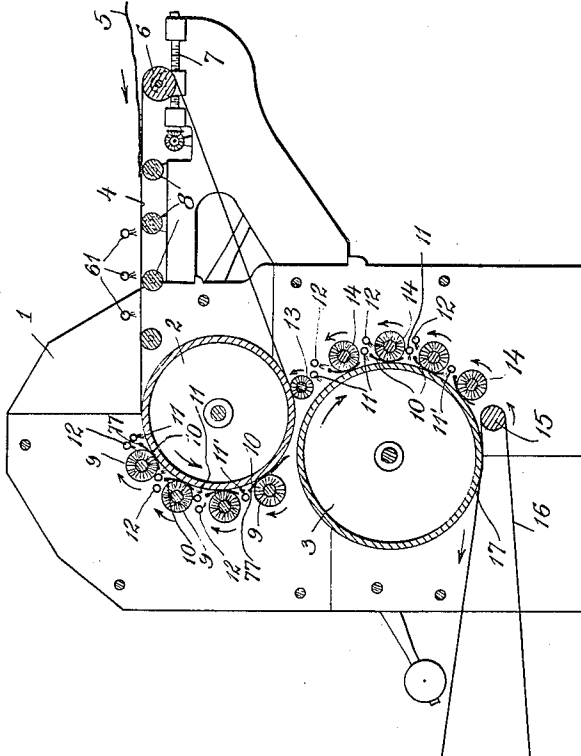
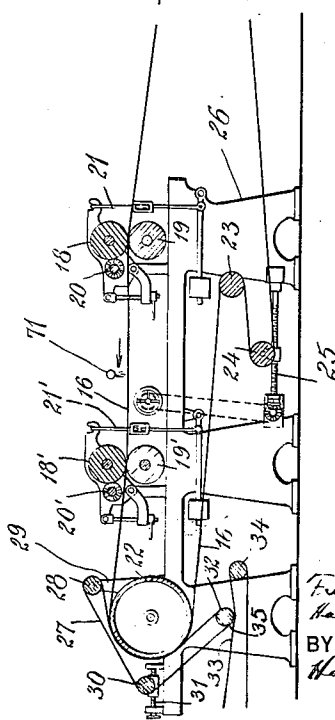
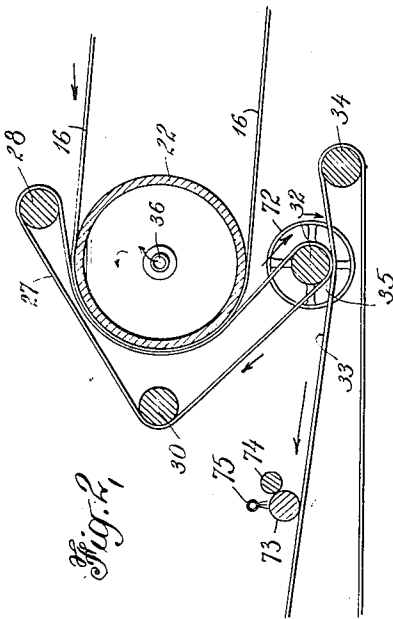


Fig. 2.



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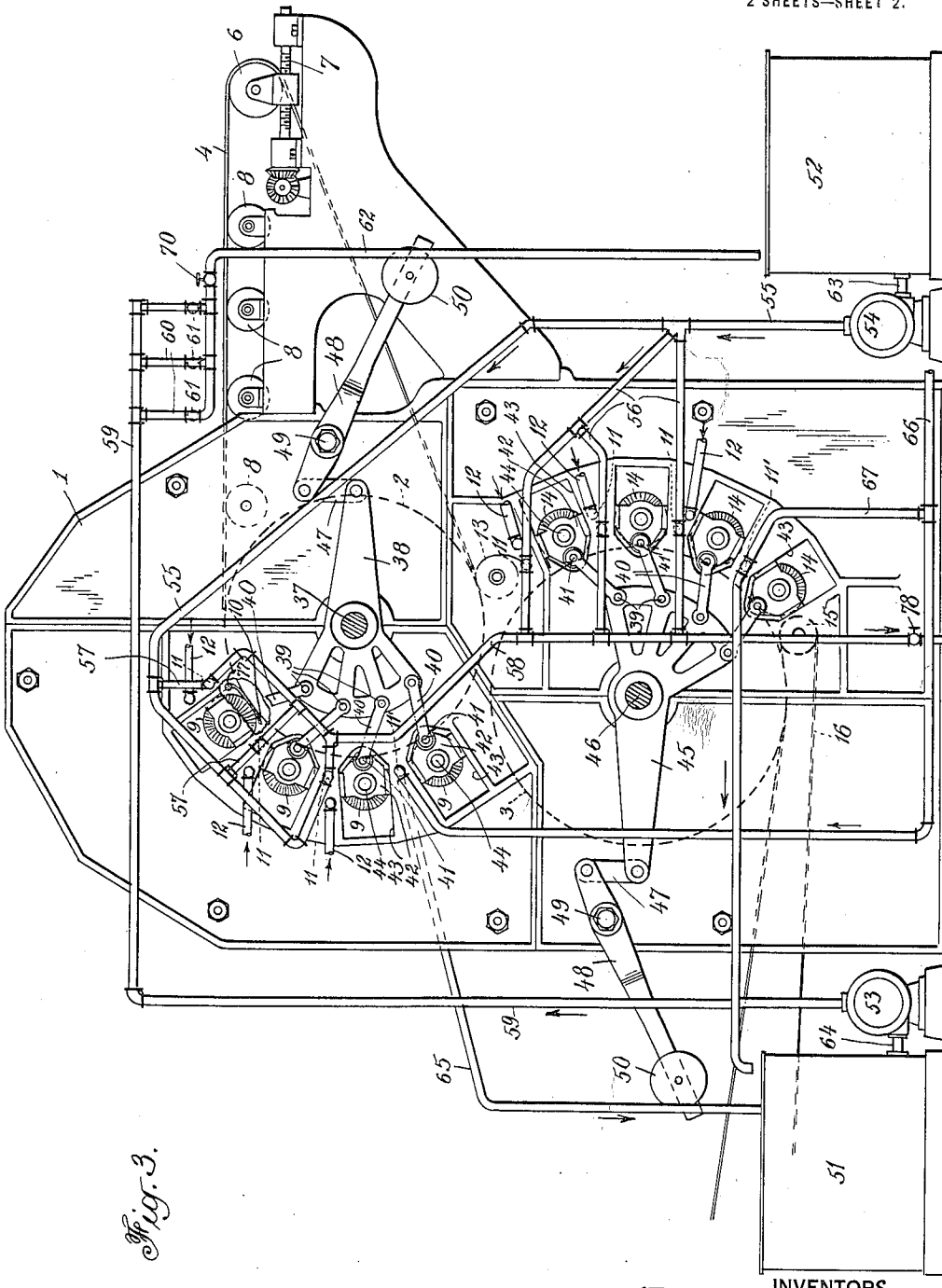


Fig. 3.

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UNITED STATES PATENT OFFICE.

FREDERICK L. SMITH, OF GRANTWOOD, AND HARVEY PORTER HARRIS, OF BAYONNE, NEW JERSEY, ASSIGNORS TO FREDERICK KAUFFMANN, OF PITTSBURGH, PENNSYLVANIA.

LAUNDRY APPARATUS.

1,402,020.

Specification of Letters Patent.

Patented Jan. 3, 1922.

Application filed February 14, 1918, Serial No. 217,119. Renewed May 24, 1921. Serial No. 472,293.

To all whom it may concern:

Be it known that we, FREDERICK L. SMITH, a resident of Grantwood, Bergen County, State of New Jersey, and HARVEY PORTER HARRIS, a resident of Bayonne, county of Hudson, State of New Jersey, citizens of the United States, have made a certain new and useful Invention Relating to Laundry Apparatus, of which the following is a specification, taken in connection with the accompanying drawing, which forms part of the same.

This invention relates especially to machines for washing and cleansing fabric articles and webs of different kinds, such as carpets, rugs, sheets, blankets, curtains and clothing of various kinds. The articles are preferably fed over a series of carrier drums so as to pass beneath rotating washing brushes in connection with which suitable spraying pipes or other distributing devices are arranged to supply water or soap or bleach liquor or other solvent material to the brushes and articles which are preferably held against the carrier drums by suitable retainer wires or devices. When one side of the articles has been washed by the brushes on one drum this washed side is then preferably brought into engagement with a succeeding carrier drum or other supporting element, so that the other side of the articles is washed by the brushes cooperating with this secondary carrier drum. A conveyer belt of felt or the like may disengage the articles from the last carrier drum and carry them forward through wringer rolls, bluing devices and drying and other apparatus and a canvas or other elastic transfer belt may advantageously encircle the end roll on which this conveyer belt is mounted so as to disengage the articles from the conveyer belt by the slightly overspeeded transfer belt which may sufficiently impinge on another delivery belt to transfer the articles thereto. The feeding devices are preferably arranged to feed any kind of fabric articles through the machine and to maintain them in substantially extended condition in their direction of travel since succeeding feeding devices are preferably each slightly overspeeded to exert a yielding stretch or pull on the articles and prevent their bunching or piling up in the machine.

In the accompanying drawing showing in

a somewhat diagrammatic way an illustrative embodiment of this invention,

Fig. 1 is a vertical longitudinal section through the machine.

Fig. 2 is an enlarged section showing the transfer mechanism; and

Fig. 3 is a partial side elevation on an enlarged scale.

The fabric articles or webs are preferably automatically fed through the washing devices and simultaneously kept substantially extended in the direction of their travel regardless of the particular shape or size of the articles. A feeding belt such as 4 of suitable material, such as wool felt for example, may be used to feed the articles into the machine and this belt may as indicated in Fig. 1 be supported on a series of guide rolls 8 journaled in the side frames 1 of the machine so that the belt may, if desired, pass over the primary travelling support or carrier drum 2 which may also operate the belt. This belt may be tightened and guided laterally in any suitable way and a tightening roll, such as 6, may be mounted in adjustable bearings in the frame which bearings may be simultaneously moved toward or from the carrier drum 2 as by simultaneously operated feed screws 7. The articles may be carried by this feeding belt more or less around the primary carrier drum 2 so as to be acted on by the washing devices mounted in connection therewith and then the articles are preferably disengaged from the feeding belt 4 as by the rotary stripper or brush 13 preferably oppositely rotated considerably faster than the belt so as to disengage the fabric articles or webs therefrom so that their washed or treated surfaces come into contact with the secondary travelling support or carrier drum 3. This carrier drum, which may be of somewhat greater diameter preferably rotates at the same surface speed and may be mounted somewhat lower in the frame so as to carry the articles forward past a secondary series of washing devices to wash and cleanse their opposite sides, these washing devices being preferably of such character as to promote the uniform feed and longitudinal tension of the articles during treatment and to not only cleanse their surfaces but promote the penetration of the treating or cleaning fluids so as to satisfactorily clean all the portions

thereof. For a general service washing machine adapted to handle blankets and other large articles the carrier drums may be five or six feet in diameter more or less and a large machine may have the carrier drums and cooperating belts from ten to twenty-four feet wide more or less, although smaller machines which may be made portable in some instances may have operating elements even less than four to six feet wide for small articles.

A conveyer device or belt 16 may receive the articles from the carrier drums and for this purpose the belt may with advantage be formed of wool felt and supported on the roll 15 adjacent the bottom of the drum so that it presses against the same and being driven at slightly greater peripheral speed than the drum disengages the articles therefrom at the point 17 and carries them forward through the subsequent apparatus, such as one or more sets of wringer rolls 18, 19 mounted on the table or supporting members 26 and yieldingly forced together and adjustably mounted as by the adjusting screws 21 so as to remove surplus water. The articles may be disengaged from the upper wringer roll 18 as by the rotary stripper 20. If desired, a suitable bluing device, such as the bluing spray pipe 71 may distribute bluing on the articles preferably after passing through the first wringer rolls and then the conveyer belt may carry the articles through a second set of wringer rolls 18', 19' having a similar cooperating stripper 20'. The articles may then be somewhat dried by the dryer roll 22 and then transferred to a suitable delivery mechanism or belt 33 of wool felt or the like leading to further drying apparatus. This transfer mechanism may comprise the transfer belt 27 mounted on the rolls 28, 30 and 32, the latter supporting the lower run of the belt being driven as by the pulley 72 at a somewhat greater surface speed than the conveyer belt 16 and when a canvas or similarly elastic transfer belt is used and is overdriven to the extent of a few per cent in this way the fabric articles can thus be effectively disengaged by the transfer belt and then transferred to the delivery belt 33 especially if the roll 32 is so positioned with respect to the belt 33 and roll 34 thereof that forcible pressing contact is secured at this point, promoting the disengagement of the articles from the transfer belt at about the point 35 through the couching effect of the roll. This transfer belt may be tightened and tensioned by adjustably mounting one of the rolls, such as 30, in adjusting devices comprising the screws 31. It is desirable to have the roll 22 of the transfer mechanism heated internally to secure drying action on the conveyer belt and articles, and if desired this dryer roll may be steam heated by supplying steam to its interior

through the hollow trunnions 36 thereof. The conveyer belt 16 may be tightened by passing it over the roll 23 on the table frames or supports 26 and also over an adjustable tightener roll 24 adjustably mounted so as to be simultaneously moved laterally by the screws 25 to tighten or adjust the tension of this conveyer belt to the extent desired. For some purposes it is desirable to apply sizing to the articles at some stage of the operation and for this purpose sizing devices may cooperate with the delivery belt 33 to apply size to the partly dried articles thereon, a sizing roll 73 being diagrammatically indicated for this purpose, together with a cooperating spreader roll 74 and sizing feed pipe 75.

The washing devices cooperating with the carrier drums to wash and cleanse the articles first on one side and then on the other may advantageously comprise a series of washing brushes engaging the articles in cooperation with retainer devices to hold the articles in a proper position on the carrier drums at these points. Means for supplying the washing brushes or articles with water or other treating liquid such as soap or bleach liquor, or even gasoline, or other solvents, may be arranged at various points in the washing unit of the machine, and for instance, one or more distributing devices or spraying pipes 61 may be arranged to supply water or other treating liquid to the articles on the feeding belt as they are fed toward the carrier drum 2. Another series of distributing pipes or devices 11 for treating liquid may be arranged around the carrier drum and still another set of distributing pipes 12 may be arranged to deliver water or other desired treating liquid against the washing brushes themselves to be worked or brushed into the fabric and have increased washing and cleansing action in this way. The desired number of rapidly rotating washing brushes 9 may be arranged in connection with the primary carrier drum 2 and another set of washing brushes 14 may cooperate with the secondary carrier drum 3 and these washing brushes may have generally similar sets of liquid distributing devices or spray pipes 11, 12 in both cases as indicated in Fig. 1. These washing brushes preferably have rather stiff bristle or other working faces, the length and stiffness of the bristles being of course adapted to the particular articles to be treated where the machine is to be used for washing or cleansing any generally similar grade of material. These brushes are also preferably rotated at quite high peripheral speeds of from 1,000 to 4,000 feet per minute so as to have an energetic and rapid cleansing action yieldingly penetrating the outer surface of the fabric articles and working the treating liquids into and through the same so as to facilitate their

cleansing action. Suitable retainer devices are employed to maintain the articles in proper relation to the carrier drums while the brushes are acting on them and wires or guides holding the articles on the drum at these points may be used with advantage. Preferably a set or series of resilient retainer wires 10 are arranged to extend under each of the washing brushes to hold the articles against the drum at this time and for this purpose each series of wires may be mounted on a supporting rod or bar such as 77 extending transversely across the carrier drum between the frames to support one or both ends of these retainer wires. In this way the articles are released from time to time so that they may expand and absorb additional quantities of treating liquid and this arrangement makes it easy for the wires to be placed in different lateral positions in connection with the adjacent washing brushes so as to minimize local shielding of any parts of the articles which would prevent their uniform cleansing.

An illustrative arrangement of piping for supplying water and treating liquid to the different parts of the machine is diagrammatically indicated in Fig. 3. The soap or bleach liquor or other primary treating liquid may be kept in the tank 51 and withdrawn therefrom through the pipe 64 by the circulating pump 53. This pump may force the treating liquid through the pipe 59 so as to be supplied by the branch pipes 60 to one or more of the primary distributing pipes 61. If desired the valve 70 may be opened to drain this part of the piping or to allow the surplus part of this liquid to be delivered into the tank 52. A city or other water supply pipe 66 may supply water for the final rinsing operation which is usually desirable at the end of each washing operation to which the fabric articles are subjected on both sides. The connected pipe 67 may thus supply the last distributing or spray pipe 11' cooperating with the lower washing brush 14 and the extension of the pipe 66 may similarly supply the distributing spray 11' cooperating with the last washing brush 9 of the primary carrier drum. This same piping may also, if desired, be used to supply water through the additional pipe 65 to the tank 51 for mixing the treating liquid therein, for instance. A different kind of treating liquid, such as soap liquor for instance, may be carried in the tank 52 and may be withdrawn therefrom through the pipe 63 by the circulating pump 54. This soap liquor may thus be supplied through the piping 55 leading by the branch lines 57 to the distributing pipes 11 arranged in connection with the washing brushes 9 and 14. This part of the piping may, if desired, be drained by opening the valve 78. Additional or different treating

liquid may be supplied to the other distributing pipes 12 through the separate pipe connections thereto which are indicated in Fig. 3.

In a universal machine of this character adapted for the washing of different kinds or classes of fabric articles the washing brushes are preferably made radially adjustable to accommodate articles of different thickness and it is advantageous to have the brushes simultaneously adjusted preferably in an automatic manner so that thicker articles passing through the machine are automatically allowed for in this way and the washing brushes enabled to exert substantially constant radial pressure. For this purpose the brushes 14 may as indicated in Fig. 3, have their shafts or trunnions 44 mounted in journal boxes 42 which may be adjustably supported in substantially radial guides 43 and their position controlled by lever or link work adjusting devices comprising the links 40 connected to the journal boxes as by the pins 41 and also pivotally connected as by the pins 39 to corresponding points on the arc-shaped or sector end of the tightener lever 45 which may be pivoted concentrically with the shaft 46 of the lower carrier drum 3, for instance. The link 47 may connect this tightener lever to the weight lever 48 supported by the pivot 49 in the frame and the weight 50 may be adjustably mounted on the free end of this lever to yieldingly hold all the rotating washing brushes inward in proper cooperation with the carrier drum so as to engage the articles thereon with the desired substantially constant force. When thicker articles are fed through the apparatus the radial pressure exerted thereby on the brushes raises this weight lever and allows all of the brushes to move out away from the carrier drum to the same extent, thus desirably supplementing the yielding character of the working faces of these brushes. A similar automatic adjusting mechanism is shown in connection with the rotating washing brushes 9 cooperating with the upper carrier drum 2 and this weight lever is similarly connected with the tightener lever 38 which in this instance is pivoted concentrically about the shaft 37 of the drum and connected by the pins 39 with the links 40 controlling the position of each of the brushes.

This invention has been described in connection with a number of illustrative embodiments, parts, elements, forms, proportions, materials and methods of use, to the details of which disclosure the invention is not of course to be limited, since what is claimed as new and what is desired to be secured by Letters Patent is set forth in the appended claims:

1. In apparatus of the class described, a conveyer belt, a heated dryer roll encircled

by said conveyer belt at its delivery end and a transfer belt of relatively elastic material extending considerably around said dryer roll and conveyer belt and driven at a somewhat greater peripheral speed to disengage articles from said conveyer belt.

2. In apparatus of the class described, a conveyer belt, a roll encircled by said conveyer belt at its delivery end and a transfer belt of relatively elastic material extending considerably around said roll and conveyer belt and driven at a somewhat greater peripheral speed to disengage articles from said conveyer belt.

3. In apparatus of the class described, a conveyer belt, a roll encircled by said conveyer belt at its delivery end and a transfer belt extending considerably around said roll and conveyer belt to disengage articles from said conveyer belt.

4. In apparatus of the class described, the combination of a conveyor belt, a heated roll encircled by said belt at the delivery end of the latter, a transfer belt extending around said roll and belt and driven at a greater speed than said conveyor belt to disengage articles from the latter, and a delivery belt arranged to receive the articles from the transfer belt.

5. In apparatus of the class described, the combination of a conveyor belt, a heated roll encircled by said belt at the delivery end of the latter, a transfer belt extending around said roll and belt and driven at a greater speed than said conveyor belt to disengage articles from the latter, and a delivery belt arranged to receive the articles from the transfer belt, said delivery belt travelling at a greater speed than said transfer belt.

6. In apparatus of the class described, the combination of a conveyor belt, a heated roll encircled by said belt at the delivery end of the latter, a transfer belt extending around said roll and belt and driven at a greater speed than said conveyor belt to disengage articles from the latter, and a delivery belt

arranged to receive the articles from the transfer belt, said delivery belt forcibly engaging and travelling at a greater speed than said transfer belt.

7. In apparatus of the class described, the combination of washing apparatus, a conveyor arranged to receive articles therefrom, drying apparatus to which the articles are delivered by the conveyor, a delivery belt, and a belt travelling at a greater speed than said conveyor to transfer the articles after action thereon by said drying apparatus to said delivery belt, said delivery belt travelling at a greater speed than said transfer belt.

8. In apparatus of the class described, the combination of washing apparatus, a conveyor arranged to receive articles therefrom, means co-acting with said conveyor for removing liquid from the articles, a delivery belt, and a belt travelling at a greater speed than said conveyor to transfer the articles after action thereon by said drying apparatus to said delivery belt, said delivery belt travelling at a greater speed than said transfer belt.

9. In apparatus of the class described, the combination of washing apparatus including carrying means, a conveyor belt co-acting with said carrying means and moving at a greater speed than said carrying means to disengage articles from the latter, wringer rolls cooperating with said conveyor belt, a heated dryer roll encircled by said conveyor belt at the delivery end of the latter, a transfer belt extending around said dryer roll and conveyor belt and driven at a greater speed than said conveyor belt to disengage article from the latter, and a delivery belt travelling at a greater speed than said transfer belt to disengage articles therefrom.

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