

F. SCHUBERT.
MACHINE FOR TREATING MATERIALS WITH A LIQUID.
APPLICATION FILED MAR. 5, 1913.

1,154,440.

Patented Sept. 21, 1915.

2 SHEETS—SHEET 1.

FIG. 1

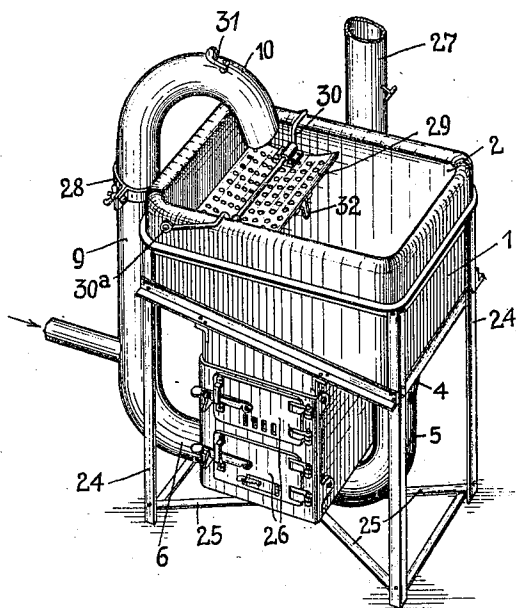


FIG. 2

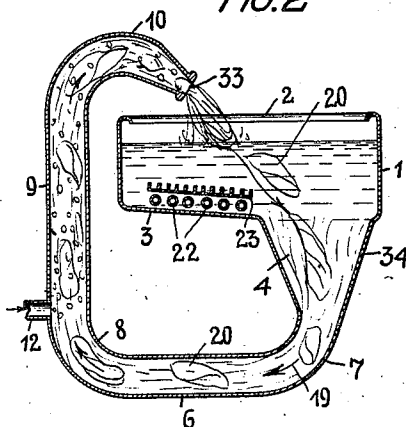


FIG. 3

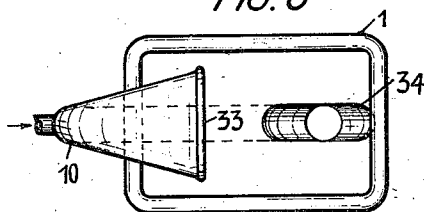


FIG. 4

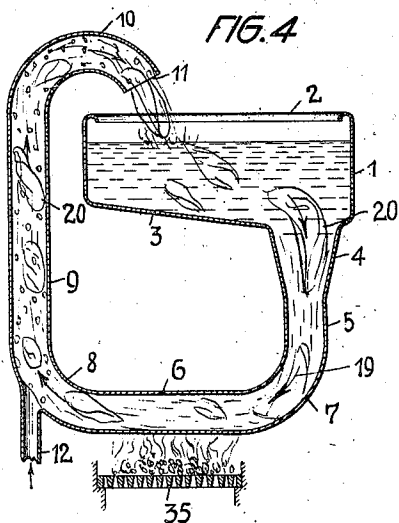
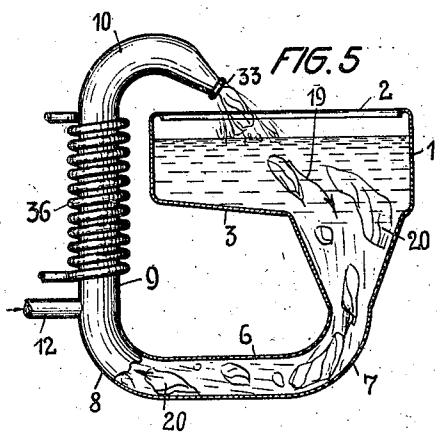


FIG. 5



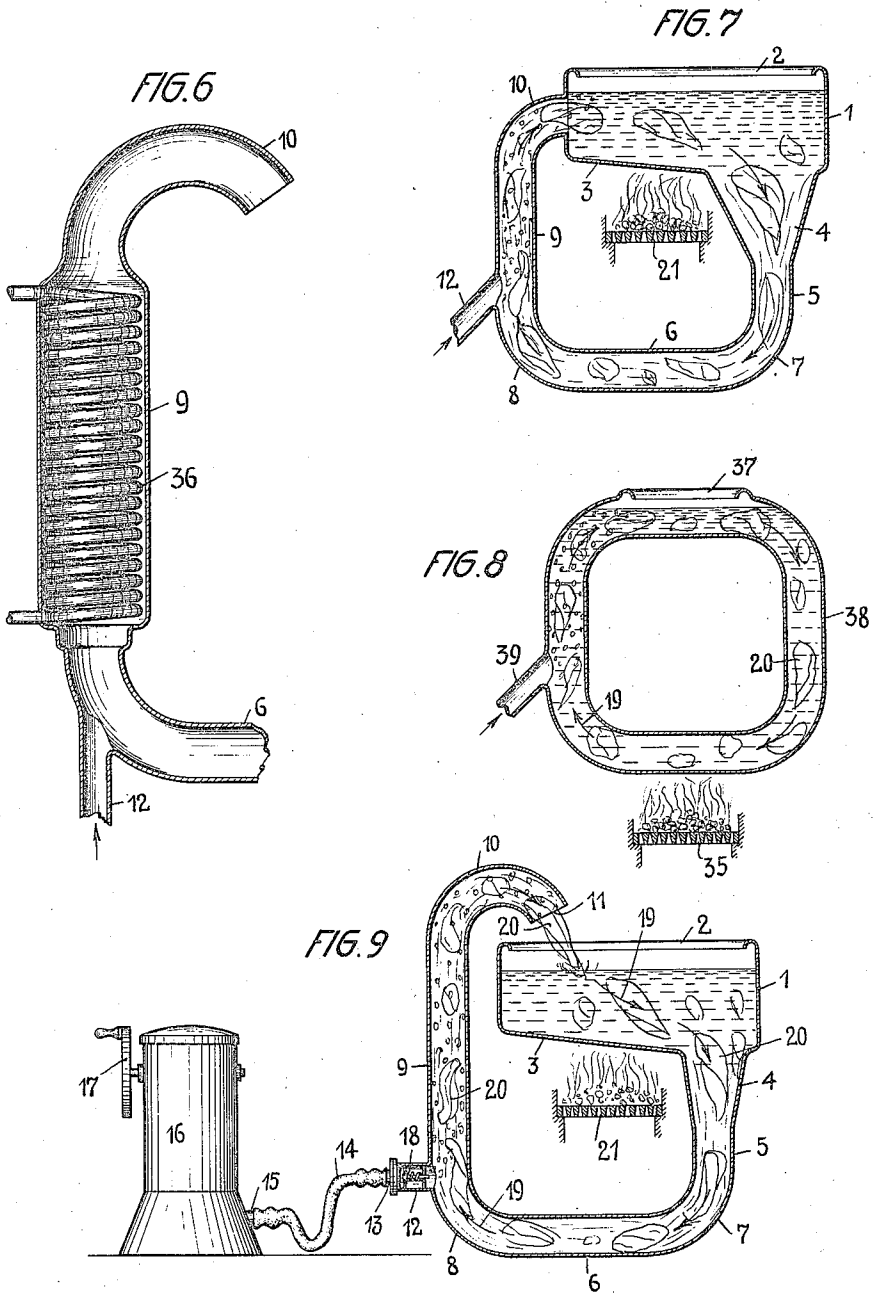
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FRANZ SCHUBERT, OF HAMBURG, GERMANY.

MACHINE FOR TREATING MATERIALS WITH A LIQUID.

1,154,440.

Specification of Letters Patent.

Patented Sept. 21, 1915.

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To all whom it may concern:

Be it known that I, FRANZ SCHUBERT, a subject of the German Emperor, residing at No. 63 Hammerlandstrasse, Hamburg, Germany, have invented new and useful Improvements in Machines for Treating Materials with a Liquid; and I do hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to a machine which can be used to treat specifically light raw materials as well as half and entirely finished articles, especially those produced by the textile industry, with a liquid either for softening, cleansing, washing, impregnating, bleaching or dyeing purposes.

My new machine is specially suitable for soaking, washing, and cleansing linen articles of clothing and the like. It can however also be employed for purifying or cleansing cellulose, cereals, coffee-beans, etc.

The essential feature of the machine consists in providing a channel which starts from a receiver, then describes any suitable course and finally returns to said receiver, into which it can either enter direct or it can terminate over the same. The channel contains the liquid, for example water, into which the material to be treated is placed, and my invention relates to further devices provided in the machine for the purpose of causing the liquid and the materials contained therein to circulate. I obtain this result by introducing compressed air or another gas vapor or the like under pressure into said channel.

One part of my invention consists in the provision of heating devices by which the liquid used for treating the material can be heated to the desired temperature.

Further my invention comprises the combination with the machine of a device which enables the material treated in said machine to be taken out while the machine remains in operation.

Other advantages of my invention will be clear from the following description of the drawing, in which—

Figure 1 shows a perspective view of one construction of the new machine. Fig. 2 is a vertical section through another construction shown in outline. Fig. 3 is a plan of the machine shown in Fig. 2. Figs. 4 and 5 represent vertical sections through two further constructions of my new machine in outline. Fig. 6 is a vertical section through

a part of the channel forming another construction of the machine. Figs. 7 and 8 are similar views also showing two further constructions in outline. Fig. 9 shows the combination of the machine with a device for producing compressed air in side elevation and partially in section.

With reference to Fig. 9 of the drawing 1 represents an open trough, through the top opening 2 of which the material to be treated, for example linen, is placed into said trough 1. The bottom 3 of this trough is inclined toward the funnel 4 which enters into the channel 5 having a horizontal portion 6 to which it is connected by the bend 7. A similar bend 8 connects the part 6 of said channel with the vertical part 9 to which is attached a bend 10, the mouth 11 of which terminates over the trough 1. At the point where the bend 8 is adjoined to the vertical part 9 a pipe 12 is attached which is provided with a socket 13, serving for the attachment of a tube 14, the other end of which is connected with the socket 15 of a blower 16. By turning the wheel 17 of this blower compressed air is produced, which penetrates through the tubing 14 and the clack valve 18 into the channel 9. This compressed air moves the liquid contained in the channel in the direction of the arrows 19. By this motion the materials 20 to be treated in the machine are moved in the same direction. The liquid and materials 20 thus circulate together through the machine in the direction of the arrows as long as compressed air is introduced into the apparatus from the blower 16.

In order to raise the liquid, which I can use either in a cold or hot condition, to the temperature required under certain conditions the heating apparatus 21 may be employed. This apparatus may consist of an ordinary fireplace or of any other suitable source of heat, and can, for example, be charged with incandescent material, or be heated by gas, electricity, etc. Steam heating can also be adopted. Such a construction of the machine is shown in Fig. 2. In this figure a heating coil 22 is shown in the trough. In order to prevent the material to be treated in the machine from coming into contact with this coil a grate, sieve, or the like 23 may be provided thereover.

The construction shown in Fig. 2 and also the others described below can be either stationary; thus surrounded, for example, by a

brick-wall, practically only leaving the top part of the machine free, or it may be portable. Such portable apparatus is represented in Fig. 1. In this construction a frame 24 consisting of angle iron carriers the trough 1 and the transverse bars 25 of said frame support the lower horizontal part 6 of the channel of the machine. A fireplace of ordinary construction provided with doors 26 enables the liquid contained in the trough to be heated. The gases of combustion escape through the chimney 27. The vertical part 9 of the channel is attached by a clamp 28 to the frame 24. In order to enable the articles treated in the machine to be taken out without stopping the operation a swinging sieve 29 is provided. This sieve is adapted to turn about a bridle 30 which can turn about the pins 30^a. If the sieve 29 is not in use it can be turned up above the pipe bent 10 where it can be held by a fastening 31, which engages with the eyelet 32 attached to said sieve 29. The sieve can of course be attached to the machine in any other suitable manner, but the attachment must always be of such a nature that it can be introduced into the circulating liquid and thus catch the articles contained therein, and can then be moved aside, so as not to prevent the circulation of said articles.

In the construction of the machine shown in Figs. 2 and 3 the mouth of the bend 10 is flattened so that the outlet 33 for the liquid and materials 20 has a longitudinal section, which is nearly parallel to the level of the liquid. Further the funnel 4 is also flattened so that the opening 34 leading from the trough 1 into said funnel 4 has also a longitudinal shape, which however is at right angles to the outlet 33.

The construction represented in Fig. 4 has a fireplace 35 arranged underneath the part 6 of the channel. Further in this construction the pipe 12 is not at right angles to the limb 9 but axial thereto. The part 9 need not however rise vertically, but can also have an inclined or partly horizontal course, although in the last case the operation of the machine is not so good.

In the construction shown in Fig. 5 a heating coil 36 surrounds the part 9 of the channel and thus heats the liquid circulating through the machine. If this coil 36 is provided in the interior of the channel, which, for practical reasons, is not so advisable, the channel must be correspondingly enlarged, as shown in Fig. 6, so that the section is not reduced and will allow the materials to pass through. Instead of allowing the bend 10 to end over the trough 1 it can enter immediately into said trough 1, as represented in Fig. 7. The liquid can also be heated by introducing steam, for example by means of an injector.

Fig. 8 relates to a further construction of

the machine which consists substantially of a hollow ring 38 having an inlet opening 37 and of the pipe 39 for introducing compressed air or the like.

It has already been mentioned that the liquid kept in circulation in the machine can be cold or hot according to requirements. Said liquid can, of course, also contain some substance, such as soap, washing powder, a bleaching, impregnating or dyeing agent.

If the machine is employed for washing the advantage is obtained that a very powerful washing action is obtained at a much lower temperature than in any existing washing machine. This is due in part to the fact that the gas bubbles and the energetic ebullition and eddying motion they cause act in exactly the same manner as the steam bubbles when boiling linen, that is they open, close and turn the folds and layers of the materials in passing through the channels, so that the liquid flows to all parts and exercises a dissolving, cooling, or impregnating and dyeing action. The formation of froth which is of so great importance when washing with soap is very effectively obtained by the gas bubbles even when the liquid is cold.

To the above cited advantages of the machine must be added the fact that the material, not being moved by any parts of the machine, is not liable to be injured. Further it is to be regarded as an advantage that the material while being treated is visible in a certain way and can be caught, examined, and, if necessary, again put into the machine. The machine is specially useful in such cases in which textile material has to be treated which cannot be subjected to boiling temperature.

In what manner the compressed air or the like is produced, or whether steam or oxygen, or other bleaching gases are used, or whether the compressed air is replaced by such gases does not alter the nature of the invention.

If desired, the lower portion of the circulating channel may be provided with a discharge valve of any approved construction.

What I claim and desire to secure by Letters Patent of the United States is:—

1. The described machine for treating materials with a liquid, comprising a trough, a channel leading from the bottom of the trough, said channel extending downwardly below the bottom of the trough then laterally and upwardly and discharging into the said trough, the channel forming a continuous and unobstructed passage, and a pipe for introducing compressed air into the upwardly projecting portion of said channel.

2. The described machine for treating materials with a liquid, comprising in combination, a trough, a channel starting from said trough the other end of which returns

to said trough, the returning end of said channel having a longitudinal mouth at right angles to the longitudinal opening of said channel starting from said trough, a pipe for introducing compressed gas entering the return part of said channel, substantially as, and for the purpose, set forth.

3. The described machine for treating materials with a liquid, comprising in combination, a channel containing said liquid and materials and starting from a fill opening to which its other end returns, a pipe for introducing compressed air which enters the return portion of said channel, and a sieve device adapted to be introduced through the fill opening and to catch the material circulating in said channel, substantially as, and for the purpose, set forth.

4. The machine described for treating materials with liquid, comprising a trough having a funnel in its bottom, the bottom inclining toward the funnel, means for heating the trough, a channel leading from the funnel and extending up above the trough and discharging into the same, and means for admitting compressed air into the channel.

5. The herein described apparatus for treating materials with a liquid, comprising an open top elongated receptacle, a channel extending downward from the bottom of the receptacle at one end thereof, then laterally in the direction of the side opposite from which it started, then upwardly above the top of the receptacle and having its end curved over the said receptacle, and a pipe for admitting compressed air to said channel.

6. The herein described apparatus for treating materials with a liquid, comprising a heater, an open top receptacle supported on the heater, a channel leading from the

bottom of the receptacle beneath the heater and then up above the receptacle and having its end curved downwardly over the receptacle, and a pipe for admitting compressed air to the said channel.

7. In an apparatus for treating materials with a liquid, an open top receptacle, a channel leading from the bottom of the receptacle up one side of the same and having its end curved over the receptacle, a pivoted sieve mounted on the receptacle below the curved end of the channel, said sieve being adapted to be swung up above the curved end of the said channel, and a pipe for admitting compressed air to said channel.

8. The described machine for treating dirty linen and the like with a liquid, comprising in combination, a channel containing said liquid and starting from a fill opening to which its other end returns, a device for producing compressed air, a pipe for introducing the compressed air into the return part of said channel and a device for heating said liquid, substantially as set forth.

9. The described machine for treating dirty linen and the like with a liquid, comprising in combination, a continuous channel containing said liquid and starting from a trough to which its other end returns and means for heating that liquid and for causing it to circulate through said channel and the trough, a device for producing compressed air, and pipe for introducing the compressed air into the return part of said channel substantially as set forth.

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

FRANZ SCHUBERT.

Witnesses:

ERNEST H. L. MUMMENHOFF,
IDA CHRIST. HAUFERMANN.