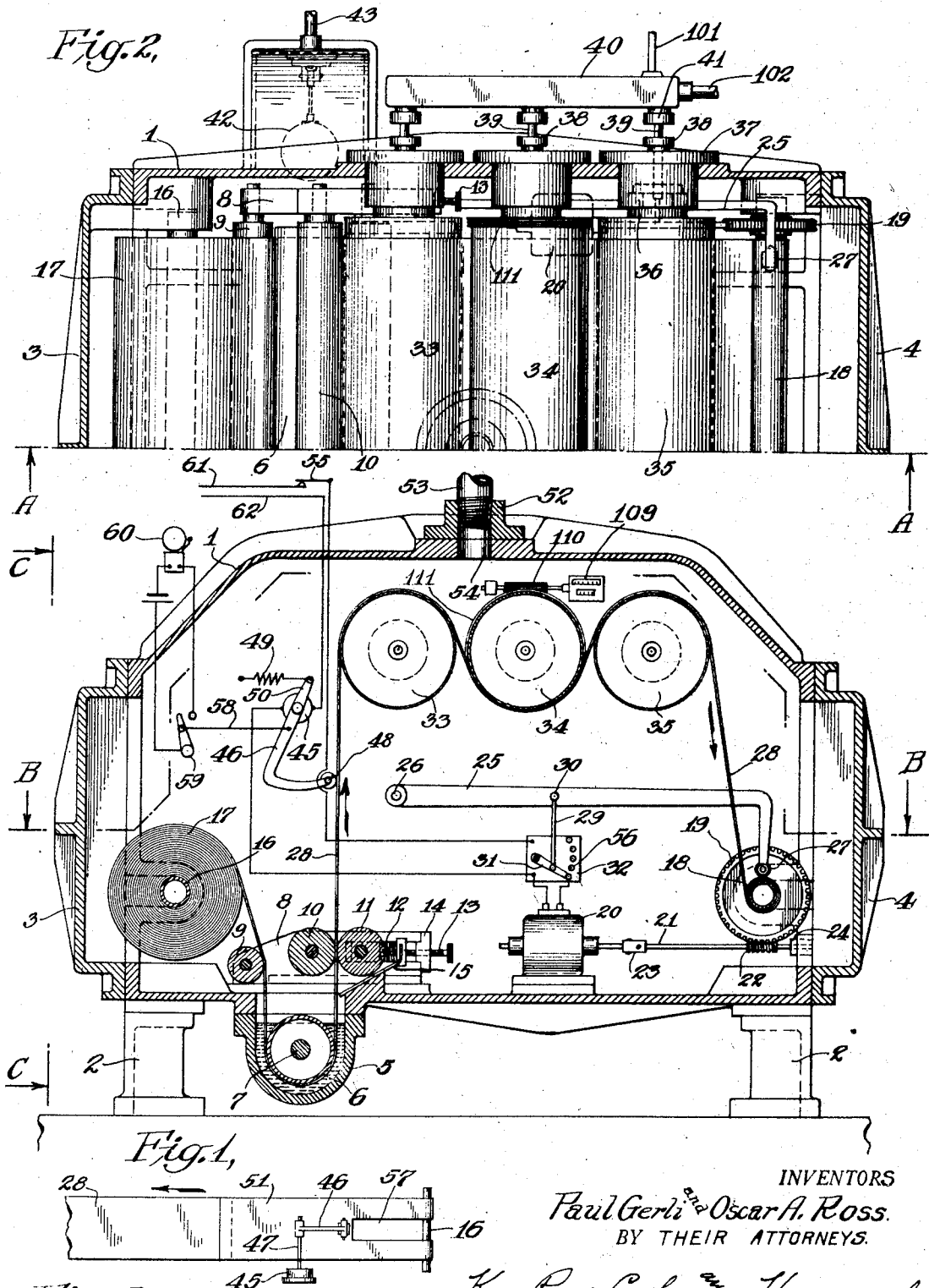


P. GERLI AND O. A. ROSS.
 APPARATUS FOR RECLAIMING SOLVENTS.
 APPLICATION FILED MAY 4, 1918.

1,345,083.

Patented June 29, 1920.

2. SHEETS—SHEET 1.



INVENTORS
 Paul Gerli and Oscar A. Ross.
 BY THEIR ATTORNEYS.

Herr, Page, Cooper & Hayward.

P. GERLI AND O. A. ROSS.
 APPARATUS FOR RECLAIMING SOLVENTS.
 APPLICATION FILED MAY 4, 1918.

1,345,083.

Patented June 29, 1920.

2 SHEETS—SHEET 2.

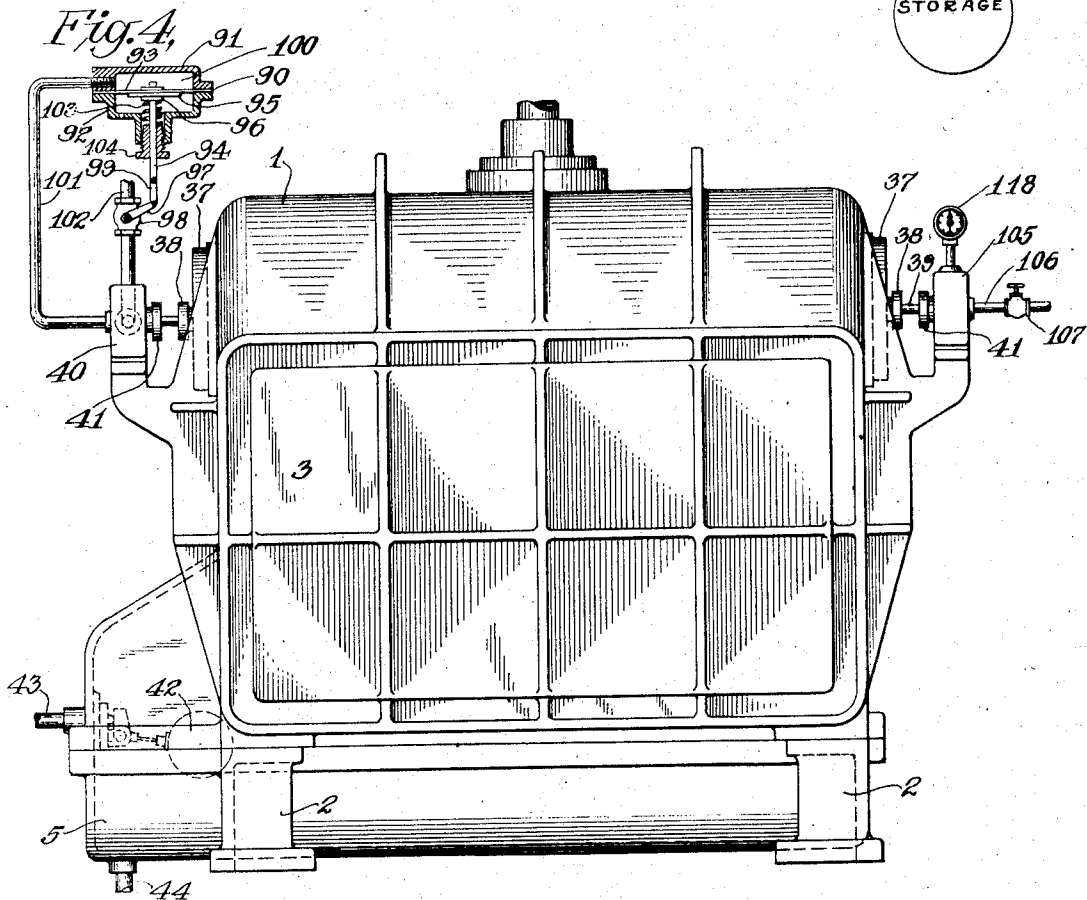
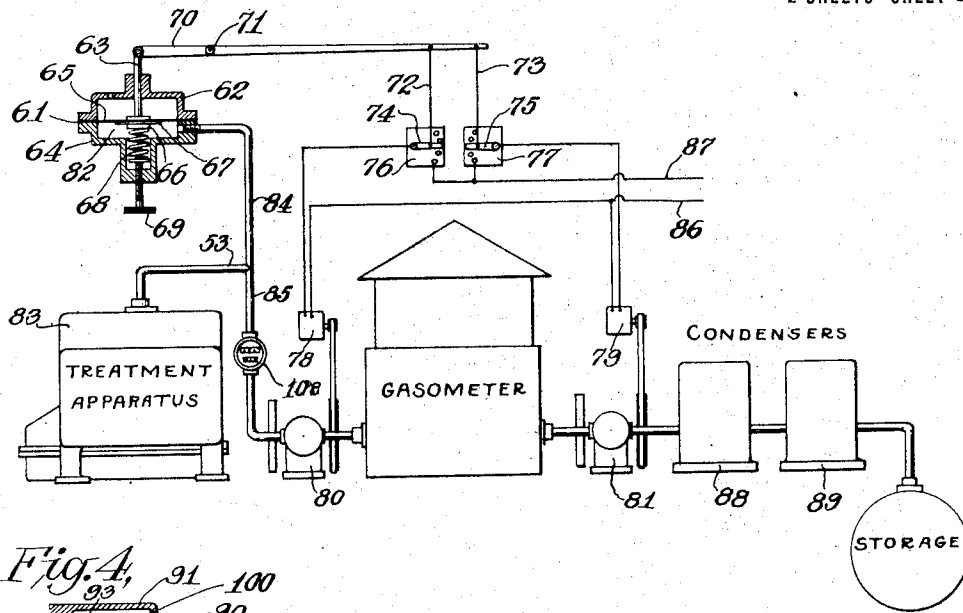


Fig. 3,

INVENTORS

Paul Gerli and Oscar A. Ross

BY

Herr, Page, Cooper and Hayman ATTORNEYS.

UNITED STATES PATENT OFFICE.

PAUL GERLI AND OSCAR A. ROSS, OF NEW YORK, N. Y.

APPARATUS FOR RECLAIMING SOLVENTS.

1,345,083.

Specification of Letters Patent. Patented June 29, 1920.

Application filed May 4, 1918. Serial No. 232,505.

To all whom it may concern:

Be it known that we, PAUL GERLI and OSCAR A. ROSS, citizens of the United States of America, residing at New York city, in the county of New York and State of New York, have invented a new and useful Improvement in Apparatus for Reclaiming Solvents, of which the following is a specification.

10 The invention upon which is based our present application for Letters Patent, pertains to a system for recovering volatile solvents employed in compounds used for treating fabrics, or similar materials.

15 Primarily, the object in view is to furnish a device whereby the solvent of a compound for treatment purposes is entirely recovered by gasifying said solvent, thereafter condensing it into a liquid whereby it can again be employed as a solvent of materials for treatment purposes.

It is further the aim to provide means whereby the solvent may be gasified at a low temperature thereby avoiding destruction or changing of form of material due to excessive heat which ordinarily might be required to drive off said solvent.

It is further the aim to provide means to automatically control the movement of material to and through the treating apparatus employed in our improved system. Also to automatically control the functioning of the various devices employed.

All the above and other aims sought are attained by our preferred form of apparatus, which for the purposes of specific illustration is shown in the accompanying drawings, in which:—

Figure 1, is a sectional view of the treatment chamber causing gasification of a solvent and is taken on line A—A of Fig. 2,

Fig. 2, is a one-half sectional view of the same device taken on line B—B, of Fig. 1,

Fig. 3, is an end elevation of the same device taken on line C—C, of Fig. 1,

Fig. 4, is a diagrammatic view of the arrangement of units employed in our improved system, and,

Fig. 5, is a reduced size plan view illustrating the function of certain parts of the control apparatus.

None of the apparatus, or parts employed in our system, are, or need be of any special or unusual construction, but for a more ready understanding of the system and of its operation, a preliminary description of the

parts and devices contained therein may be apposite.

To housing, or shell 1, supported by legs 2, are hinged doors 3 and 4. On its underside is secured treatment vat 5, containing roller 6, mounted on shaft 7. On its inside are secured bearing members 8, supporting guide roller 9, and ringer rollers 10 and 11, roller 11 being adjustable and adapted to press against roller 10 by means of spring 12 controlled by screw 13 in bracket 14. Drippings from roller 11 are returned to vat 5, by an ordinary guard. Shaft 16 supports untreated material roll 17, and shaft 18, having worm gear 19, driven by motor 20, through shaft 21, and worm 22, receives the treated material. Shaft 21, has universal joint 23, and its outer end is supported in removable sleeve 24.

Lever 25, pivoted on stud 26, has roller 27, at its free end, in contact with the surface of material 28, winding on shaft 18. Said lever through link 29, pivoted as 30, and connected to controller arm 31, controls the speed of motor through the speed control box 32.

Heating rolls 33, 34 and 35, are supported in ball bearings 36, secured in bearing supports 37, having stuffing boxes 38. Rolls 33, 34, and 35, are tubular having small outlet tubes 39, secured to the ends thereof. Said tubes 39, enter steam header 40, through stuffing boxes 41.

The level of treating compound in vat 5, is determined by float valve 42, controlling the opening of feed pipe 43. Vat 5, is also supplied with drain pipe 44.

Snap switch 45, controlling supply of energy to motor 20, is controlled by lever comprising a long arm 46 and a short arm 50, mounted on shaft 47. Said lever has roller 48, normally held against material 28, by spring 49 attached to the short arm 50 of the said lever.

Housing 1, has exhaust opening 54, to which is secured flange 52, having pipe 53.

Control unit 61, is composed of upper housing 62, and lower housing 64, clamped between which is diaphragm 65, to which is attached rod 63, which is secured to said diaphragm by nut 66, and washer 67. The movement of said diaphragm is under control of spring 68, the tension of which is regulated by adjusting screw 69.

Pivoted to the outer end of rod 63, is lever 70, operating around pivot 71, and to the

outer end of said lever are pivoted links 72 and 73, connected to controlling levers 74 and 75, of control units 76 and 77, for motors 78 and 79. Motor 78 drives vacuum pump 80, and motor 79, drives compressor 81.

Heat control unit 90, is composed of upper housing 91, and lower housing 92, having clamped therebetween diaphragm 93, to which is secured stud 94, by means of washer 95 and nut 96. Stud 94, operating through housing 92, is connected to lever 97, of valve 98, and through link 99, controls supply pipe 102. Said stud 94 passes through the center of adjusting screw 104, adapted to regulate the pressure of spring 103, interposed between said adjusting screw and nut 96. Said spring is adapted to cause movement of diaphragm 93, when the pressure in chamber 100, is carried above or below a predetermined amount. Chamber 100 is connected to steam header 40, through pipe 101.

Meter 108 registers the quantity of gasified solvent drawn from treatment apparatus 83. Meter 109, through pinion 110, driven by worm 111 on roller 34, registers the quantity of material treated in said apparatus.

The operation of our system and control of apparatus therefor is as follows:—Door 3 is opened and a roll as 17, of untreated material is rolled into place as shown. Each end of material 28, on roll 17, has an apron, as 51 attached thereto, whereby the entire material on roll 17, may pass through the entire process without stopping. The beginning apron 51, is passed over roller 9, under roller 6, between rollers 10 and 11, and over and under rollers 33, 34, and 35, thereafter being secured to shaft 18.

Door 3, is now closed which hermetically seals housing 1, against entrance of air thereinto. Thereafter the vacuum pump 80 is started, and steam controlled by control unit 90, is fed to heater 40, passing through pipes 29, to heater rolls 33, 34, and 35. The temperature of said rolls is automatically regulated by control unit 90, as follows:—It is well known that the temperature of steam varies directly with its pressure, and, therefore, that any desired temperature within certain limits may be obtained by maintaining a given pressure. Such a predetermined pressure is maintained by heat control unit 90 as follows:—After the desired temperature is known, and therefore the pressure required to obtain such temperature, adjusting screw 104, is regulated whereby, the pressure of spring 103, operating against diaphragm 93, permits the valve 98, through stud 94, link 99, and lever 97, to permit sufficient steam to enter header 40, whereby the pressure in said header, and therefore in rollers 33, 34 and 35, is such that the proper temperature is obtained. To

prevent accumulation of condensation on rollers 33, 34 and 35, header 105 is supplied with a drain pipe 106, controlled by valve 107, whereby steam may be allowed to slowly escape, in this manner assuring that such condensation is avoided. Thereafter switch 55 is closed, and, as switch 45 is also closed, motor 20 rotates, and by shaft 21 and worm 22, causes gear 19 to rotate shaft 18, thereby winding up treated material 28 on said shaft.

It will be noted that due to the small diameter of the roll of material 28 on shaft 18, lever 25, maintains lever 31, in the high speed position for motor 20. As the roll of treated material 28 increases in diameter on shaft 18, lever 25 is raised causing lever 31 to likewise rise through link 29, in this manner causing said lever to move to a lower speed contact as 56. The cutting in of slower speed contacts as 56, due to increase of diameter of the roll on shaft 18, is preferably so proportioned that movement of material 28, passing over rollers 33, 34 and 35, will be at practically a uniform speed at all times, in this manner insuring uniform treatment irrespective of the speed of shafts 16 or 18.

After all the treated material has been wound up on shaft 18, and the end apron as 51, leaves shaft 16, and as its opening 57, passes upward toward heating roller 33, roller 48, leaves material 28, and enters said opening 57, thereby through action of spring 49, causing lever 46 to open switch 45 and stop motor 20. At the same time lever 46, through link 58, closes a circuit through switch 59 to bell 60, calling attention to the fact that the machine has completed treating the material as 28.

Due to the vacuum in housing 1, the temperature, required to gasify the solvent, as for example, gasoline, is much reduced, in this manner making it possible to treat such material as rubber, or material to be treated with rubber compounds in a rapid and economical manner.

As the solvent is gasified by the heat of rolls as 33, 34 and 35, and the inherent heat of the interior of housing 1, the gases pass upward through pipe 53, to the vacuum pump 80 and thence to the gasometer, from whence it passes to the compressor 81, where its pressure is raised before entering the condensers. After being liquefied by said condenser, in well known manner, it passes to the storage tank where it remains until required for dissolving additional treating material to be placed in vat 5.

The control of our improved system as illustrated by Fig. 4, is as follows:—Control unit 61, is adjusted through screw 69, whereby with a predetermined vacuum in chamber 82, diaphragm 65 is actuated whereby the rod 63, through lever 70, and links 72, and

73, causes control levers 74 and 75, to vary the speed of motors 78 and 79 whereby the speed of said motors will maintain the speed of the vacuum pump 80, and compressor 81, such that said pump and compressor will respectively pump and compress the gasified vapors drawn from treatment apparatus 83 through pipe 53. It is obvious that inasmuch as pipe 84 is connected between chamber 82 and pipe 53, substantially the same vacuum will be present in chamber 82, as is present in the treatment apparatus 83.

By the above system of control, not only, a substantially predetermined vacuum is maintained in treatment apparatus 83, but also, the vacuum pump 80, and compressor unit 81, will operate at a speed proportionate to the amount of solvent being gasified, in this manner producing an economical and automatic operation of the entire system.

It will be obvious to those skilled in the art that various modifications may be made without departing from the spirit of our invention, therefore, we do not wish to limit ourselves to the exact construction, as herein shown and described, but reserve to ourselves the right to all modifications as properly fall within the sphere and scope of our invention.

What we claim is:—

1. In an apparatus for reclaiming solvents from a compound used for treating a material in the form of a long strip, the combination of a hermetically sealed chamber in which said material is treated, reels for carrying the material while under treatment, rolls from and onto which the material is wound, means for varying the speed of the winding reel as the diameter of the roll thereon varies so that all parts of the material will be exposed for the same length of time, means for drawing off the solvent from the compound applied to the material, means for exhausting said gasified solvent from the chamber and means for liquefying the gasified solvent.

2. In an apparatus for reclaiming solvents from a compound used for treating a material in the form of a long strip, the combination of a hermetically sealed treating chamber, means therein for applying a compound to the material to be treated, means for controlling and regulating the supply of such compound, treated reels over which the material is carried, rolls from and onto which the material is wound, means for varying the speed of the winding reel in proportion to the diameter of the roll of material thereon so that all parts of the material will be subjected to treatment for the same length of time, means for drawing off from the chamber the vaporized solvent contained in the compound applied to the material, and means for liquefying said vaporized solvent.

3. In a system for reclaiming solvents from a compound applied to a treated material, comprising, a hermetically sealed chamber, means for treating material in said chamber, means for gasifying the solvent contained in the compound applied to said material, means for exhausting said gasified solvent from said chamber, means for controlling said exhausting means dependent for operation upon the pressure of fluid in said chamber, and means for liquefying said gasified solvent.

4. In a system for reclaiming solvents from a compound the combination of a hermetically sealed chamber, means therein for gasifying the solvent contained in said compound, means for exhausting said gasified solvent from said chamber, and means for controlling said exhausting means dependent for operation upon the exhausted pressure of said chamber.

5. In a system for reclaiming solvents from a compound, comprising, a hermetically sealed chamber, means therein for gasifying the solvents contained in said compound, means for exhausting said gasified solvent from said chamber, means for controlling said exhausting means dependent for operation upon the exhausted pressure in said chamber, and means for liquefying said gasified solvent.

6. In a system for reclaiming solvents from a compound applied to a treated material, comprising, a hermetically sealed chamber, means therein for treating said material, means therein for moving said material for treatment, means for actuating said moving means, and means for automatically stopping said actuating means dependent for operation on a predetermined movement of said material.

7. In a system for reclaiming solvents from a compound applied to a treated material, comprising, a hermetically sealed chamber, means therein for treating said material, means therein for moving said material for treatment, means for actuating said moving means, means for automatically stopping said actuating means dependent for operation on a predetermined movement of said material, and means for indicating the operation of said stopping means.

8. In a system for reclaiming solvents from a compound applied to a treated material, comprising, a hermetically sealed chamber, means therein for treating said material, means for automatically controlling the flow of treating compound to said treating means, means for gasifying the solvent contained in said compound after said treatment, and means for liquefying said solvent.

9. In a system for reclaiming solvents from a compound applied to a treated material, comprising, a chamber adapted to be hermetically sealed, means therein for ap-

plying a compound to the material, means
for controlling the movement of said mate-
rial during treatment, means for gasifying
the solvent contained in said compound
5 after treatment of said material, means for
exhausting said gasified solvent from said
chamber, means for automatically control-
ling said exhausting means, and means for

condensing said gasified solvent into a
liquid. 10

In testimony whereof, PAUL GERLI and
OSCAR A. ROSS, have signed their names to
this specification this 1st day of May, 1918.

PAUL GERLI,
OSCAR A. ROSS.