

No. 726,207.

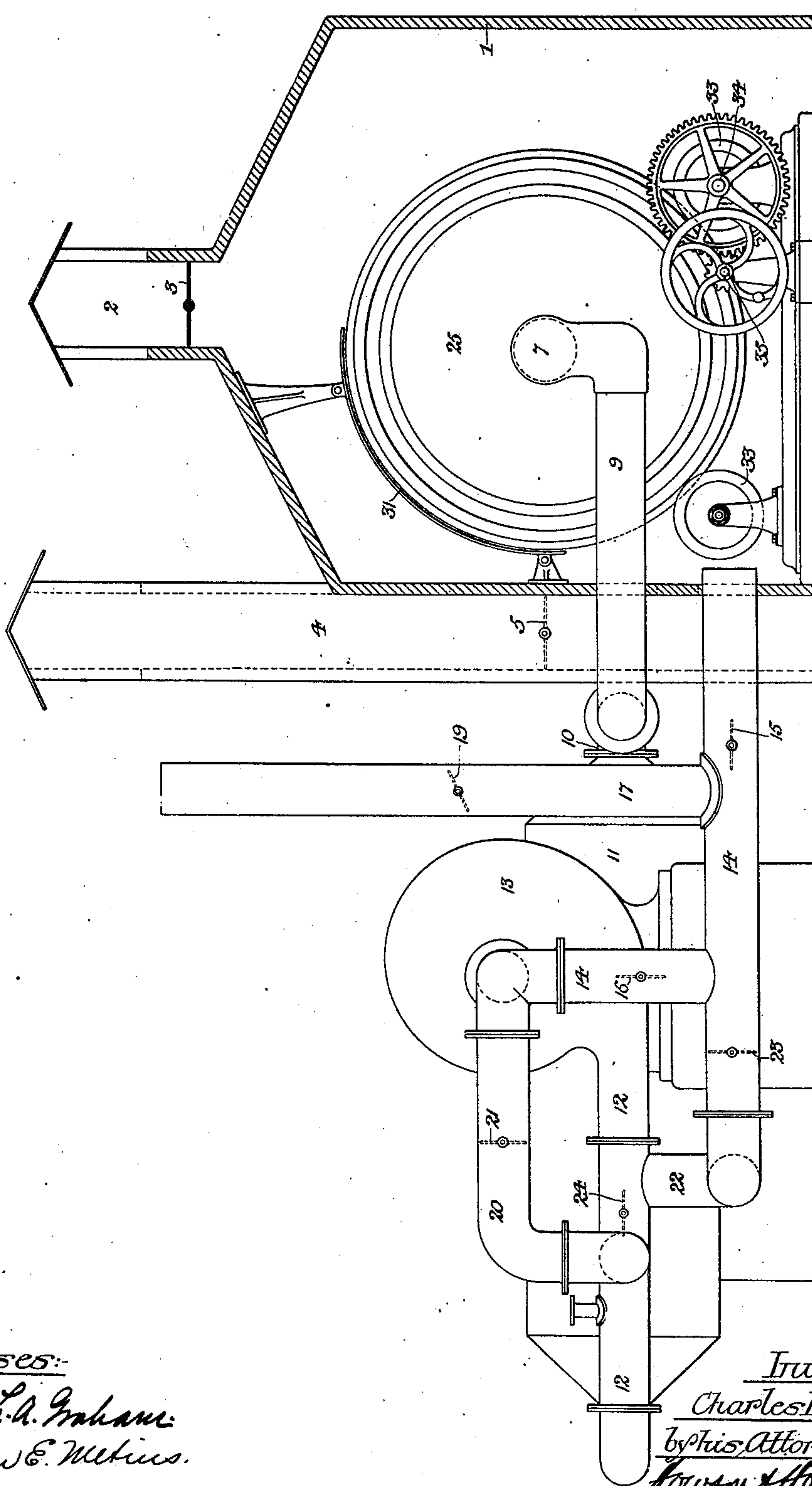
PATENTED APR. 21, 1903.

C. E. WILD.
APPARATUS FOR OXIDIZING TEXTILE MATERIAL.
APPLICATION FILED APR. 21, 1902.

NO MODEL.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses:

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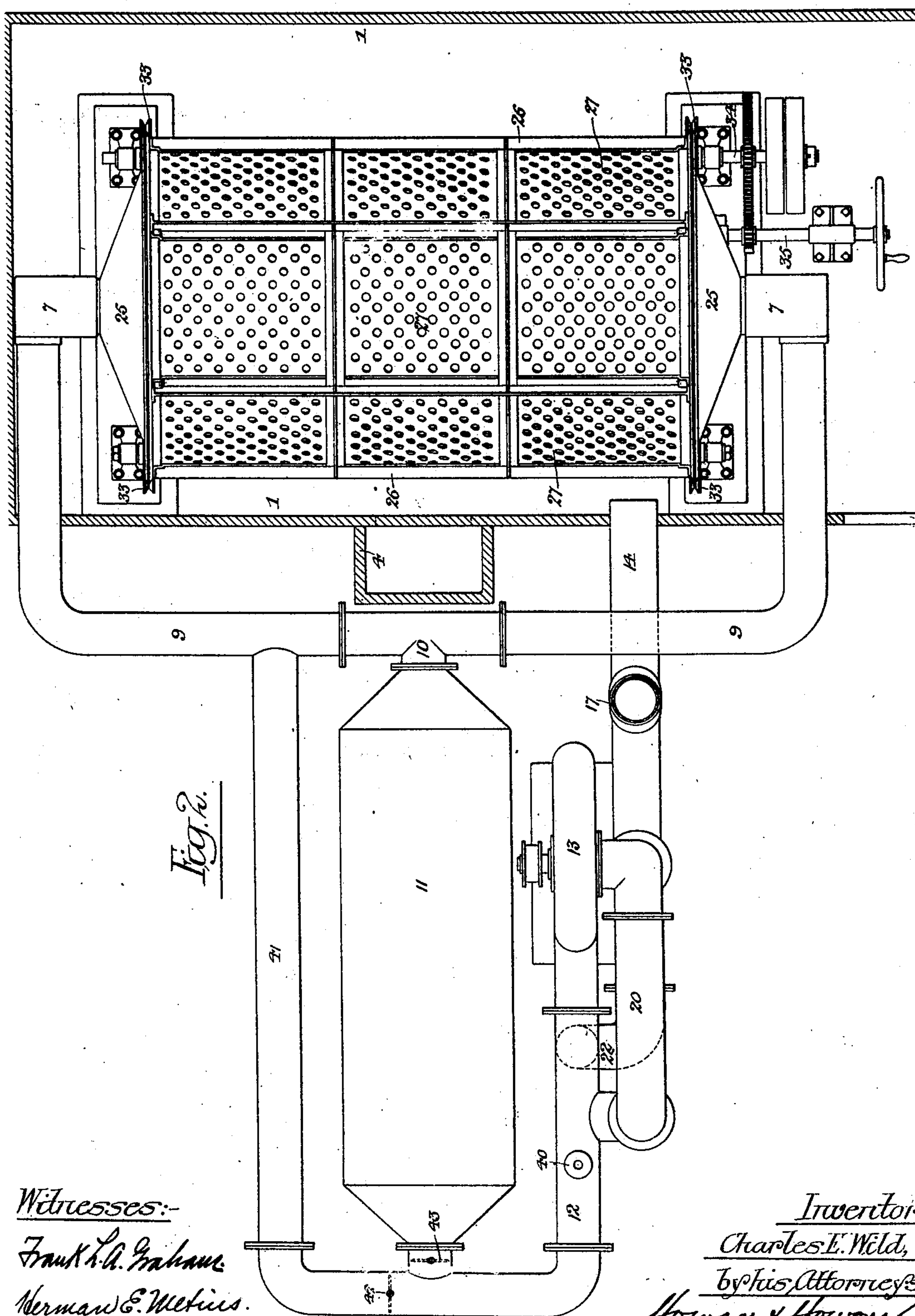
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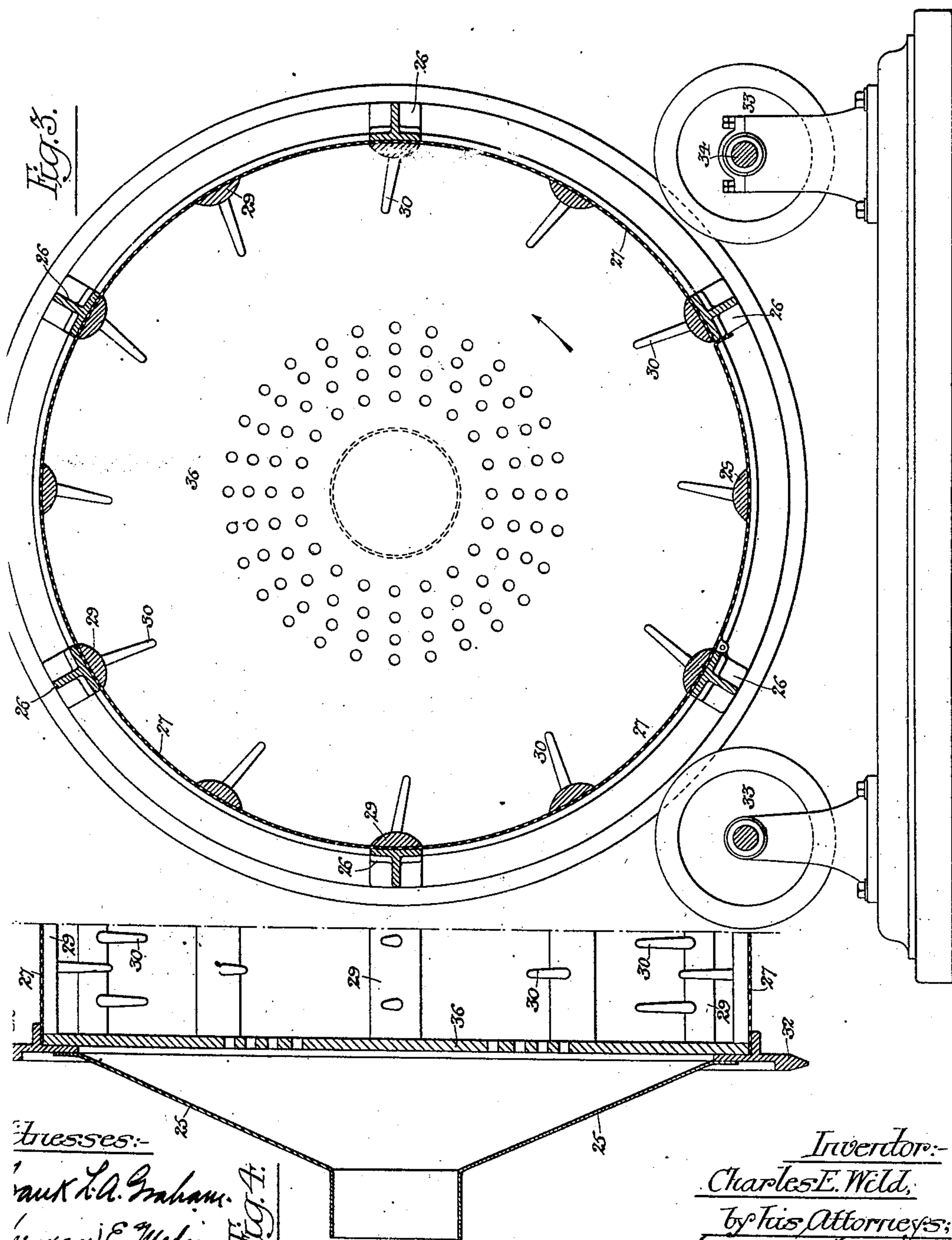
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NO MODEL.

3 SHEETS—SHEET 3.



UNITED STATES PATENT OFFICE.

CHARLES E. WILD, OF PHILADELPHIA, PENNSYLVANIA.

APPARATUS FOR OXIDIZING TEXTILE MATERIAL.

SPECIFICATION forming part of Letters Patent No. 726,207, dated April 21, 1903.

Application filed April 21, 1902. Serial No. 104,007. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. WILD, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain
5 Improvements in Apparatus for Oxidizing Dyed Textile Material, of which the following is a specification.

The object of my invention is to provide
10 mechanism whereby I can in much less time than usual thoroughly oxidize textile materials dyed with anilin colors, and especially those employed in the production of a black color upon the fiber, my invention having
15 been devised with the view of providing for the oxidizing of the goods by means of a forced blast or current of air or other oxidizing agent maintained at a substantially uniform normal temperature and free from the influence
20 of adverse atmospheric conditions. These objects I attain in the manner hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is a view, partly in side elevation and partly in vertical section, of apparatus
25 constructed in accordance with my invention. Fig. 2 is a plan view of the same, partly in section. Fig. 3 is an enlarged transverse section of a drum or cylinder forming part of the apparatus, and Fig. 4 is an enlarged
30 vertical section of one end of said drum or cylinder.

The main difficulty in the way of producing a deep, fast, and uniform black color upon anilin-dyed textile fiber lies not so much in
35 the dye liquor employed as in the subsequent operation of oxidizing, for in performing this operation the final result is very materially affected by such factors as the temperature or variation of temperature of the air, gas, or
40 other oxidizing agent employed, the relative degree of dryness of the same, the freedom with which it acts upon the fiber, and the time of treatment. So much is this the case that in apparatus using rotating reels or tum-
45 blers the same have in addition to rotating around their own axis been caused to travel in a circular path on a horizontal bed, so as to be presented successively to all points of the compass, in order to neutralize as far as
50 possible the effect of drafts in the room or apartment containing the reel. Besides fail-

ing to attain the desired end, however, such tumbling-reels are objectionable, because they depend upon the natural flow of air in the reel and the displacement of the material in
55 order to avoid the effect of the free acids developed during the treatment, whereas in my apparatus I displace the air instead of the material, and therefore attain the desired end without the objections to the ordinary
60 plan. Even when the ordinary method is associated with the injection of chemical vapors at a given stage of the process in order to prevent the weakening of the fiber it is not attended with as good results as those attained
65 by the use of my apparatus.

In carrying out my invention my aim has been to render the material while under treatment substantially independent of natural
70 atmospheric conditions, thereby eliminating the element of uncertainty due to atmospheric changes; to expedite the process by causing the air or other oxidizing agent to flow through the material at any desired rate of speed, thereby rendering the period of treatment one
75 of minutes instead of hours, as usual; to employ the same air or other oxidizing agent again and again, if desired; to insure uniformity by maintaining the oxidizing agent at a substantially uniform temperature during the
80 treatment, and to prevent injury to the fiber by heat, my improved treatment being what may be called a "cold" treatment, in that the maximum temperature of the oxidizing agent is maintained in the neighborhood of from 85°
85 to 95° Fahrenheit, a temperature which is incapable of injuring even the most delicate fiber under normal conditions, whereas by the methods now in use practical oxidation cannot be effected at such a low temperature, the
90 ordinary operation requiring such a degree of heat as to cause injury to the fiber.

Apparatus constructed in accordance with my invention is adapted either for the treatment of yarn or woven or knit goods, being
95 intended especially, however, for the treatment of stockings or other small knitted wares.

Referring first to Figs. 1 and 2 of the drawings, 1 represents a casing, of any suitable
100 material, having at the top a ventilating-dome 2 with damper 3 and at one side a stack 4

with damper 5, said stack communicating with the chamber within the casing 1 at the lower portion of the same.

The casing 1 is so constructed that when the dampers 3 and 5 are closed it is practically cut off from communication with the outer air, ingress to or egress from the chamber being effected through openings having close-fitting doors, the casing being also by preference windowless, the purpose being to render the chamber within the casing 1 as free as possible from light and from surrounding atmospheric influences, light having on the material under treatment a chemical effect which cannot easily be controlled. Within the chamber contained in the casing 1 is mounted a rotary drum or cylinder, the construction of which will be hereinafter described, it being sufficient at present to say that each end of the drum communicates with a fixed hollow trunnion 7, which also communicates with a pipe 9, each of these pipes communicating with the outlet 10 of a heater 11, which may be operated by steam or other heating agent, the inlet end of this heater communicating with a pipe 12, which constitutes the discharge-pipe of a centrifugal fan 13 or other equivalent means of inducing a flow of air or other oxidizing agent into the heater 11. The flow of air into the heater is controlled by a damper 43, and a branch pipe 41 with damper 42 provides for the flow of air into the pipes 9 without passing through the heater, if desired, the damper 43 in this case being closed.

The inlet-pipe 14 of the fan communicates with the lower portion of the chamber within the casing 1 and is provided with dampers 15 and 16, and between these dampers is a branch pipe 17, provided with a damper 19 and communicating with the room which contains the casing 1 or with the outside air. A branch pipe 20, provided with a damper 21, extends from the discharge-pipe 12 of the fan to the inlet-opening of said fan, and between said branch 20 and the fan said discharge-pipe 12 is also provided with another branch 22, communicating with the pipe 14, said branch 22 having a valve 23, and the pipe 12 at a point between the branches 20 and 22 being provided with a valve or damper 24. A branch 40 on the pipe 12 provides for the addition of water or vapor of water or any desired chemical fluid to the air as may be needed in the treatment of the fiber.

By means of the apparatus above described various methods of treatment of the material in the drum are rendered possible. For instance, air, gas, or other oxidizing agent heated to the proper temperature may be forced into each end of the drum through the hollow trunnions of the same and after passing through the material contained in the drum may be drawn from the chamber within the casing 1 through the pipe 14 to be again passed through the heater and returned to the drum, or the air or other drying and oxidizing agent after leaving the drum may be

permitted to escape from the chamber either through the dampered dome 2 or through the dampered stack 4—that is to say, either from the upper or lower portion of the chamber containing the drum—fresh supplies of air or other drying or oxidizing agent in such case being furnished by the dampered pipe 17, or by appropriate manipulation of the dampers in the various pipes the operations may be reversed and air or other agent derived from the chamber within the casing 1 may be drawn into the drum and removed therefrom through the hollow trunnions 7 and pipes 9 and after passing through the heater 11 may be returned to the chamber through the pipe 14 or air may be drawn into the chamber through the dampered dome 2 or dampered stack 4 and may be discharged through the pipe 17, or the air may be circulated without passing through the heater. By this means the treatment of the material is under perfect control, and the conditions of such treatment may be varied in such manner as in the judgment of the attendant may be necessary in order to secure the best results. The drum has opposite heads 25 and longitudinal connecting-bars 26, and the body of the drum consists of a perforated cylindrical structure 27, of wood or paper, or other suitable open-work structure of material which will not injuriously affect the fiber under treatment and will not be affected by the material used in treating said fiber, said cylindrical structure having internal longitudinal bars 29 with internally-projecting studs or pins 30, so that as the drum is rotated in the direction of the arrow, Fig. 3, these pins will engage with the stockings or other articles contained within the drum and will carry the mass of the same up on the ascending side of said drum from the bottom to the top of the same, during which time they are subjected to the action of the air or other oxidizing agent forced through the drum. To prevent free escape of air through the upper portion of the drum on the descending side of the same, a segmental shield or guard 31 is provided, this shield being intended to cover all portions of the drum with which the contents of the same are not in contact, and thereby insure the passage of the air through said contents of the drum. The opposite heads of the drum have projecting flanges 32, which are mounted upon grooved supporting-rollers 33, and one of these rollers at each head has rotating movement imparted to it, so as to cause rotation of the drum in the direction of the arrow, this rotation being effected either by power applied to the shaft 34 by means of a suitable belt-pulley or by hand through the medium of a crank-wheel on a shaft 35, geared to the shaft 34. The drum has at each end an internal or false head 36, so as to form between the same and the main head 25 a chamber, which communicates with the interior of the drum through suitable perforations or other openings in said false head 36. Hence by a proper

disposition of the perforations or other openings in these heads the flow of air-currents in the drum can be readily governed. For instance, by distributing the openings uniformly throughout the head the air may enter the interior of the drum freely and with equal force at all points, while by massing the openings the air can be caused to enter any desired portion of the drum with any desired force or volume and with different degrees of force or in different volumes at different portions of the drum. Owing to the provision for a forced and powerful circulation of the oxidizing agent, the drum need be rotated but slowly. Hence the stockings or other articles submitted to its action are not shaken about and rubbed against each other, as in a rapidly-rotating reel. Consequently there is very little abrasion of the fibers and a consequent limited production of lint on the inside of the stockings or fuzz on the outside of the same.

Among the advantages arising from the use of my improved apparatus may be mentioned the facility afforded for treating the fiber with currents of any desired strength, the use of a closed circuit, whereby the air or other oxidizing agent after once passing through the material may be subjected to heat or other treatment and then again passed through the material, or, on the other hand, the constant use of fresh air or other oxidizing agent, the ready application of either dry air or of moist or chemically-impregnated air, as may be required, the control of temperature, and freedom from outside atmospheric conditions, these advantages resulting in increased weight of product due to the saving of fiber, &c., the thorough fixing of the emeraldine formation preventing "bleeding," the softness and elasticity of the dyed fiber and freedom from "crocking," because of the abandonment of the hot chrome treatment, and the production without subsequent artificial treatment of an especially uniform and brilliant natural blue-black which will effectually withstand the action of the elements and all of the usually-applied tests.

In an application filed by me on the 9th day of March, 1903, Serial No. 146,943, I have shown, described, and claimed an embodiment of my invention in which the heater for the flowing fluid is omitted, and I herein disclaim such modified construction except in so far as the same may contain the shield or guard 31, which can be used indifferently with the system employing the heater and with the system omitting said heater.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. In apparatus for oxidizing dyed textile material, the combination of a rotatable drum with perforated or other open body, a substantially closed chamber containing the drum, a fluid-circulating device having one of its terminals communicating with the interior of the

drum and the other terminal communicating with the chamber containing said drum and a heater interposed in said fluid-circulating device, substantially as specified. 7c

2. In apparatus for oxidizing dyed textile material, the combination of a rotatable drum with perforated or other open body, a fluid-circulating device, a heater through which the fluid is caused to flow, and means whereby either the inlet or discharge pipe of the circulating device may be caused to communicate with the interior of the drum, substantially as specified. 75

3. In apparatus for oxidizing dyed textile material, the combination of a rotatable drum having a perforated or other open body, a substantially closed chamber containing the drum, and having a dampered stack communicating with the lower portion of the chamber, means for circulating fluid through said drum in a continuous circuit, and a heater interposed in said circuit, substantially as specified. 80

4. In apparatus for oxidizing dyed textile material, the combination of a rotatable drum having a perforated or other open body, a substantially closed chamber containing the drum, and having a dampered dome at the top and a dampered stack communicating with the lower portion of the chamber, means for circulating fluid through said drum in a continuous circuit, and a heater interposed in said circuit, substantially as specified. 85

5. In apparatus for oxidizing dyed textile material, the combination of a rotatable drum having a perforated or other open body, means for lifting the contents of the drum on the rising side of the same, a fluid forcing or exhausting apparatus communicating with the interior of the drum, and a shield or guard for obstructing flow of fluid through the casing of the drum on the descending side of the same, substantially as specified. 90

6. In apparatus for oxidizing dyed textile material, the combination of a rotatable drum with perforated or other open body, a substantially closed chamber containing the drum, a fluid-circulating device having one of its terminals communicating with the interior of the drum, and the other with the chamber containing the same, whereby fluid may be circulated through said drum in a continuous circuit and in either direction, a heater interposed in the said circuit, and means for cutting the heater out of the circuit, substantially as specified. 95

7. In apparatus for oxidizing dyed textile material, the combination of a rotatable drum, means for circulating fluid through the same in a continuous circuit, a heater interposed in said circuit, and means for adding other fluid to said circulating fluid during its flow, substantially as specified. 100

8. In apparatus for oxidizing dyed textile material, the combination of a rotatable drum with perforated or other open body, a substantially closed chamber containing the drum, 105

means for circulating fluid through said chamber and its contained drum in a continuous circuit, a heater interposed in said circuit, and means for adding other fluid to said circulating fluid during its flow, substantially as specified.

9. In apparatus for oxidizing dyed textile material, the combination of a rotatable drum with perforated or other open body, a chamber containing said drum and having an outlet-opening provided with a damper for closing the same, means for circulating fluid through said chamber and its contained drum in a continuous circuit, and a heater interposed in said circuit, substantially as specified.

10. In apparatus for oxidizing dyed textile material, the combination of a rotatable drum with perforated or other open body, a chamber containing said drum and having an outlet-opening provided with a damper for closing the same, means for circulating fluid through said chamber and its contained drum in a continuous circuit, a heater interposed in said circuit, and means for adding other fluid to said circulating fluid during its flow, substantially as specified.

11. In apparatus for oxidizing dyed textile material, the combination of a substantially closed chamber, a rotatable drum contained wholly within said chamber, means for circulating fluid through said drum in a continuous circuit, a heater in said circuit, and means for adding other fluid to said circulating fluid during its flow, substantially as specified.

12. In apparatus for oxidizing dyed textile material, the combination of a substantially closed chamber, a rotatable drum contained

wholly within said chamber, and having a perforated or other open body, means for circulating fluid through said chamber, and its contained drum, in a continuous circuit, a heater interposed in said circuit and means for adding other fluid to said circulating fluid during the flow of the latter, substantially as specified.

13. In apparatus for oxidizing dyed textile material, the combination of a chamber having an outlet-opening provided with a damper for closing the same, a rotatable drum contained wholly within said chamber and having a perforated or other open body, means for circulating fluid through said chamber, and its contained drum, in a continuous circuit, and a heater interposed in said circuit, substantially as specified.

14. In apparatus for oxidizing dyed textile material, the combination of a chamber having an outlet-opening provided with a damper for closing the same, a rotatable drum contained wholly within said chamber and having a perforated or other open body, means for circulating fluid through said chamber, and its contained drum, in a continuous circuit, a heater interposed in said circuit, and means for adding other fluid to said circulating fluid during the flow of the latter, substantially as specified.

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

CHAS. E. WILD.

Witnesses:

WALTER CHISM,
JOS. H. KLEIN.