

April 6, 1937.

G. A. FRIESS

2,076,367

METHOD OF AND APPARATUS FOR DRYING CARBON TISSUES

Filed April 29, 1935

2 Sheets-Sheet 1

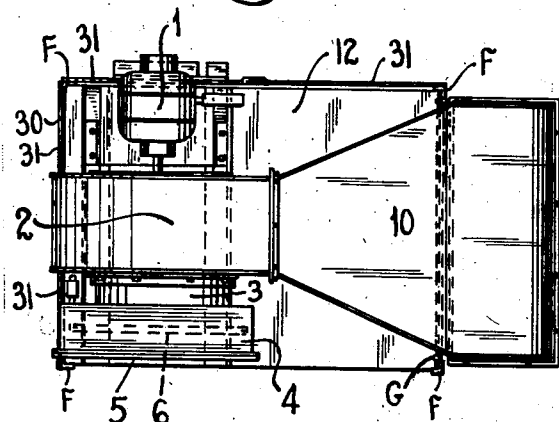
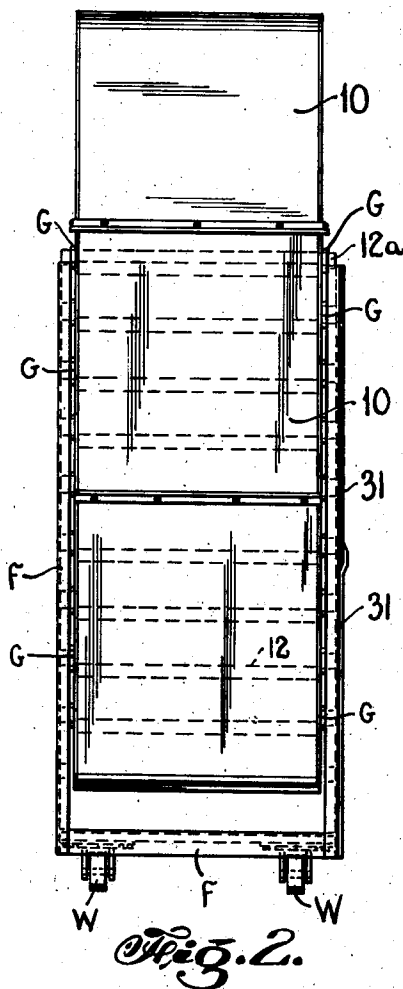
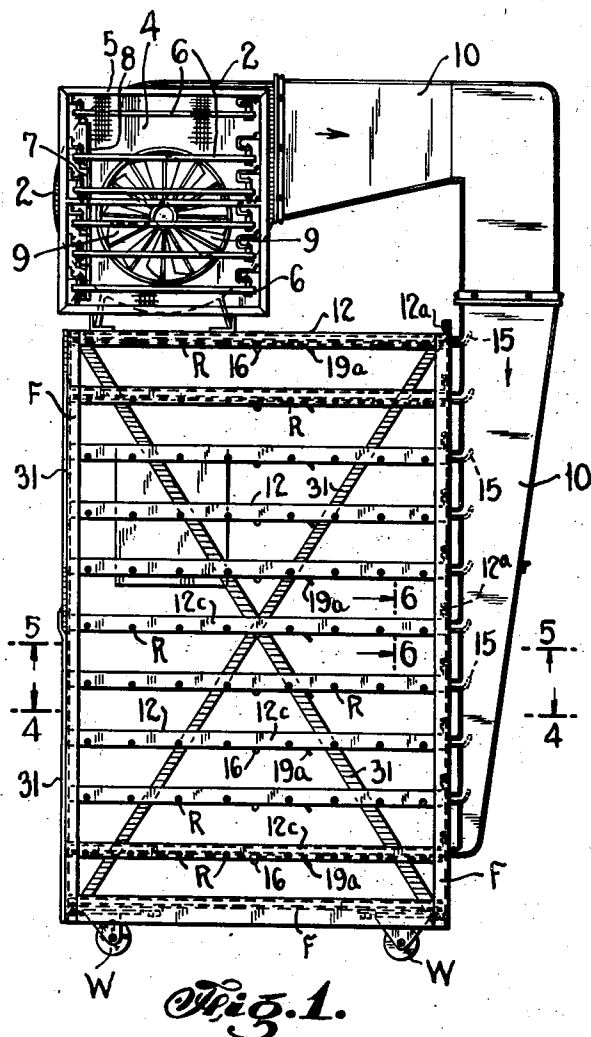


Fig. 3.

INVENTOR.
Gustave A. Friess
BY
Mock and Blum
ATTORNEYS.

April 6, 1937.

G. A. FRIESS

2,076,367

METHOD OF AND APPARATUS FOR DRYING CARBON TISSUES

Filed April 29, 1935

2 Sheets-Sheet 2

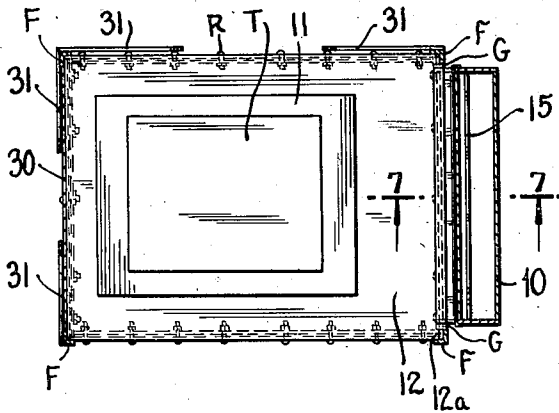


Fig. 4.

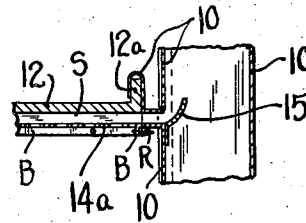


Fig. 7.

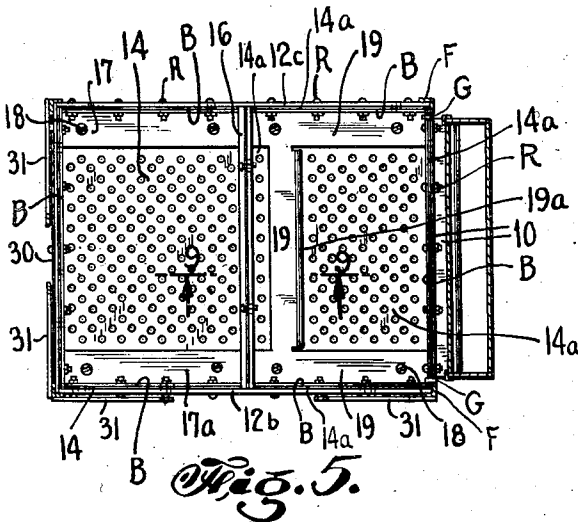


Fig. 5.

Fig. 8.

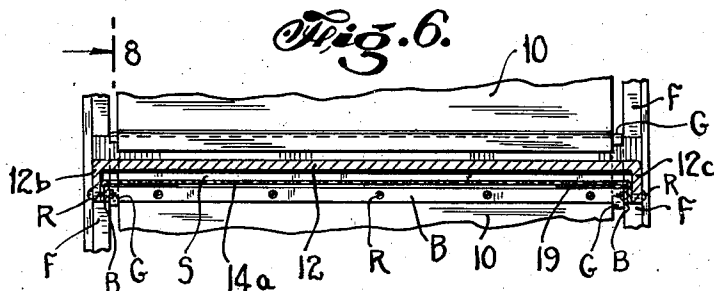
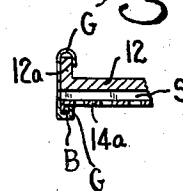


Fig. 6.

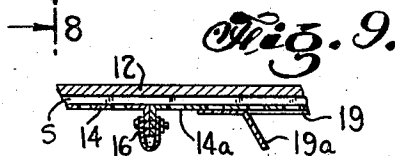


Fig. 9.

INVENTOR.
Gustave A. Friess
BY
Mock and Blum
ATTORNEYS.

UNITED STATES PATENT OFFICE

2,076,367

METHOD OF AND APPARATUS FOR DRYING
CARBON TISSUESGustave A. Friess, Rye, N. Y., assignor to News
Syndicate Co. Inc., New York, N. Y., a corpo-
ration of New York

Application April 29, 1935, Serial No. 18,759

4 Claims. (Cl. 34-24)

My invention relates to a new and improved method of and apparatus for drying carbon tissues.

One of the objects of my invention is to provide an apparatus and method for shortening the drying period.

Another object of my invention is to provide a method and apparatus for drying the tissue, so as to prevent any buckling or curling of the tissue, so that the dried tissue is in flat and planar form.

Another object of my invention is to provide an apparatus which shall be simple and cheap to construct and operate.

Other objects of my invention will be set forth in the following description and drawings which illustrate a preferred embodiment thereof, it being understood that the above statements of the objects of my invention is intended to generally explain the same without limiting it in any manner.

Fig. 1 is a front elevation of a form of apparatus which may be used for carrying out said method.

Fig. 2 is a side elevation of Fig. 1.

Fig. 3 is a top plan view of Fig. 1.

Fig. 4 is a sectional view on the line 4-4 of Fig. 1.

Fig. 5 is a sectional view on the line 5-5 of Fig. 1.

Fig. 6 is a sectional view on the line 6-6 of Fig. 1.

Fig. 7 is a sectional view on the line 7-7 of Fig. 4.

Fig. 8 is a sectional view on the line 8-8 of Fig. 6.

Fig. 9 is a sectional view on the line 9-9 of Fig. 5.

In printing photographs by means of the photogravure or rotogravure method, it is necessary to prepare and to dry carbon tissues. These tissues are made of paper, having a gelatin coating on one side of the paper.

Heretofore such tissues have been dried by placing them on sheets made of special absorbent felt and such sheets of felt, in contact with the tissues, were hung in a cabinet, so as to permit the felt to absorb the moisture of the carbon tissue. This process was lengthy and it took about 1½ to 2 hours in order to secure satisfactory drying.

In the improved apparatus shown, a motor operates a fan (not shown), which is located in a suitable fan-casing 2. The fan-casing 2 is connected by means of a pipe 3, to an inlet

casing 4. Said inlet casing 4 has a mouth 5. The inlet casing 4 is provided with a suitable heater, which may be of the electric type.

In the embodiment described, the inlet casing 4 is provided with electrically heated elements 6. Each element 6 may be of conventional form, comprising a member in which a heating wire is imbedded. The outer shells of the elements 6 may be made of metal, and said outer shells may be insulated from the wall of the inlet casing 4, by any suitable insulating means.

The heating wires of the respective heating elements 6, have their ends connected in parallel to a supply circuit which has the wires 7 and 8.

The inlet end of the pipe 3 is controlled in any suitable manner, as for example, by means of louvre blades 9, which may be adjusted if desired, so as to increase or decrease the effective cross section of the inlet end of the pipe 3. Air is thus drawn into the fan-casing 2, and said air may be heated to any suitable temperature. The current supply to the electric heater may be regulated, so as to regulate the temperature of the heated air. The air is then forced in the direction of the arrow shown in Fig. 1, into and down the casing 10.

As shown in Fig. 4, the tissues T are placed upon the planar surfaces of supports 11. Said supports 11 are preferably imperforate. They may be made of any suitable material which will not warp or bend under the effect of the heat or moisture.

The supports 11 are placed upon the upper surfaces of shelves 12.

Referring to Fig. 6, it can be seen that each shelf 12 has a lateral U-shaped cross section. Each shelf 12 also has a downward flange 12b at the left-hand end thereof, referring to Fig. 1 and Fig. 6, and it has an upward flange 12a at the right-hand end thereof, referring to Fig. 7.

The underside of each shelf 12 is provided with suitable perforated means. Said perforated means are spaced from the underside of the shelf 12. Hence, and as shown more particularly in Fig. 7, a space S is formed between the underside of each shelf 12 and said perforated means. As shown in Fig. 7, said spaces 50 communicate with the housing 10. Baffles 15 are provided so as to deflect some of the air which passes downwardly through the casing 10, into said chambers or spaces S. Hence each sheet of tissue T has its paper face exposed to

the downwardly directed air currents which issue from the adjacent upper space S. The paper side of each sheet T is thus dried directly by means of a forced draft of heated air, while
 5 the underside or gelatin face of the tissue T is in contact with a support made of non-absorbent and rigid and planar material. This material may be a phenol formaldehyde condensation resin, of the type known as "Bakelite", or
 10 any suitable non-metallic or metal material. It can also be made of metal, having a lacquered surface. Said support could be made of absorbent material.

The perforated means at the underside of each
 15 shelf 12 may be of any suitable construction, as the only purpose of said perforated means is to downwardly distribute the current of hot air which is forced out of each chamber S.

The size and number of the holes in said perforated means can be regulated according to the
 20 velocity of the air current.

I have shown a particular embodiment of said perforated means, but I do not wish to be limited to the specific construction thereof.

Referring to Fig. 5, this shows perforated plates
 25 14 and 14a having downward flanges at their adjacent edges, and such downward flanges are connected by means of a bar 16, shown in Fig. 9, which has a U-shaped cross section. Said bar 16
 30 is connected to the flanges of the perforated plates 14 and 14a by any suitable fastening means. The perforated plate 14 has imperforate bars 17 and 17a removably connected thereto, by means
 35 of screws 18 or other suitable fastening means. The purpose of the bars 17 and 17a is to control the size and location of the perforated area of the plate 14. Said bars 17 and 17a could be of any desired shape and area. Likewise, the perforated plate 14a has an imperforate bar 19 con-
 40 nected thereto by screws or other fastening means. Hence the perforated areas of the plates 14 and 14a are separated from each other and from the edges of the shelf 12, save that the left-hand edge of the perforated plate 14, and the
 45 right-hand edge of the perforated plate 14a, substantially abut the corresponding edges of the shelf 12.

The perforated plates 14 and 14a have flanges which are connected to the front and rear flanges
 50 12b and 12c of the shelf 12, and to the downwardly directed left-hand flange of the shelf 12. This is done by means of bars B, and bolts R, which have nuts connected thereto.

The right-hand and downwardly directed flange
 55 of the member 14a, referring to Figs. 6 and 7, is connected to an extension of the adjacent wall of the housing 10. This extension also has a downwardly directed flange.

Referring to Fig. 5, the right-hand edge of the
 60 central branch of the plate 19 is turned downwardly, as indicated at 19a in Figs. 1 and 5. The left-hand ends of the pockets or spaces S are closed by means of a plate 30 which is suitably connected to the frame F of the apparatus. The
 65 apparatus is mounted upon wheels W and it is provided with diagonal cross braces 31 as shown in Fig. 1. Additional cross braces 31 are provided, as shown for example in Fig. 4.

While the invention is particularly useful for
 70 drying carbon tissues, it may also be used for drying films made of celluloid or the like.

The ordinary carbon print is made on heavy paper, which carries a film of gelatin having carbon pigment.

75 This gelatin film is ordinarily in direct contact

with the support 11. It would not be departing from the invention if a sheet of felt or the like were placed upon the shelf 12 and the carbon tissue or print was located upon said porous member.

Any suitable additional means may be used for preventing leakage of the heated air which is forced into each chamber S, save in a downward direction.

It would not be departing from the invention 10 if the carbon tissues were held in some plane other than the horizontal plane.

Generally speaking, a current or currents of heated air are directed against the exposed faces of the carbon tissues and in a direction substan- 15 tially perpendicular to said exposed faces.

The heated air strikes each said exposed face, and the air then spreads laterally over said exposed face. The pressure of the heated air against the exposed face of the carbon tissue, 20 may be sufficient to prevent any curling or wrinkling thereof, during the drying process. However, said pressure is ordinarily very slight, since air can escape readily through the front and rear of the apparatus. 25

Since the gelatin face of the moist carbon tissue is in close and adhering contact with the support 11, which is preferably rigid and imperforate, the carbon tissue is dried uniformly so as to prevent 30 any curling or wrinkling.

Referring to Fig. 8, this shows how a plate G serves to prevent any leakage of the hot air from the chamber S.

The sizes of the plates 17, 17a and 19 may be varied, and said plates can be adjusted, since 35 they are removably connected to the perforated plates. I have discovered that if the hot air is uniformly applied to the carbon tissue, the drying is uneven, because the edges of the tissue dry before the inner part of the tissue. Hence the edges 40 dry and shrink before the central part of the tissue has dried. This uneven drying and shrinking makes it difficult or impossible to secure registration accurately, especially in multi-color roto- 45 gravure work.

The use of the imperforate plates 17, 17a and 19, in combination with the baffles 19a, (which are important) distribute the air so as to secure uniform drying, thus preventing curling or wrinkling or uneven shrinking of the tissue. 50

Said plates 17, 17a and 19 prevent the downward currents of air from directly impinging upon at least two edges of the tissue, and upon a portion of the tissue intermediate the edges of the tissue. The baffles 19a laterally deflect the air 55 which passes through the perforations of plate 14a, which are directly adjacent the central leg of plate 19. Hence some of the air moves in a direction which has a component which is parallel to the face of the tissue. The area of the carbon tissue may be the same as the combined areas of plates 14 and 14a including those parts of said plates 14 and 14a, which are covered by imperforate plates 17, 17a and 19. Said carbon tissue is located directly below said plates 14 and 14a. 60 Said carbon tissue may be of less area or of greater area than said combined area of plates 14 and 14a. The air currents may be disposed so as to avoid any direct impingement thereof upon any 65 of the edges of the tissue.

The baffles 19a cause a lateral movement of the heated air, that is, a movement in a direction which has a component parallel to the upper paper face of the planar sheet of tissue. Said lateral current of hot air may be supplemented 70

in any suitable manner, by causing air to move in a direction parallel to the face of the carbon tissue, in which case the component is one hundred per cent of the direction of movement of the air.

If the sheet of carbon tissue is located upon a substantially non-porous support, the paper base of the sheet is exposed directly to the action of heated air or other heated gas or vapor, and the gelatin film or coating is substantially protected from exposure to said heated air or gas or vapor.

If the sheet of carbon tissue is rectangular so that its length is greater than its width, the plates 17 and 17a and 19 are located adjacent the long edges of said sheet of carbon tissue, so that the long edges are subjected to less direct heat than the interior of the sheet of carbon tissue. Under such circumstances and even if a part of the shorter edge portions of said rectangular sheet is directly exposed to the heated air, the sheet will not curl during the drying thereof. The paper which is in common use for preparing carbon tissue has a grain or direction of fibre, which is parallel to the length of the paper. Hence, by protecting the longitudinal edges of the paper, the curling of the paper is substantially prevented.

For convenience the perforated plates 14 and 14a may be regarded as constituting two separated sources of heated air, since the lateral leg of the plate 19 prevents the downward movement of the air adjacent said lateral leg.

I have shown preferred embodiments of my invention, but it is clear that numerous changes and omissions can be made without departing from its spirit.

I claim:

1. A method of drying carbon tissue which consists in supporting a sheet of wet carbon tissue upon a substantially rigid support, and directing a current of heated air against the exposed face of said carbon tissue, while preventing contact between said air current and a sufficient edge portion of said tissue, so as to cause said tissue to dry and shrink substantially uniformly.

2. A method of drying a sheet of carbon tissue having a paper base and a gelatin coating at one side of said paper base, which consists in subjecting said sheet to the action of a drying medium, while preventing contact between said drying medium and sufficient of the edge portion of said sheet, so as to cause the tissue to dry and shrink substantially uniformly.

3. A method of drying a substantially rectangular sheet of carbon tissue which consists in causing air to impinge directly upon the exposed paper face of said carbon tissue, while substantially preventing contact between two of the edges of said sheet of tissue and the air, so as to cause said tissue to dry and shrink substantially without curling.

4. A method of drying a substantially rectangular sheet of carbon tissue which consists in causing air to impinge directly upon the exposed paper face of said carbon tissue, while substantially protecting two of the edges of said sheet of tissue from the air, and also preventing said air from impinging directly upon a lateral zone of the sheet of tissue which is intermediate the edges of said sheet.

GUSTAVE A. FRIESS. 35