

May 18, 1926.

1,585,282

B. DEWEY ET AL

APPARATUS FOR DRYING LINING MATERIAL ON COVERS.

Filed Feb. 17, 1925

2 Sheets-Sheet 1

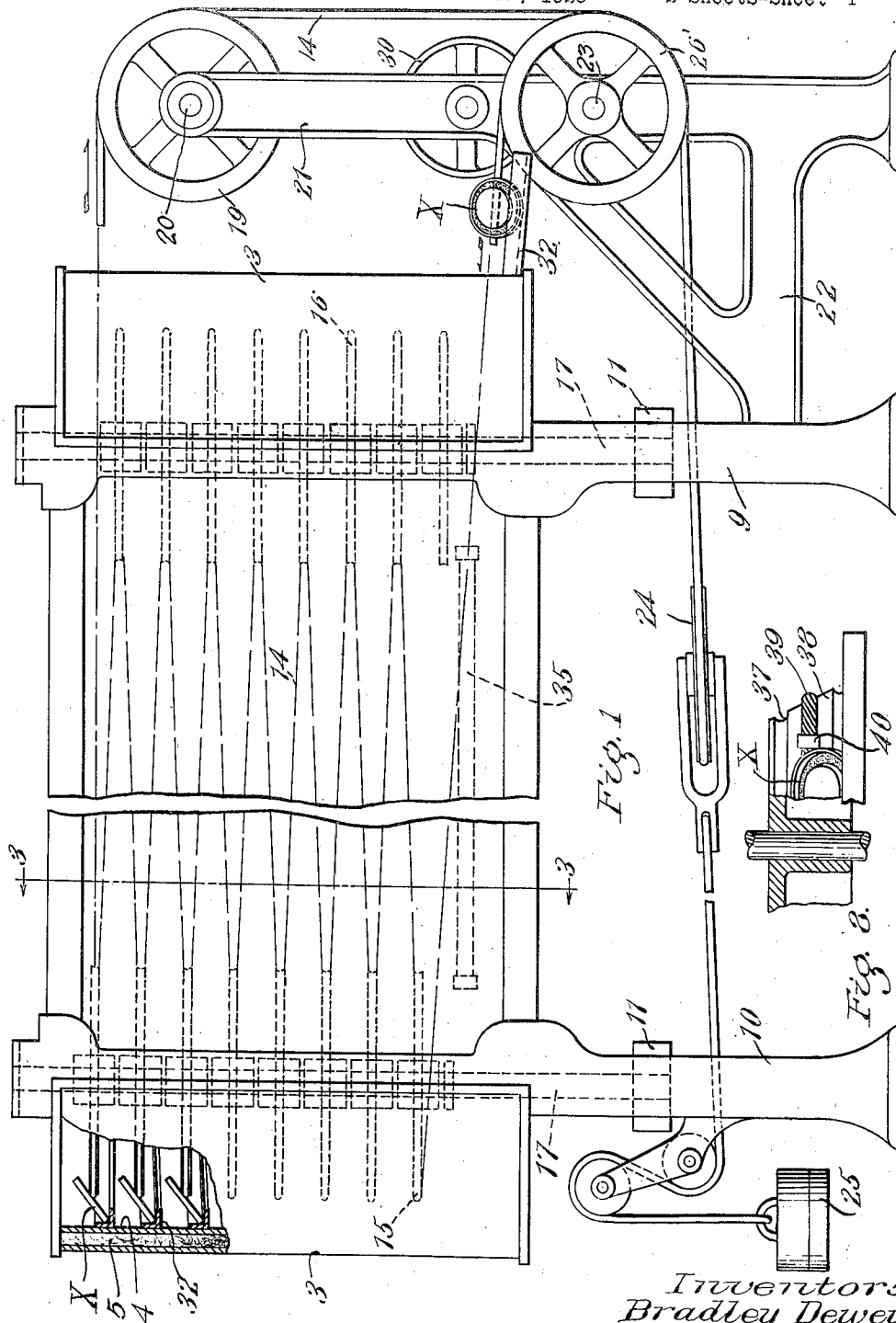


Fig. 1

Fig. 3

Inventors:
Bradley Dewey.
Theodore T. Miller.
by Robert, Roberts & Cushman
Att'ys.

May 18 , 1926.

B. DEWEY ET AL

1,585,282

APPARATUS FOR DRYING LINING MATERIAL ON COVERS

Filed Feb. 17, 1925

2 Sheets-Sheet 2

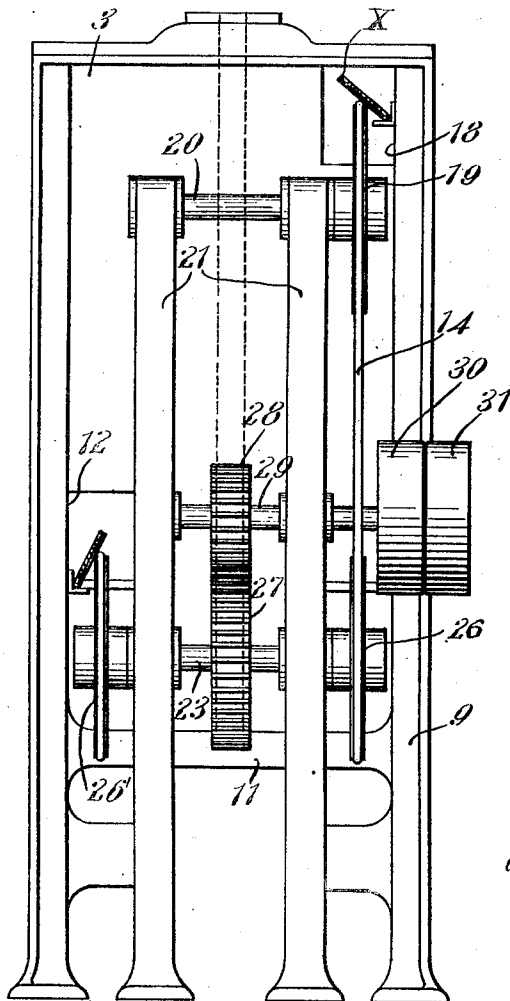
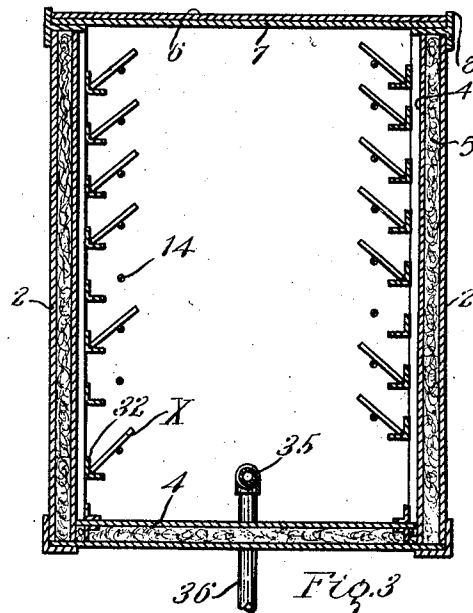


Fig. 2.



36  Fig. 3

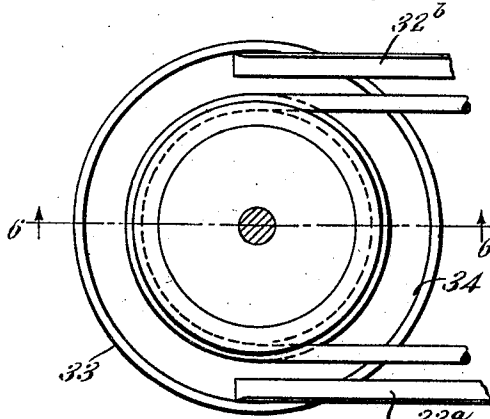


Fig. 5.

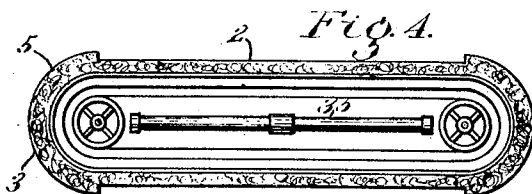


Fig. 4.

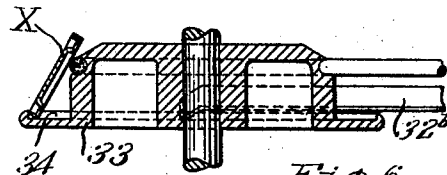


Fig. 6.

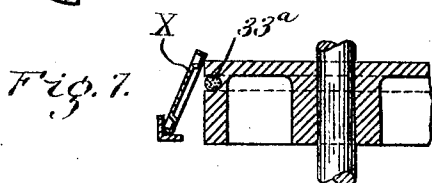


Fig. 7.

Inventors:
Bradley Dewey.
Theodore T. Miller

by Roberts, Roberts & Cunningham
Att'y's.

Patented May 18, 1926.

1,585,282

UNITED STATES PATENT OFFICE.

BRADLEY DEWEY, OF CAMBRIDGE, MASSACHUSETTS, AND THEODORE T. MILLER, OF ORANGE, NEW JERSEY, ASSIGNORS TO DEWEY & ALMY CHEMICAL COMPANY, OF CAMBRIDGE, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

APPARATUS FOR DRYING LINING MATERIAL ON COVERS.

Application filed February 17, 1925. Serial No. 9,822.

This invention relates to apparatus for conditioning can covers for sealing such for example as shown in our copending applications Serial Nos. 9,823 and 9,826, filed Feb. 17, 1925, but more particularly to an apparatus for drying the liquid lining material on can covers.

Heretofore numerous types of driers have been in use for drying liquid lining materials on can covers and among these types is the screw drier upon which the covers having lining material thereon are placed and conveyed in a suitable manner until the material is thoroughly dried. This type of drier is objectionable particularly because the screws become dirty and gum up with the lining material which frequently flows over the edge of the covers. As soon as the screws become dirty the efficiency of the apparatus is greatly impaired. Furthermore with such apparatus it is necessary frequently to replace certain parts and also to obtain the services of skilled mechanics to make changes necessary to adapt the driers for different size covers. Another well-known form of drier is the plate drier which is made up of interlapping series of circular plates mounted on two vertical shafts, the distance between the shafts being less than the diameters of the plates. In order to conduct the covers from one plate to an adjacent plate finger mechanisms are employed which are constructed and arranged to engage each cover and cause it to assume the desired movement. This type of drier has likewise proved inefficient for accomplishing the desired result because frequently the covers jam due to the wiping action of the fingers, furthermore such an apparatus requires an excessive amount of space which in itself is one of the greatest objections to existing driers. A still further objection to this type resides in the fact that the covers are jarred as they drop from one plate to another, so that with certain kinds of liquid material there is considerable danger of the material spattering from the cover when this jarring takes place so that as a result the effective sealing area of the cover is seriously impaired. Still another type of drier is the chain belt type which is made up of flexible chain belts which pass around a number of pulleys, but this type of drier also has its

disadvantages. Unless the covers are overlapped on each other the apparatus must be exceedingly long thus occupying an unduly great amount of space; furthermore when the covers are overlapped on each other the overlapping arrangement prevents uniform drying and a comparatively great period of time is required thoroughly to dry all the covers.

Objects of this invention are to overcome the difficulties inherent in the types of apparatus above pointed out; to provide a drying apparatus which is simple in its construction, occupies but a comparatively small amount of space, is capable of efficiently drying liquid lining material on a cover in a much shorter period of time than has heretofore been possible, is adapted to handle a comparatively great number of covers at one time without jamming or jarring, and is also adapted to receive covers of various sizes without changing parts; and to provide a drying apparatus having the new and improved features of construction and arrangement hereinafter more fully described.

In accordance with this invention the can covers having liquid lining material suitably distributed thereover in the form for sealing are conducted into a drier which may consist of a casing of a suitable form having heat insulating walls, and inlet and discharge openings for the covers. Arranged within the casing may be two vertical series of sheaves about which a conveyor such as an endless cable, chain or the like passes and spaced a uniform distance from the cable is a track against which the periphery of the covers rests, the covers lying against the cable preferably between the center and periphery of the covers assuming an inclined position so that they are rolled along the track by the cable. Within the casing preferably adjacent the bottom is a heater so that by introducing the covers for example into a lower portion of the casing the cable may convey them in an approximately elliptically helical route progressively upward until they are finally discharged from an upper portion of the casing with the lining material dry, the relatively high temperature facilitating the evaporation. One advantage of a drier constructed in accordance with the invention

is that it occupies a comparatively small amount of space, and is in this respect a marked improvement over driers of a similar nature of which we are aware, and furthermore it is capable not only of handling a great number of covers but the drying time is reduced to a minimum thus speeding up production and reducing manufacturing costs. A further outstanding feature resides in the fact that this drier accommodates covers of different forms and sizes without troublesome changing of parts.

In the drawings,

Fig. 1 is a side elevation of an apparatus for drying lining material on covers;

Fig. 2 is an end elevation of the apparatus shown in Fig. 1;

Fig. 3 is a transverse section taken on the line 3—3 of Fig. 1;

Fig. 4 is a top plan view on a reduced scale of the apparatus shown in Fig. 1 with the cover removed.

Fig. 5 is a top plan view of a modified form of sheave in which the covers are carried around the corners of the casing by the sheaves without rolling action;

Fig. 6 is a transverse section on the line 6—6 of Fig. 5;

Fig. 7 is a fragmentary sectional elevation of another modified form of sheave in which the sheave and cover are in frictional contact; and

Fig. 8 is a fragmentary elevation of a further modified form of sheave.

In the form of the invention chosen for the purpose of illustration the drying apparatus comprises a casing of sheet metal or other suitable material having side walls 2, curved end walls 3 and a lining 4 of insulating material such as asbestos board on the inside of the casing and spaced a slight distance from the inner walls thereof, the space intervening between the casing and lining 4 being filled with a filler 5 of asbestos wool or other suitable insulating material so that in this manner the interior of the casing is thoroughly insulated from the surrounding atmosphere. Closing the top of the casing is a cover 6 also having a lining 7 of insulating material, the cover preferably resting upon a ledge 8 surrounding the top of the casing and thus being readily removable whenever required. For supporting the ends of the casing uprights 9 and 10 suitably reinforced as by integral braces 11 are employed, said uprights being recessed to receive the side walls of the casing so that in this manner the casing is supported in substantially a horizontal position above the ground.

The can covers X in the form of circular disks with the liquid lining material suita-

bly distributed thereover in the form for sealing are introduced into the drier preferably through an opening 12 at one end. Within the drier is arranged an endless cable 14 against which the covers rest so that they are continuously rolled around the inside of the drier in an approximately elliptical helical or serpentine path progressively upward until finally discharged at the top, the length of time required to carry the covers X through the drier being predetermined and as discharged the lining material on the cover is thoroughly dried. As indicated in Fig. 1 the endless cable 14 passes alternately around a sheave 15 positioned adjacent one end of the casing and then around a sheave 16 positioned at the opposite end of the casing, the series of sheaves being arranged vertically with the sheaves of one series in staggered relation to the sheaves on the other series and each series being suitably mounted upon a single upright shaft 17 rigidly mounted in the cross braces 11. After passing alternately around the two series of sheaves 15 and 16 respectively, the cable 14 passes through the discharge opening 18 adjacent the top of the end wall 3 and around a sheave 19 rotatable on a horizontal axis and mounted on a shaft 20 which is rotatable on upright supporting members 21 which are preferably secured to the uprights 9 by integral braces 22. From the sheave 19 the cable 14 extends vertically downward over a sheave 26 also rotatable on a horizontal axis and mounted on a shaft 23 supported by the uprights 21, and from the sheave 26 the cable extends substantially horizontally around a sheave 24 having a weight 25 for maintaining the cable taut, and thence around a sheave 26' which is fast to the shaft 23. From the sheave 26' the cable 14 extends through the inlet opening 12 above mentioned.

In order to drive the cable 14 a gear 27 is fast on the shaft 23 and meshes with a gear 28 fast on a shaft 29 to one end of which is secured a drive pulley 30 which is adapted to be connected to any suitable source of power such for example as an electric motor, the usual idler pulley 31 being mounted adjacent the drive pulley 30.

Arranged within the casing and spaced a suitable distance from the cable 14 is a track 32 preferably of angle iron which extends along the path of the cable 14, the track being positioned below and to one side of the cable so that the periphery of the covers is adapted to rest in the track and the upper portion of the covers, preferably between the center and the periphery, lies against the cable. In this form the covers and cable 14 are in frictional engagement

throughout the path of the covers, the track being bent around the corners of the drier on a radius whose center is the same as that of the vertical shafts 17 to guide the covers.

5 It will be apparent that by supporting the covers in the manner described they will be conveyed in an approximately elliptical helical path about the interior of the drier and conducted progressively upward until
10 finally discharged through the outlet or discharge opening 18. As indicated in Fig. 1 the track 32 may be bent around the corners of the drier at a uniform distance from the sheaves and the frictional engagement between the cable and the covers will operate
15 to propel covers in the desired manner.

It may be desirable, however, to convey the covers around the corners of the drier by means of the sheaves and as indicated in
20 Figs. 5 and 6 the sheaves 33 may be formed with a circular channel 34 adjacent the periphery thereof and in this manner it is not necessary to bend the track but in this instance the track 32^a may terminate at a
25 suitable distance from the end of the casing and may be so arranged that it will discharge the covers directly into the channel 34 of the sheave. Thereupon the sheave 33 carries the covers from the track 32^a
30 to the track 32^b on the opposite side and with this arrangement the covers do not roll around the corners but are carried around by the sheaves.

As another modification the covers X may
35 be conveyed around the corners of the drier by the frictional engagement between the sheaves and covers. In this form as indicated in Fig. 7 the grooves 33^a in the sheaves are made deeper so that the cable 14 lies well
40 within the peripheral surface of the sheaves, and the cable does not engage the covers around the corners of the drier.

In some instances it may be desirable to employ sheaves as shown in Fig. 8 having a
45 plurality of peripheral grooves 37 formed in an exteriorly tapered surface 38 around one of which grooves the cable 39 may be trained. By providing several such grooves spaced from each other the cable may extend into whichever groove desired according
50 to the size of the cover X so that covers of different sizes can readily be dried without any great trouble by merely slipping the cable into the proper groove. Furthermore
55 lugs 40 may be attached to the cable at suitably spaced intervals to engage the covers and propel them along the track at a uniform speed. It is to be understood that such lugs may be used in connection with
60 any of the above modifications.

For facilitating the drying action within the casing a heater 35 which may be in the form of an elongate nozzle having a plurality of openings through which fuel such as gas may be discharged for combustion is

arranged horizontally adjacent the bottom thereof and fuel may be conducted to the nozzle from any suitable source through a conduit 36. By arranging the heater 35
adjacent the bottom of the drier and also
70 introducing the can covers X through the opening 12 which is positioned adjacent the bottom the liquid lining material on the covers will first be subjected to the more
75 intense heat and as the covers pass progressively upwardly within the drier and evaporation takes place the covers are conducted away from the source of heat; in other words when the lining material is of
80 greatest fluidity it is brought into contact with the highest temperature and thereafter is conducted progressively into regions of lower temperature so that as a result uniform drying of the material is obtained.

Although we have shown and described
85 such forms of the invention which are the best known to us at the present time it is to be understood that the above is given merely by way of illustration and not of limitation and numerous changes in details
90 of construction, arrangement and selection of materials may be effected without departing from the spirit of the invention especially as defined by the appended claims. Furthermore the ends may be introduced at
95 the top of the drier and caused to move downwardly instead of upwardly if desired.

We claim:

1. An apparatus of the character described comprising an endless flexible conveyor, a
100 track in parallel relationship to said conveyor, and means for driving said conveyor whereby can covers bearing against said conveyor may be rolled along said track.

2. An apparatus of the character described
105 comprising an endless flexible conveyor describing a serpentine path, a track in parallel relationship to said conveyor, and means for driving said conveyor whereby can covers bearing against said track and conveyor may
110 be rolled along said path.

3. An apparatus of the character described comprising an endless flexible conveyor describing an elliptically helical path, a track
115 in the form of channel iron in parallel relationship to said conveyor, and means for driving said conveyor whereby can covers having one edge bearing on said track and another portion resting against said conveyor may be rolled along said path.
120

4. An apparatus of the character described comprising a heat insulating housing, an
125 endless flexible conveyor in said housing, and a track in parallel relationship to said conveyor whereby can covers having an edge bearing on said track and another portion
130 resting against said conveyor may be propelled through said housing, said covers being introduced into one portion of the housing and discharged from another portion.

5. An apparatus of the character described comprising a housing, an endless flexible conveyor in said housing describing an elliptically helical path, a track in parallel relationship to said conveyor, and means for driving said conveyor whereby can covers having one edge bearing on said track and another portion resting against said conveyor may be rolled along said path.
6. An apparatus of the character described comprising horizontally spaced, vertically arranged series of rolls, an endless flexible conveyor alternately passing around a roll of one series and then a roll of another series, and a guide extending parallel to and to one side of the horizontal course of said conveyor whereby the periphery of can covers may be supported on said guide and another portion thereof rest against said conveyor, said covers being propelled in a tortuous path from one series of sheaves to another.
7. An apparatus of the character described comprising horizontally spaced, vertically arranged series of rolls, an endless flexible conveyor alternately passing around a roll of one series and then a roll of another series, a guide extending parallel to and to one side of the horizontal course of said conveyor whereby the periphery of can covers may be supported on said guide and another portion thereof rest against said conveyor, said covers being propelled in a tortuous path from one series of sheaves to another, and a heater arranged in juxtaposition to a portion of said conveyor thereby to create a heated zone through which said covers are propelled.
8. An apparatus of the character described comprising a casing, horizontally spaced, vertically arranged series of rolls in said casing, the rolls of each series being in alignment with each other and the sheaves of one series being staggered with respect to the sheaves of another series, an endless flexible cable alternately passing around a roll of one series and then a roll of another series, a guide extending parallel to and to one side of the horizontal course of said conveyor whereby the periphery of can covers may be supported on said guide and another portion thereof rest against said cable, and when said cable is driven said cable and rolls cooperate to propel the covers through a tortuous path, and a heater in said casing.
9. An apparatus of the character described comprising a casing, horizontally spaced, vertically arranged series of rolls in said casing, the rolls of each series being in alignment with each other and the sheaves of one series being staggered with respect to the sheaves of another series, an endless flexible cable alternately passing around a roll of one series and then a roll of another series, a guide extending parallel to and to one side of the horizontal course of said conveyor whereby the periphery of can covers may be supported on said guide and another portion thereof rest against said cable, and when said cable is driven said cable and rolls cooperate to propel the covers through a tortuous path, and a heater in said casing, said covers being first introduced into the region of said heater.
10. An apparatus of the character described comprising a casing, means for insulating the inside of the casing from the atmosphere, horizontally spaced, vertically arranged series of rolls in said casing, the rolls of each series being in alignment with each other and the sheaves of one series being staggered with respect to the sheaves of another series, an endless flexible cable alternately passing around a roll of one series and then a roll of another series, a guide extending parallel to and to one side of the horizontal course of said conveyor whereby the periphery of can covers may be supported on said guide and another portion thereof rest against said cable, and when said cable is driven said cable and rolls cooperate to propel the covers through a tortuous path, and a heater in said casing, said covers being first introduced into the region of said heater.
11. An apparatus of the character described comprising a casing, horizontally spaced, vertically arranged series of sheaves, a shaft for supporting each of said series, the sheaves of one series being staggered with relation to the sheaves of the other series, an endless cable alternately passing over a sheave of one series and then a sheave of another series, a track extending parallel to and to one side of the horizontal course of said cable, and a heater arranged in said casing adjacent the bottom thereof, said casing having an inlet for can covers adjacent a lower portion thereof thereby first to subject said covers to the more intense heat.
12. An apparatus of the character described comprising a casing, horizontally spaced, vertically arranged series of sheaves, a shaft for supporting each of said series, the sheaves of one series being staggered with relation to the sheaves of the other series, an endless cable alternately passing over a sheave of one series and then a sheave of another series, a track extending parallel to and to one side of the horizontal course of said cable, a heater arranged in said casing adjacent the bottom thereof, said casing having an inlet for can covers adjacent a lower portion thereof thereby first to subject said covers to the more intense heat, and means for driving said cable.
- Signed by us at Cambridge, Mass., this 11th day of February 1925.

BRADLEY DEWEY.
THEODORE T. MILLER.