Feb. 23, 1954 J. R. FURTH 2,670,191

OIL BURNING TOBACCO CURING FURNACE AND HEAT DISTRIBUTOR

Filed Jan. 6, 1950

3 Sheets-Sheet 1

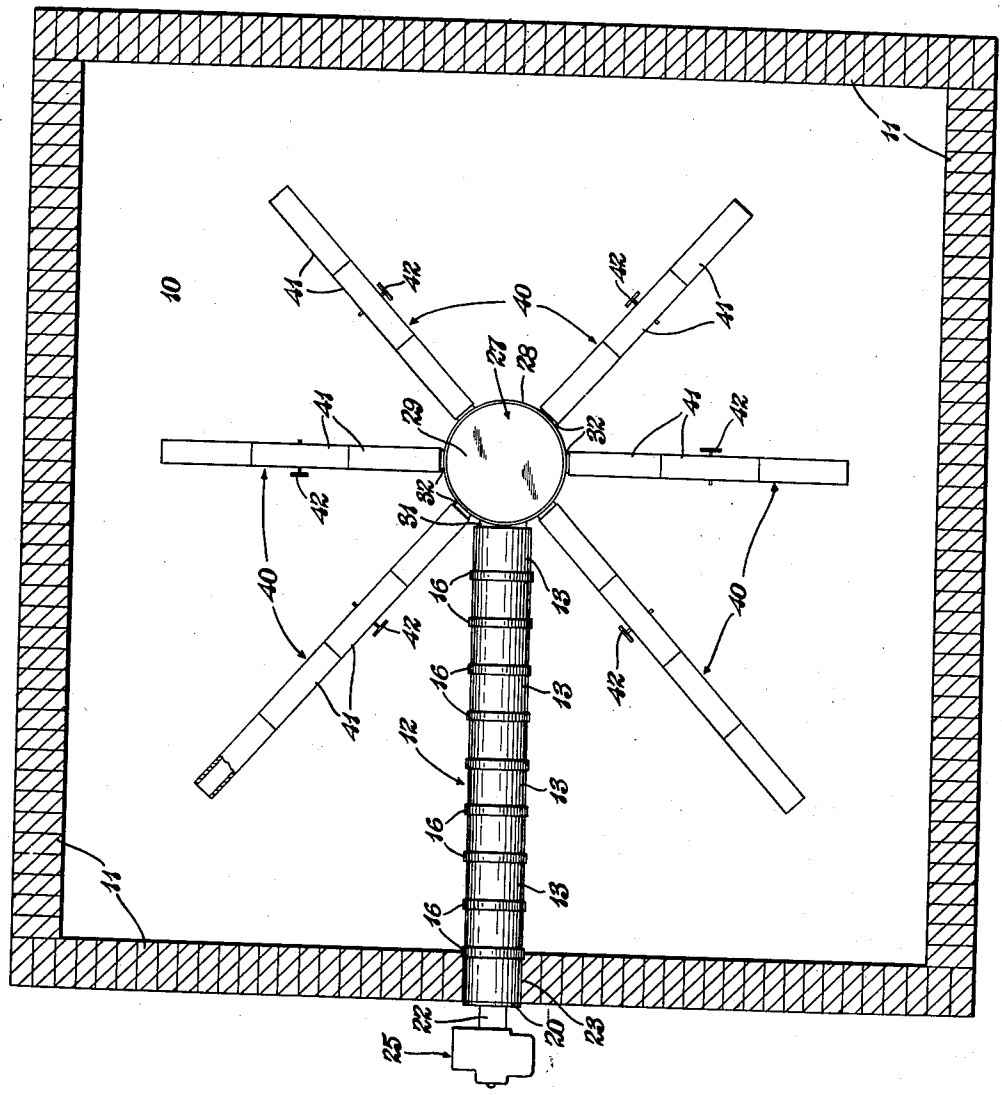


Fig. 1

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3 Sheets-Sheet 2

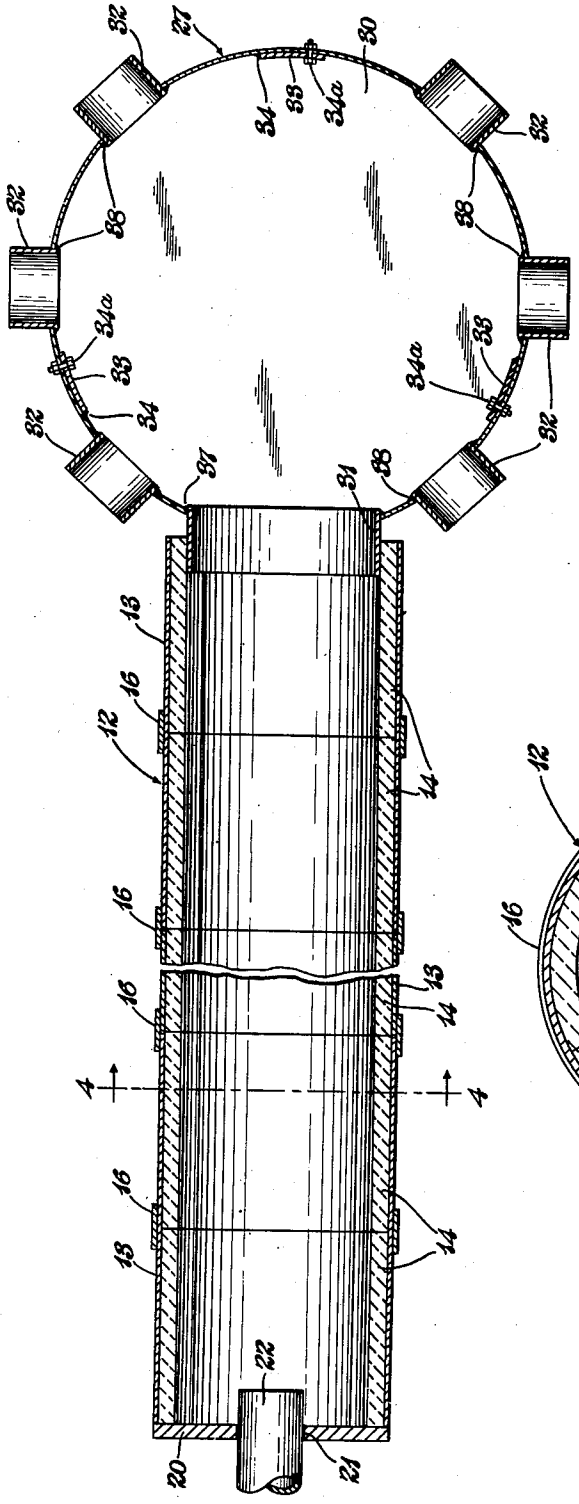


Fig. 3

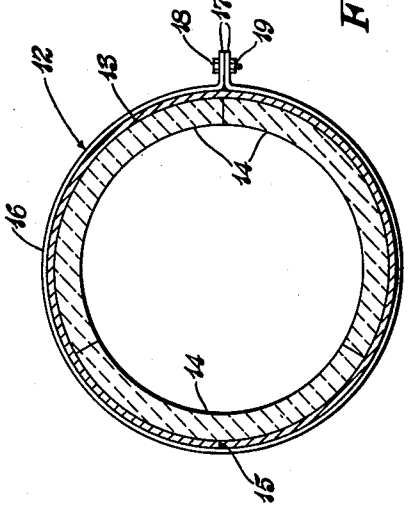


Fig. 4

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3 Sheets-Sheet 3

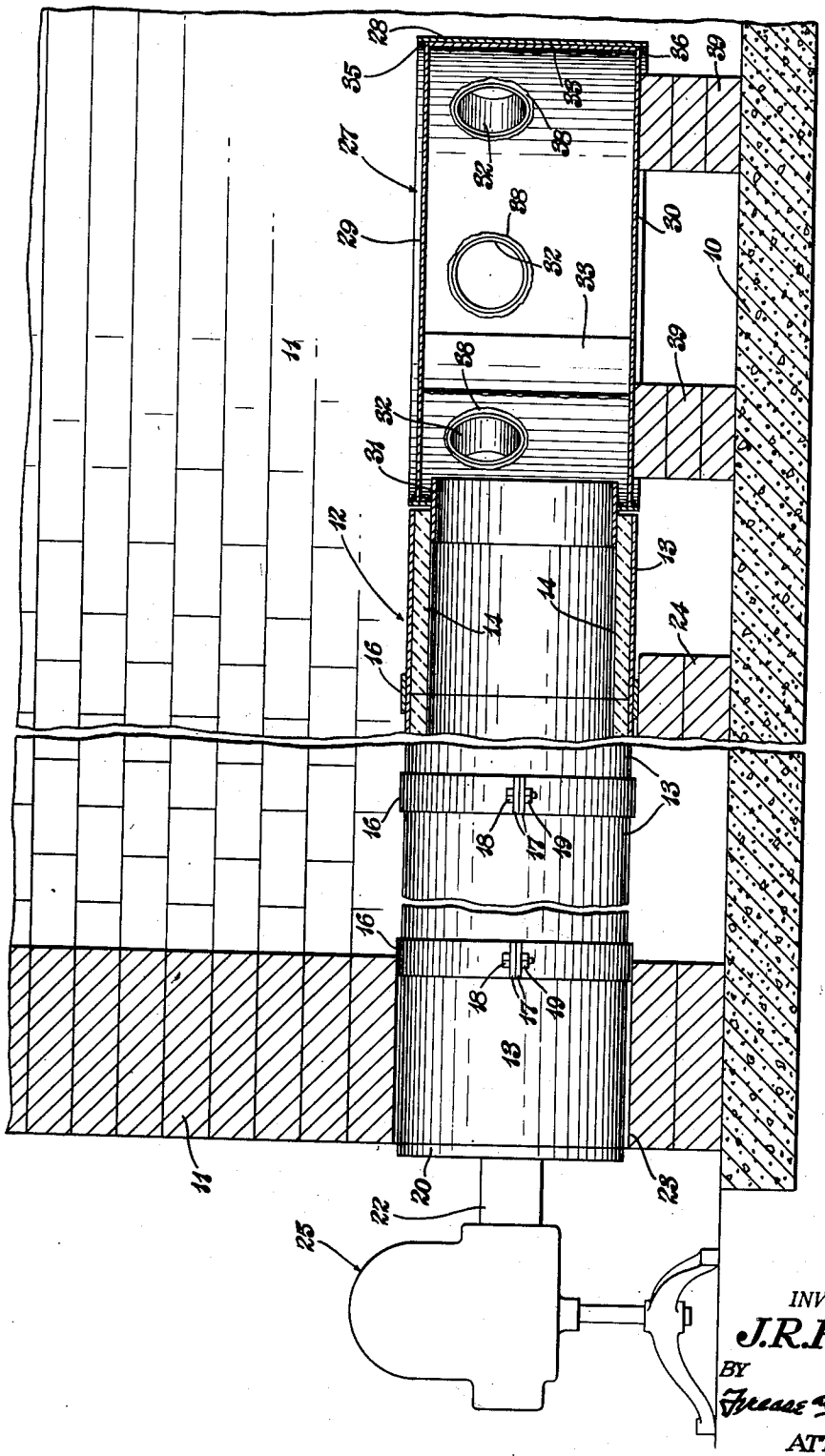


Fig. 2

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UNITED STATES PATENT OFFICE

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OIL BURNING TOBACCO CURING FURNACE AND HEAT DISTRIBUTOR

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1 Claim. (Cl. 263—19)

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The invention relates to the curing of tobacco, and more particularly to a novel type of oil burning tobacco curing furnace and heat distributor, for installation in a tobacco curing barn.

In the curing of tobacco, the leaves are strung upon sticks and hung in a tobacco barn, where they are subjected to heat for the time required to remove the moisture from the tobacco and cure it for use.

These tobacco barns are equipped with heating devices, which usually require ducts or flues in or under the floor of the barn, which flues or ducts are connected to a stack or chimney for carrying off the products of combustion.

Such heating devices as are at present in use are expensive to install and, since there is a considerable heat loss through the stack or chimney, require a considerable amount of fuel oil to properly cure a barn full of tobacco.

It is an object of the present invention to provide an oil burning, tobacco curing furnace and heat distributor, which is inexpensive to install in a tobacco barn and which requires no underground flues or ducts and no chimney or stack for carrying off the products of combustion.

Another object is to provide such a furnace and heat distributor which may be quickly and easily mounted within and removed from a tobacco barn, thus greatly reducing the cost of installation.

A further object of the invention is to provide an oil burning, tobacco curing furnace comprising a refractory lined tube, extending horizontally through the lower portion of the barn and having a conventional, electrically operated gun-type pressure burner extending into the outer end thereof, and a heat distributor connected to the inner end thereof.

A still further object is to provide such a furnace formed of a plurality of lengths of three-piece sections of high heat resisting refractory liners, enclosed within a steel casing.

It is also an object of the invention to provide a heat distributor for connection to the inner end of the tubular furnace and comprising a hollow sheet metal drum, having a plurality of radially disposed pipes connected thereto and extending horizontally across the lower portion of the barn, dampers being provided within said pipes to properly regulate the heat quantity emission from each pipe suitable to the varying requirements under the varied prevailing conditions.

Another object is to provide such a tobacco

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curing furnace and heat distributor which is so constructed that it may be operated more economically than conventional curing devices, using considerably less fuel oil than is required under present practice.

A further object is to provide an oil burning tobacco curing furnace and heat distributor of the character referred to, which is so constructed and operated that all visible volatiles of the fuel are consumed in the furnace, so that only clean heat is passed through the distributor and directed through the sections of stove pipe and thus distributed evenly throughout the entire area of the barn, whereby the tobacco is cured clean and without any oily or greasy odor or feeling such as is prevalent with uncontrolled oil burning curers.

The above and other objects, apparent from the drawings and following description, may be attained, the above described difficulties overcome and the advantages and results obtained by the apparatus, construction, arrangement and combinations, sub-combinations and parts which comprise the present invention, a preferred embodiment of which, illustrative of the best mode in which applicant has contemplated applying the principle, being set forth in detail in the following description and illustrated in the accompanying drawings, in which:

Figure 1 is a plan, sectional view of a tobacco barn, showing the improved oil burning tobacco curing furnace and heat distributor located therein;

Fig. 2 an enlarged, fragmentary, vertical sectional elevation of the lower portion of a tobacco barn, showing the improved tobacco curing furnace and heat distributor located therein, the furnace being shown connected to a conventional, electrically operated gun-type pressure burner;

Fig. 3 an enlarged plan sectional view of the tobacco curing furnace and heat distributor connected therewith, showing an oil burner extended into the outer end of the furnace; and

Fig. 4 a transverse, sectional view through the furnace, taken as on the line 4—4, Fig. 3.

The tobacco barn shown in the drawings may be of any conventional construction, comprising a floor 10 and side walls 11, enclosed under a conventional roof (not shown) as in usual and well known practice. No ducts or flues are located on, or under, the floor, as in usual practice, nor is the conventional chimney or stack required for carrying off the products of combustion.

In other words, it is not necessary that any special construction or apparatus be incorporated in the tobacco barn, other than the bare walls, floor and roof thereof, in order to install the improved oil burning tobacco curing furnace and heat distributor to which the invention pertains.

The furnace is illustrated generally at 12, and is in the form of a long tube of relatively small diameter, made up of a plurality of tubular sections of steel casing, indicated at 13, each enclosing two lengths of three-piece sections of high heat resisting refractory liners 14.

The steel casings 13 may be formed of steel sheets wrapped around the sections of refractory liners, as best shown in Fig. 4, the opposite edges of the sheet meeting, as at 15, and being clamped around the refractory liners by steel clamping bands 16, each having angular flanges 17 at its ends adapted to be drawn together as by a bolt 18 and nut 19, for clamping the bands around the casing. One of these clamping bands is located at each joint of the casings, and also intermediate the ends of each casing at the joints between the refractory sections 14, as best shown in Fig. 3.

The outer end of the furnace 12 is closed by an end plate 20, having a central opening 21 therein to receive the nozzle 22 of the oil burner as will be later described.

One wall 11 of the tobacco barn is provided with a central opening 23, at a point spaced slightly above the floor 10 of the barn, which opening receives the outer end portion of the furnace 12, as shown in Figs. 1 and 2.

The furnace 12 may be supported in horizontal position within the barn, as by piers 24, of brick or the like, as shown in Fig. 2. Upon the outside of the barn is located a conventional electrically operated gun-type pressure burner unit indicated generally at 25 using a solenoid fuel unit and having a special 20 degree nozzle as indicated at 22, located through the central opening 21 of the end plate 20 and extended into the outer end of the furnace 12 as indicated in Figs. 1, 2 and 3. Conventional type, automatically controlled temperature control instruments may be used in connection with this burner unit.

The distributor comprises a drum, indicated generally at 27, which may be formed of heavy sheet metal, located upon a vertical axis as shown in the drawings, and comprising the cylindrical side wall 28, closed at its upper and lower ends by the top and bottom walls 29 and 30.

This drum has a relatively large inlet neck 31, designed to fit snugly within the open, inner end of the furnace 12, as best shown in Figs. 2 and 3, and a plurality of radially disposed, smaller outlet necks 32 are located at spaced intervals around the cylindrical side wall 28 of the drum.

This cylindrical side wall may be formed of one or more sheets or plates the ends thereof being joined by means of a vertically disposed strip 33, welded and bolted or riveted to the side wall plate or plates as indicated at 34 and 34a respectively. The top and bottom plates 29 and 30 may be welded to the upper and lower end portions of the cylindrical side wall, as indicated at 35 and 36 respectively, and the inlet neck 31 and outlet necks 32 may be connected to the vertical side wall as by welding indicated at 37 and 38 respectively, so that a strong, rigid, air-tight drum is thus formed.

The distributor drum may be supported upon the floor of the furnace as by piers 39, of brick or the like, as best shown in Fig. 2. Radially disposed distributor pipes or tubes, indicated generally at 40, are connected to the outlet necks 32 of the distributor drum and are horizontally located throughout the lower portion of the barn, the outer ends thereof being open so as to distribute the heat from the furnace evenly throughout the lower portion of the barn.

These distributor pipes may be formed of conventional stove pipe sections, as indicated at 41 in Fig. 1. Preferably each line of stove pipe is provided with a conventional damper, as indicated at 42, to properly regulate the heat quantity emission from each pipe, suitable to varying requirements under varied prevailing conditions.

The oil burner unit, located on the outside of the barn, is provided with the conventional fan for drawing outside air to the burner for combustion, which fan also acts to force the resulting heat throughout the entire heating and distributing system, eliminating the need of a separate fan for that purpose.

Outside air is drawn to the burner not only for combustion but for de-humidifying inside barn atmosphere and for forcing the heat throughout the entire heating and distributing system, eliminating the need of separate fans for these three important, individual purposes. To applicant's knowledge this is the first time this feature has been employed. Separate de-humidifying fans have been used, the common practice being to take in cold air through openings in the four walls of the barn, near the floor, this cold air absorbing much heat and thus demanding fuel oil consumption in proportion.

In the operation of the improved tobacco curing furnace and heat distributor, when the oil burner unit is operated, the flame passing through the elongated furnace 12 produces a long narrow hot gas travel causing the oil to burn at an efficiency closely approximating 15% CO_2 under normal operating conditions.

Upon arrival of the hot gases in the distributor drum all visible volatiles have been consumed and the clean heat is directed through the pipes 40 and thus distributed evenly throughout the entire barn area.

It has been found in actual practice that this is not only a very economical furnace and distributor to install, because of the very economical first cost, due to the minimum of materials and equipment involved, but is also very economical to operate as it requires considerably less fuel to cure a barn full of tobacco than by conventional practice because of the fact that there is no heat loss through ducts, flues, stacks or the like, all of the clean heat from the burner being admitted to the interior of the barn for curing the tobacco therein.

In view of the elimination of flues and chimney, and reduction in fuel oil requirements, and the superior product produced in actual practice, this curing furnace and heat distributor has proven a considerable saving to the tobacco farmer as compared with the conventional types now in general use.

Tobacco cured in barns equipped with the improved curing furnace and heat distributor, being superior to the same kind of tobacco cured by conventional apparatus, brings a higher price on the market than the same kind of tobacco cured under present practice.

I claim:

A tobacco curing furnace and heat distributor for a tobacco barn, comprising an elongated hori-

zontal imperforate tubular furnace adapted to be mounted upon the floor of the barn with its outer end located through a wall of the barn and its inner end located substantially at the center of the floor, said tubular furnace comprising a tubular steel casing and tubular refractory liners located end to end within said casing, a gun type pressure burner unit with fan located outside of the barn, the burner nozzle extending into the outer end of the furnace, an end plate closing the outer end of the furnace around the nozzle whereby the burner nozzle provides the only air intake for the furnace and heat distributor, a distributor comprising a relatively large diameter hollow drum located upon a vertical axis and communicating with the inner end of the tubular furnace for receiving all of the hot gases from the furnace, and a plurality of horizontal radially disposed relatively small diameter pipes communicating with the drum and receiving all of the hot gases therefrom and terminating in open outer

ends located entirely within the barn, the length, construction and arrangement of the tubular furnace and burner unit being such that all visible volatiles of the fuel are consumed in the furnace.

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References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
106,636	Swindell	Aug. 23, 1870
285,112	Clawson	Sept. 18, 1883
815,093	Keeney	Mar. 13, 1906
1,728,053	Gill	Sept. 10, 1929
2,095,186	Gill	Oct. 5, 1937
2,216,075	Henderson	Sept. 24, 1940
2,342,058	Morris	Feb. 15, 1944
2,505,249	Johnson et al.	Apr. 25, 1950
2,518,021	Keay	Aug. 8, 1950
2,551,215	Lytton	May 1, 1951
2,611,599	MacCracken	Sept. 23, 1952