No. 805,801. PATENTED NOV. 28, 1905.

R. D. KLINE.

CULTIVATION OF MUSHROOMS.

APPLICATION FILED JUNE 7, 1905.

2 SHEETS—SHEET 1.

Fig. 1.

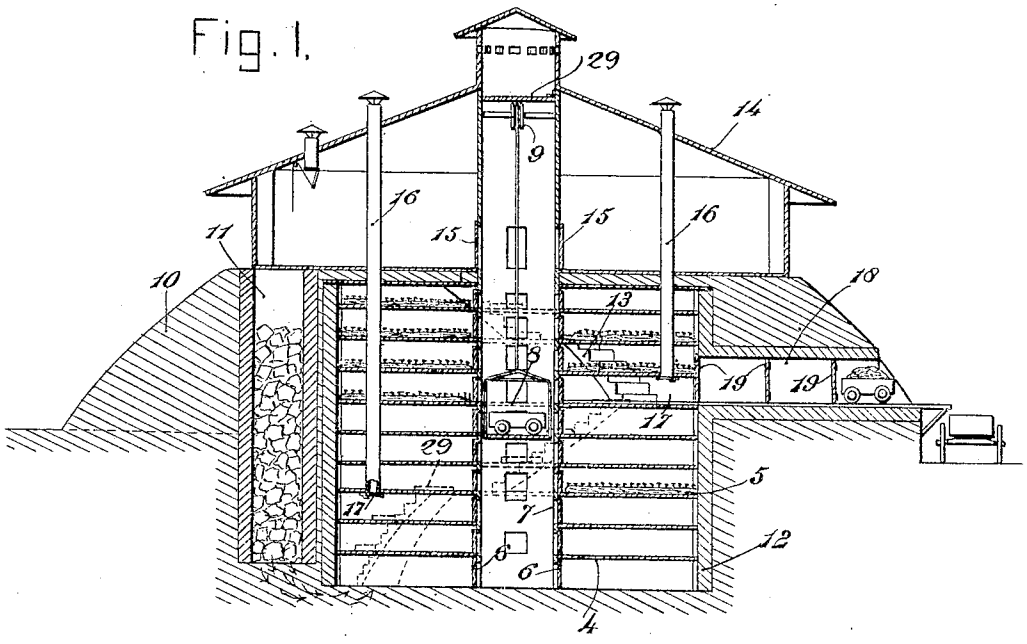



Fig. 2.

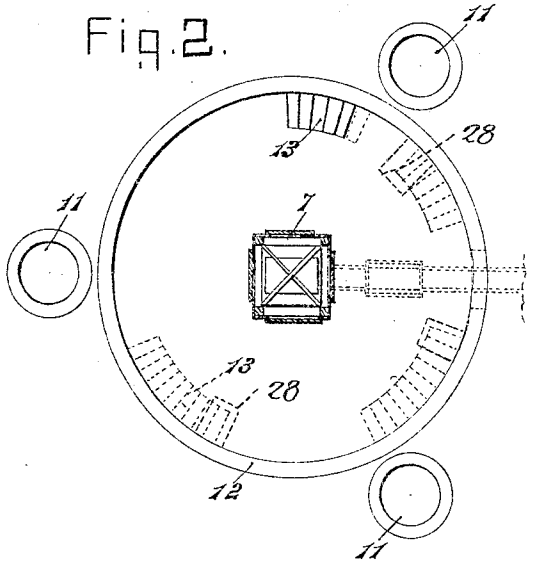
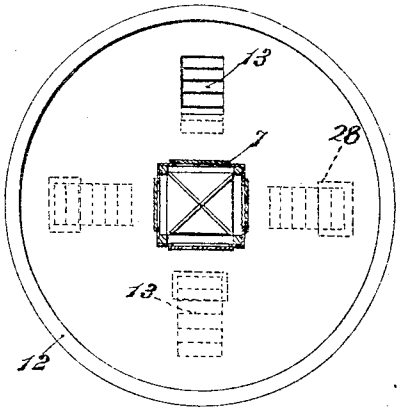



Fig. 3.




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2 SHEETS—SHEET 2.

Fig. 4.

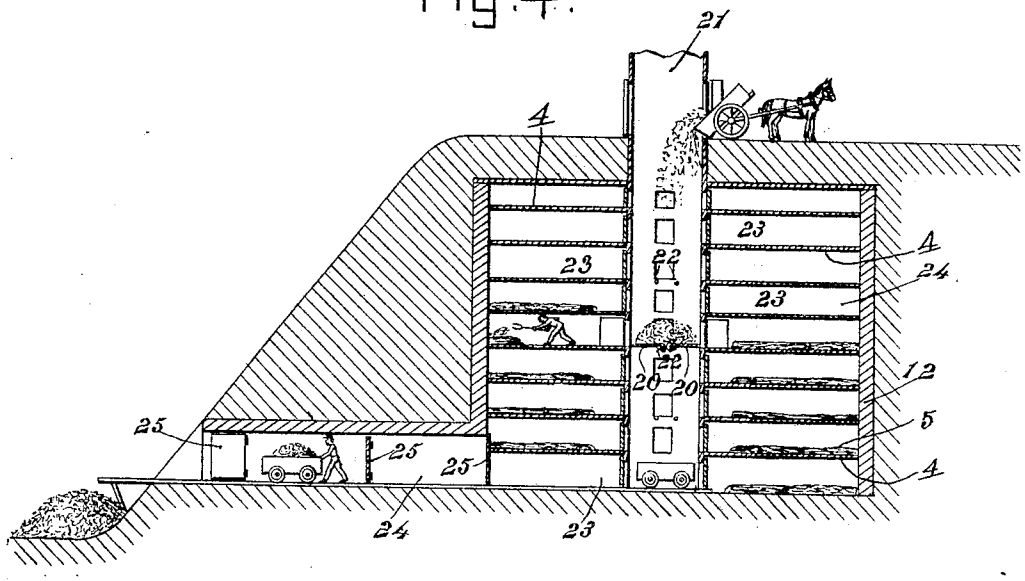
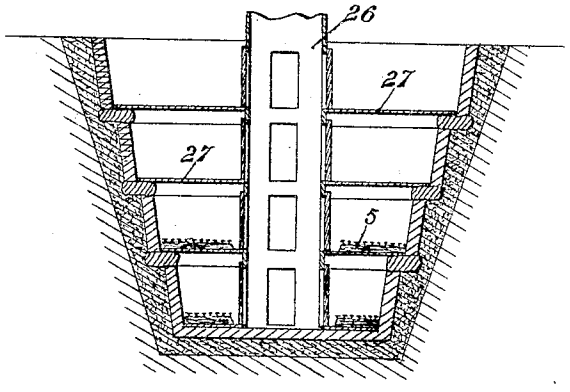



Fig. 5.




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# UNITED STATES PATENT OFFICE.

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## CULTIVATION OF MUSHROOMS.

No. 805,801. Specification of Letters Patent. Patented Nov. 28, 1905.

Application filed June 7, 1905. Serial No. 264,178.

*To all whom it may concern:*

Be it known that I, RUDOLPH D. KLINE, a citizen of the United States, residing at Streator, in the county of Lasalle and State of Illinois, have invented a new and useful Cultivation of Mushrooms, of which the following is a specification.

This invention relates to the cultivation of mushrooms.

One of the salient objects of the invention is to utilize all of a given space for doing effective work in growing mushrooms, whereby to receive the largest possible returns for a minimum cultivated area.

A further object of the invention is to provide a novel means whereby the temperature of the space employed for growing the mushrooms may be regulated at will to keep it at such point as to preclude the germination of the mushroom-maggot, which can thrive at a temperature above 60° Fahrenheit, but which cannot hatch or become active at lower temperatures.

A further object of the invention is to provide a novel means for ventilating the building or place where the growing is going on, thus to insure a proper supply of oxygen to effect the best results.

A further object is to provide for a ready distribution of the manure forming the beds upon which the mushrooms grow, and also to permit its removal when spent, and thus worthless.

With the above and other objects in view, as will appear as the nature of the invention is better understood, the same consists in the novel construction and combination of parts of a mushroom-growing building, as will be hereinafter fully described and claimed.

In the accompanying drawings, forming a part of this specification, and in which like characters of reference indicate corresponding parts, Figure 1 is a view in sectional elevation of a building used for the purposes above stated. Fig. 2 is a view in plan, showing more particularly the arrangement of the ice-wells relatively to the building and also the arrangement of the elevator-shaft. Fig. 3 is a view similar to Fig. 2, showing a slightly-different arrangement of stairs. Fig. 4 is a view in sectional elevation exhibiting a building arranged in the side of a hill and thus entirely under ground. Fig. 5 is a view in vertical section of a slightly-modified form of building.

In the simplest form of the invention it is designed that a cellar beneath an ordinary building shall be utilized for the purpose of growing mushrooms, and to effect this result the cellar proper, which may be of any depth, is deepened by the provision of a subcellar, there being piers arranged at four or more parts in the wall of the subcellar to support the walls of the upper cellar. It is to be understood that any part of the structure that is built beneath the ground for the purpose of forming a room or chamber for mushroom-propagating purposes will be built or formed in a true circle of a single row of bricks and suitably cemented to render the wall waterproof. By employing but a single row of bricks and disposing them in a true circle it will be seen that not only will the cost of the construction of the building be materially lessened, but also the strongest possible structure will be secured, and all available space will be utilized for the purpose of growing mushrooms.

Arranged within the cellar and the subcellar are floors 4, which are shown in Figs. 1, 4, and 5, and these floors may be made of any suitable material, preferably of boards, and spaced apart a sufficient distance to allow a workman to pass into the various chambers thus formed, as shown in Fig. 4. Upon the floors are arranged beds 5, of manure, upon which the mushrooms are planted. Each of the chambers communicates, by means of a door 6, with a centrally-disposed elevator-shaft 7, having a car 8, that is operated by overhead tackle 9 in the usual or any preferred manner, and this car is used for the purpose of removing the mushrooms from the various chambers. As shown in Fig. 1, part of the chambers are beneath the ground and part are above the normal ground-level, but are banked around with earth 10, which is removed in forming the main excavation, so that, in effect, the entire mushroom-growing portion of the structure is beneath the ground. In order to control the temperature of the different chambers to cause them to remain at a point where there will be no danger of the maggots of the mushrooms developing, wells 11 may be built around the cellar of the building 12 and be kept filled with ice or spring-water that is cold. Ordinarily where the cellar is several stories deep under ground it will always be cool enough for the purposes stated, but where built

partly above ground and partly beneath the ground the refrigerating means described may be of value. Arranged around the sides of the walls are stairways 13, which are so disposed that the beds 5 pass under them, thus utilizing practically all the space within the cellar. Instead of having the steps arranged around the walls, as shown in Fig. 2, they may enter from four sides of the cellar, as shown in Fig. 3, and communicate with the shaft 7.

As shown in Fig. 1, the mushroom-growing portion of the building is covered by a superstructure 14, extending to the roof of which is the shaft 7, and by this arrangement not only is the cellar protected from the direct action of the sun's rays, but there is also provision made whereby proper ventilation of the chambers below may be secured. Entrance to the elevator-shaft and thence to the steps is secured by means of doors 15. Extending downward from the roof of the superstructure into the chambers of the mushroom-growing portion of the apparatus are ventilators 16, the lower ends of which are adapted to be closed by doors 17, which may be opened by the operator when air is desired.

To supply the manure to the different chambers, there is, as shown in Fig. 1, a tunnel 18 provided, which leads out beyond the superstructure and is closed by a plurality of doors 19, thus to preclude entrance of atmospheric air, which would tend to interfere with the temperature of the structure. The manure will be hauled through this tunnel in a suitable wagon and be dumped upon the floors, whence it can be distributed by the workmen in the manner shown in Fig. 4. The spent manure may also be removed through the tunnel 18 when necessary.

In the form of the invention shown in Fig. 4 the structure is wholly beneath the ground and is built in the side of a hill. In this form of the invention there is provision made for both supplying manure to the different chambers and for removing that which is spent, the former being effected by the provision of platforms 20, which will temporarily close entrance through the elevator-shaft 21, the platforms being supported by studs or projections 22, arranged on the two opposite sides of the elevator-wall. The shaft will be provided with doors 23, through which access to the different chambers 24 may be had either for the purpose of supplying fresh manure or for removing that which is spent. When the manure is to be removed, it is thrown down the shaft and into a wagon or receptacle, whence it is wheeled out through a tunnel 24, arranged at the base of the structure and closed by a plurality of doors 25, which will positively prevent any introduction of the outside air, which might result in either raising or lowering the temperature of the building to an objectionable extent.

In the form of the invention shown in Fig. 5 the chambers gradually decrease in size from the upper to the lower end of the cellar, and this form of the invention is exhibited to show another of the many different ways in which the invention can be carried into effect. In this view the elevator-shaft 26 is shown and also the floors 27; but the steps are omitted, as they may be arranged either as shown in Fig. 1 or Fig. 3. In each form of the invention, however, the circular construction of the cellar is maintained, and also the building of the walls thereof of single thickness of brick.

In each of the structures shown, either where arranged wholly below the ground or partly below and partly above the ground, the same underlying feature is present— namely, that all available space is utilized for doing effective work, and by thus conserving space and cultivating every part of it the output will be exceedingly large and lucrative. Furthermore, by having the beds in constricted spaces, as described, they can be attended by one operator more readily and more effectively than if spread over a considerable area.

The cellars or chambers can be lighted by incandescent electric lights or any other suitable means. (Not necessary to be shown.)

Instead of employing the wells for containing ice or cold water coils of pipe communicating with a suitable refrigerating apparatus may be employed for this purpose.

By the provision of the trap-doors 28 in the floors at head of the stairways, together with the main shaft, a strong ventilating system is provided, which will be utilized to its full capacity when the beds are actively heating, but when the heat is practically spent, and it becomes necessary to conserve it, these doors can gradually be closed until the ventilating system is doing the entire work. Each floor is capable of isolation, this being necessary from the fact that the beds in the whole house are not made at one time, so that it will be unnecessary to have the main shaft and doors therein wide open in all the chambers at the same time. In other words, each chamber will be capable of isolation or of working with all the rest as a unit, according to the necessity of the case.

In some instances the main shaft may be provided with a trap-door or damper 29 at its top, this to be closed in extremely cold weather.

Having thus described the invention, what is claimed is—

1. A structure of the class described comprising a circular inclosure surrounded by earth and having tiers of chambers arranged therein, a shaft communicating with the

chambers, a lateral tunnel communicating with the interior of the structure, and a plurality of doors for closing the tunnel.

2. A structure of the class described comprising an inclosure surrounded by earth and having tiers of chambers arranged therein, a shaft communicating with the chambers, a lateral tunnel communicating with the interior of the structure, means for ventilating the chambers, and a plurality of doors for closing the tunnel.

3. A structure of the class described comprising a circular inclosure surrounded by earth and having tiers of chambers arranged therein, stairways arranged around the inner wall of the structure and communicating with the chambers, a shaft, doors for controlling communication between the shaft and the chambers, a lateral tunnel communicating with the interior of the structure, and means for ventilating the chambers.

4. A structure of the class described comprising an inclosure having tiers of chambers therein, a shaft communicating with the chambers, doors for controlling communication with the chambers, and hinged platforms arranged within the shaft opposite the chambers.

5. A structure of the class described comprising an inclosure surrounded by earth and having tiers of chambers arranged therein, a shaft communicating with the chambers, a lateral tunnel communicating with the interior of the structure, and a plurality of doors for closing the tunnel.

6. A structure of the class described comprising a sunken inclosure, tiers of chambers arranged therein, a shaft communicating with the chambers, and wells or depressions disposed exteriorly of the inclosure and adapted to receive a refrigerant.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

RUDOLPH D. KLINE.

Witnesses:

BLANCHE PATTERSON,

JOHN H. SHAY.