

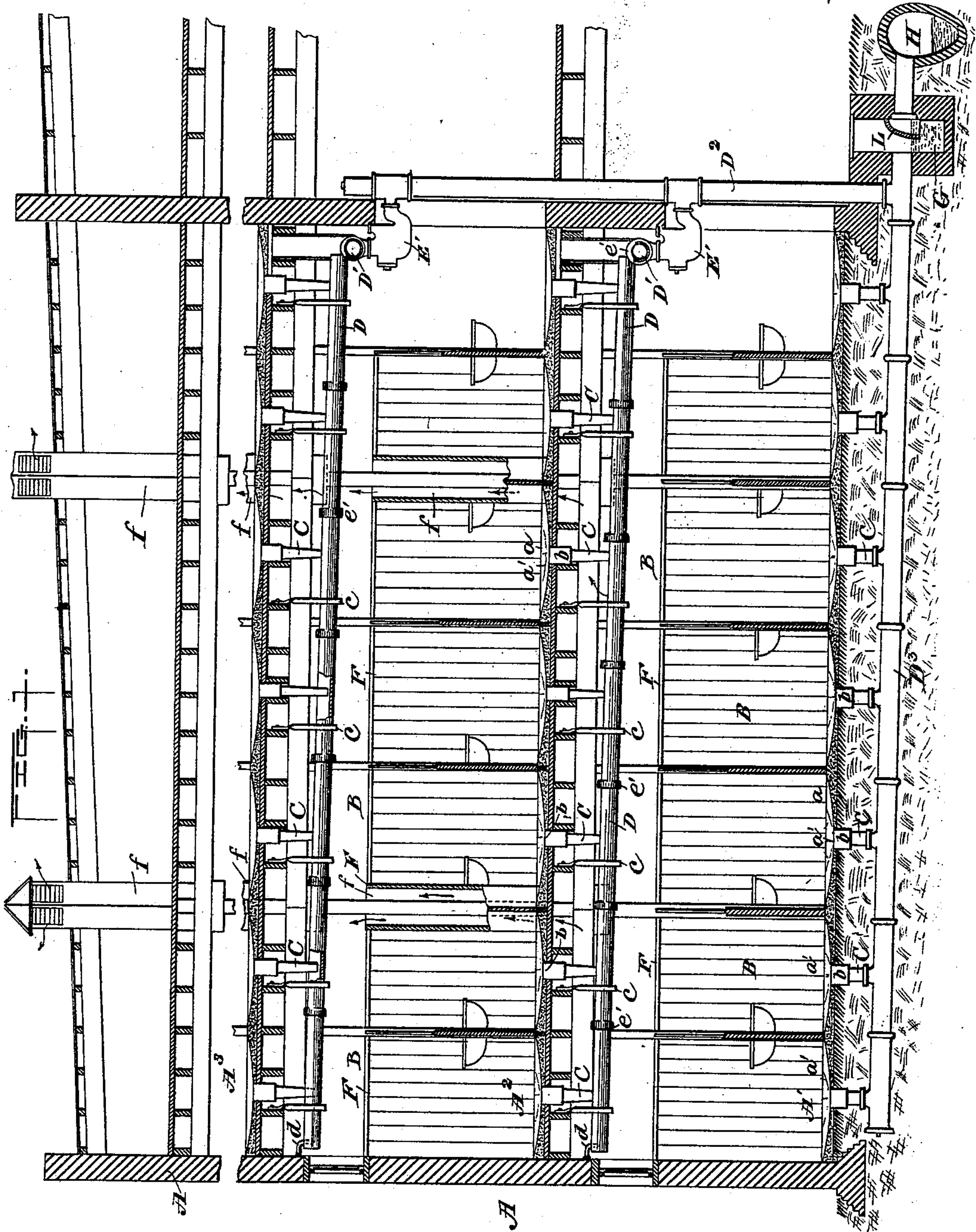
(No Model.)

3 Sheets—Sheet 1.

W. F. DOWNEY.
DRAINAGE SYSTEM FOR STABLES.

No. 541,600.

Patented June 25, 1895.



Witnesses

L. A. Comer Jr.
Jas. V. Brown

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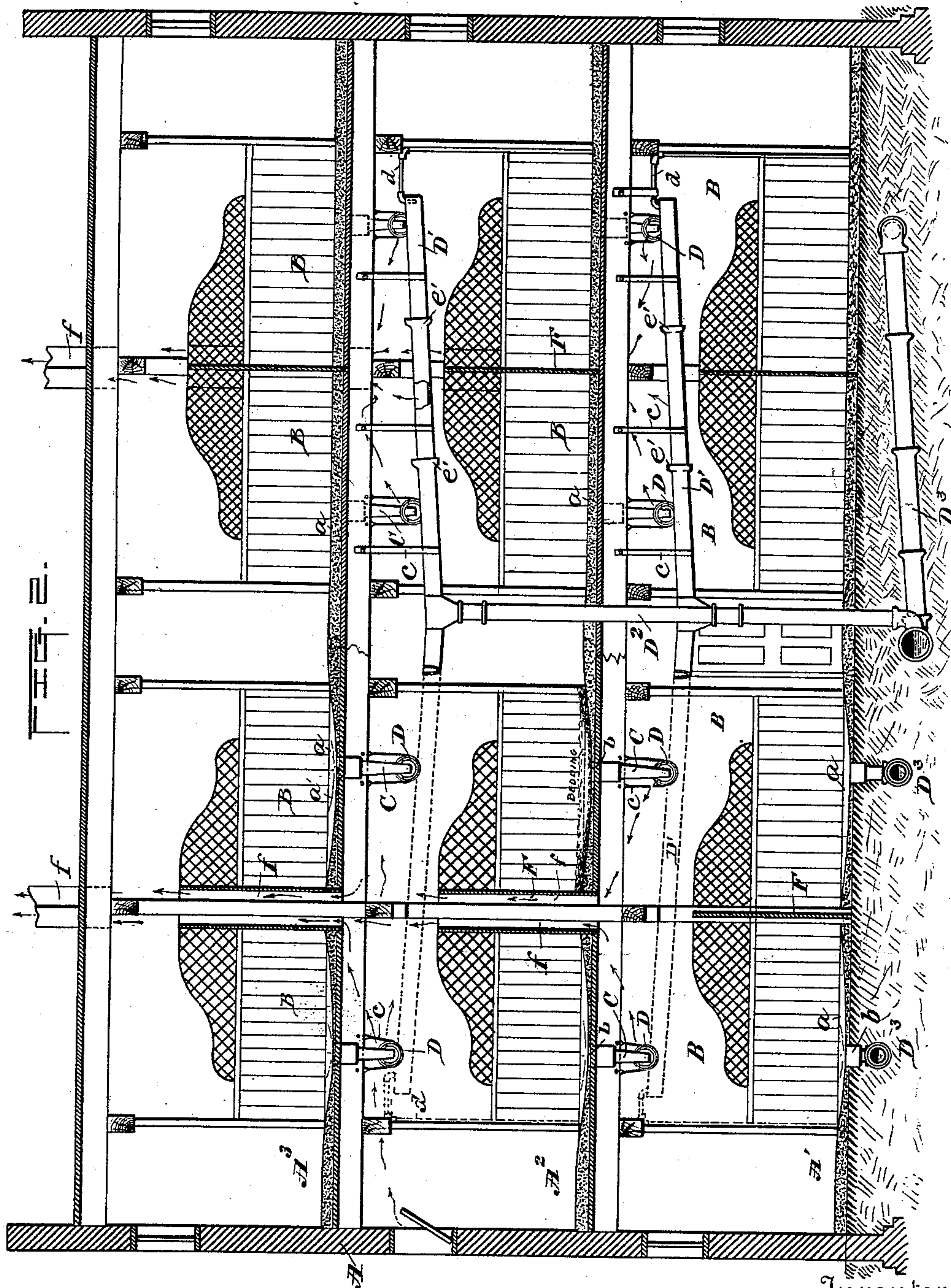
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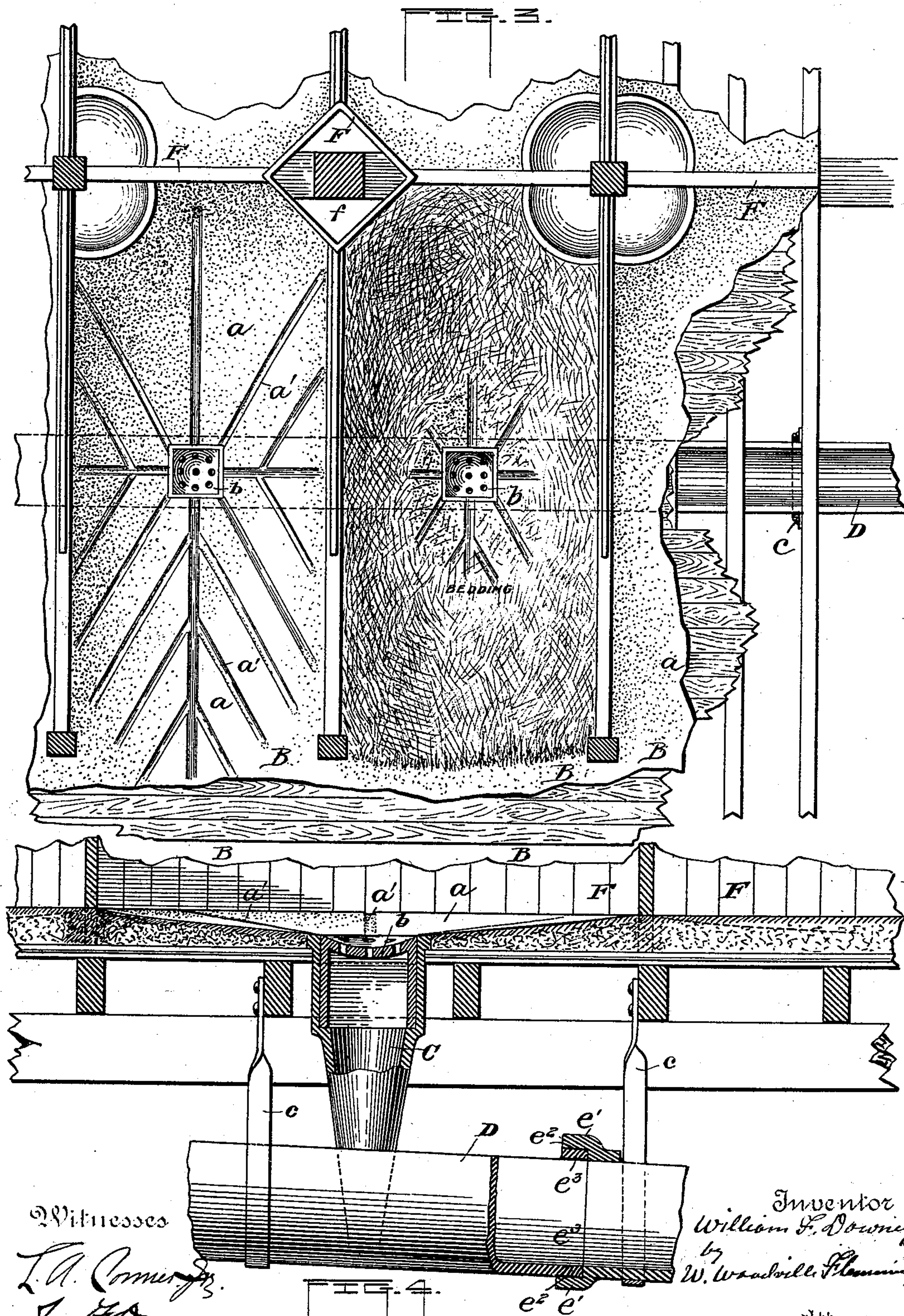
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UNITED STATES PATENT OFFICE.

WILLIAM F. DOWNEY, OF WASHINGTON, DISTRICT OF COLUMBIA.

DRAINAGE SYSTEM FOR STABLES.

SPECIFICATION forming part of Letters Patent No. 541,600, dated June 25, 1895.

Application filed April 30, 1894 Serial No. 509,493. (No model.)

To all whom it may concern:

Let it known that I, WILLIAM F. DOWNEY, a citizen of the United States, residing at Washington city, in the District of Columbia, have invented certain new and useful Improvements in the Drainage of Stables; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in the drainage of stables and like structures, wherein live stock is housed, and is especially applicable to the care of horses.

The providing of a cheap, durable and effective means whereby the air, floor, stalls and bedding of stables may be kept clean and free from noxious smells, and accumulation of filth is the object I have in view.

The effect of ammoniacal gases upon the eyes of horses, and the foul air which prevails where there is defective provision for the removal of such gases is well known to all familiar with the care of live stock.

A further requisite of a system of drainage of stables and like structures is that all portions of such system shall be easily accessible at all times, and shall not be liable to clogging, and thereby form a source of annoyance and breeder of disease.

It is becoming common to place horses upon several floors of a building and the means of properly draining the stalls is a matter of much consequence. It is further necessary that a means of ventilation of the same shall be an adjunct thereto, for without a means of removing the resultant gases and fumes, any system of drainage would be fatally defective. This I have provided for in a simple and effective manner, by which fresh air is supplied without creating a draft, and the gases and fumes are conveyed to the outer air by suitable escape flues.

In the care of live stock on a large scale the item of the cost of bedding forms no small consideration, and the preservation of the same from unnecessary waste, and contamination, is very essential. By the use of my

invention I have been enabled to reduce the amount of wet bedding which it is necessary to remove to a very small quantity, and thereby much of the waste, heretofore necessary, is prevented. The effect of the soiled and wet bedding upon the hoofs of horses and other live stock is also well known to those having the care of such stock.

The saturation of the flooring is prevented by coating the floor with any suitable material, such as granolithic, Portland cement, which is not porous, and which will not take in moisture, or retain or create noxious gases and odors.

With these ends in view my invention consists in certain novel features of construction and combination of parts, which will be particularly hereinafter described and pointed out in the claims.

In the accompanying sheets of drawings I have illustrated my invention as applied to a form of structure which I have found to be advantageous for carrying out my invention, but the form and arrangement may be changed to suit the exigencies of the case.

Figure 1 is a longitudinal vertical sectional view through a stable or similar structure constructed in accordance with my invention. Fig. 2 is a transverse vertical sectional view of the same. Fig. 3 is a plan view of two of the stalls. Fig. 4 is a detail view on an enlarged scale.

Like letters of reference indicate like parts wherever they occur.

The structure, A, may be of any suitable material, of any convenient form, and the arrangement of the several floors may be varied, and as many stories may be used as is necessary.

The several floors, A², A³, may be reached in any suitable way, e. g., by elevator, or inclined way as may be desired.

The ground floor, A', is similar in construction to all the others, except so far as is necessary to modify the form of drain to adapt it to underground use. The floors, A', A², A³, may be of any suitable material, but I have found a floor having the exposed surface formed of granolithic or like material is desirable, such a surface being impervious to moisture, and not liable to deterioration from exposure to the action of the urine discharged thereon or

of water used for cleaning, or from the offal. A very desirable and fire proof floor is thus produced and leakage of any liquid from one floor to the floor below is prevented.

5 The stalls, B, are provided with the usual feed troughs, &c. The floor, *a*, of each stall is formed so as to fit the contour of the body of the animal which is placed therein when such animal is lying down and in order to accomplish this result the floor is slightly concaved or sloped downwardly from the sides and both ends toward a point at or near the center. The floor is thus made highest at those portions on which the hoofs of the animal rest when standing and any liquid falling on such floor will therefore be drained away from the animal's hoofs toward the lower central portion of the stall. To facilitate this draining of liquid from the hoofs I form a series of channels or grooves, *a'*, in the sloping or concaved portions of the floor.

Beneath the floor, preferably adjacent thereto, and suspended by suitable hangers are a series of drain troughs, D, which I construct of any suitable material. The troughs, D, are inclined sufficiently to give a fall to the liquid matter discharged therein which may be readily carried to the main outlet, through the system of troughs as will now appear.

30 A trap, *b*, of comparatively small diameter is located at the lowest point in the floor of each stall and covers the upper end of a discharge pipe, C, which empties directly into one of the troughs, D. The perforations in the cover or trap, *b*, are of such size as to prevent any but liquid matter from passing into the pipe, C, which pipes are preferably of the form shown.

40 The troughs, D, of which I prefer to arrange one below each line or series of stalls empty into troughs, D', of similar form but preferably extending at substantially right angles to the length of the troughs, D. In the drawings I have shown but two troughs, D', on each story of the building but do not wish to be understood as intending to limit myself to that number. The troughs, D', conduct the discharge of the troughs, D, to a proper place where the same may be discharged, through a common conduit or pipe to a settling pool to be hereinafter referred to.

As shown in the drawings the troughs, D, are arranged in parallel lines and the lowest points of such troughs are represented as being about the middle of the structure but it is obvious that this may be changed to suit the particular building in which the system is placed. The troughs, D', communicate at their lower ends with a common discharge pipe, D², which is connected at its lowest end with a suitable drain below the lower floor of the structure, A or into suitable receptacles. A trap, E', having the proper cleaning openings and gas seal is arranged at the communication between such discharge pipe, D², and the drain.

I prefer to make all of the troughs, D, D',

open at their top so that they are readily accessible at all times for the purpose of cleaning.

70 The partitions, F, of the stalls preferably extend only a portion of the distance between the two floors so that a free air space is provided above all of the stalls on a floor and below the ceiling of that floor. Within these partitions, F, of the stalls, B, at suitable distances apart, are formed flues or passages, *f*, which preferably extend only to the top of said partitions, and open into the free air space, just referred to, which is above the heads of the horses or other live stock in the stalls. The arrangement of the flues, *f*, in the different stories, they being in vertical alignment as shown in the drawings, and their being of the length stated connects the free air spaces of the floors and the air space in the upper story with the external air, in such a manner that the resultant fumes and gases which form in the troughs, D, D', are sucked upward through the top of the building and never form around the heads of the animals, thereby preventing their inhalation, and the resultant damage to the health and eyesight of the animals. The troughs, D, being open near the floor by which they are supported, permit the immediate ascent of the gases through the flues, *f*.

By placing the discharge opening centrally of the stall, and sloping the sides and ends toward this discharge opening, the moment there is a discharge of liquid it immediately finds its way to the opening and is drained away from the hoofs of the animal occupying the stall so that they cannot prevent the free and complete exit. The importance of this cannot be overestimated for upon this the healthy condition of the hoofs of the animal depend, as well as the keeping the stall clean and free from becoming permeated with a mass of disease breeding material detrimental to the animal, and increasing the cost of maintenance. I remedy such defects by the arrangement I have described and this is further aided by making the bed as shown in Fig. 3.

115 By distributing the bedding very thin at a point over the trap, *b*, and banking it on the higher portions of the floor, toward the sides and ends of the stall I have found that the animal in the stall rests more comfortably, and the bedding does not offer the resistance to the discharge of liquid matter it would if made thicker at the central point. As all the liquid immediately upon its discharge is drained off through the trap, *b*, the dry offal is easily removed, almost unaccompanied by straw from the bedding, and thereby the manure so obtained is much less bulky, and is more easily cared for and preserved, and the bedding may be used longer for all of the straw is useful no matter how short it may be.

The drain troughs are flushed through suitable pipes, *d*, whenever desired so that all the ammonia contained therein is diluted so that

very little ammoniacal gas accumulates, and such as does so accumulate is carried to the external air through the vertical flues, *f*, in the manner already described.

5 The arrangement of the drain *D*³ on the ground floor is composed of any suitable drain tile, or if it were desired a wooden drain, properly coated to preserve the same might be used. The discharge pipe and pipes connect-
10 ing therewith are of the same general construction as is used in connection with the other floors. The discharge pipes of the several stalls being comparatively short distances apart, and all solid matter being prevented
15 from entering the trough or drain, it is impossible for the same to become stopped up, and the arrangement of discharge pipes makes it very easy to clean any portion of the trough by simply inserting a hose when the cap of
20 the trap, *b*, has been removed. The troughs are further provided with flushing pipes, *d*, so arranged that each trough may have a constant or intermittent flow of water as may be desired.

25 The drain pipe enters a receiving pocket or settling basin which is provided with a man-hole, and said pocket or basin permits the heavy particles to settle to the bottom, and a seal is formed by the partition, *L*, which depends below the level of the liquid. From the
30 receiving pocket or settling basin, *G*, the drain pipe leads to the sewer, *H*.

The hangers, *c*, for the drain troughs and the troughs themselves may be made of any
35 suitable form, which is found convenient to use, though those shown are easily and conveniently made and put up.

As shown in the drawings the troughs employed in my improved system are preferably
40 made in sections, each of which is provided at one end with an annular collar, *e*¹, having an annular seat formed therein, and each section has at its other end, *e*², an arch shaped covering, *e*³, extending over its upper open side.

45 In placing the sections of the trough together the end, *e*², of each section is fitted within the collar, *e*¹, of an adjacent section, and seated firmly against the seat therein. The joints between the sections can then be
50 calked or made tight by any suitable and desirable means.

The arrangement of windows which I have shown, permits the ingress of pure air which is directed upwardly, and thereby drives off
55 the gases and odors while supplying fresh air. Such arrangement also prevents any draft reaching the horses or other live stock in the stalls.

Although I have shown a particular form
60 of construction which I have found advantageous to use, I do not desire to limit myself to the exact construction and arrangement shown, as these may be varied in many ways without departing from the spirit and scope
65 of my invention.

The operation from the foregoing descrip-

tion will be obvious and its advantages apparent to those who are familiar with the needs and dangers surrounding the care of live stock, particularly fine horses.

70 Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a drainage system for stables, the combination of a stall floor which is coated with
75 a suitable liquid-proof material upon which the animal stands or lies down and is concaved or sloped downwardly and inwardly from its sides and ends toward the center to form a surface conforming substantially to
80 the contour of the body of the animal when lying down in the stall, and forming a bank for the bedding, a trap arranged at the lowest point in the stall floor, and connections between said trap and a sewer, substantially
85 as shown and described, for the purpose specified.

2. In a drainage system for stables, the combination of a stall floor upon which the animal stands or lies down which is sloped or
90 concaved downwardly and inwardly from its sides and ends and has a series of channels or grooves formed in its inclined surfaces, a trap arranged at the lowest point in the stall floor, said grooves converging at said
95 trap, and connections between the trap and a sewer, substantially as shown and described.

3. In a drainage system for stables, the combination of a series of stalls arranged on different floors of a building and each having a
100 trap opening through its floor, a series of conduits, open at the top, supported below the ceiling of each story and connected with the traps in the stalls on the floor above, air shafts formed between the stalls in each story of the
105 building and opening through the floor of such story, and a discharge pipe connected with a sewer and with the stall conduits, substantially as shown and described, for the purpose specified.

4. In a drainage system for stables, the combination of a series of stalls arranged on different floors and separated by partitions of less height than the story in which they are placed but extending above the animal's head,
115 a conduit, open upon its upperside, supported from the air space, receiving the drainage of the stalls on the next floor above, said stalls being provided with traps communicating therewith, air passages, formed by the parti-
120 tions, communicating with the air space in each story, and finally with the external air and a discharge connected with the conduits beneath the series of stalls and a sewer, substantially as shown and described.

125 In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM F. DOWNEY.

Witnesses:

GEO. P. NEWTON,
JAS. F. DENSON.