(No Model.) 2 Sheets—Sheet 1.

G. A. DAVIS.

MACHINE FOR DRYING MATRICES.

No. 492,147. Patented Feb. 21, 1893.

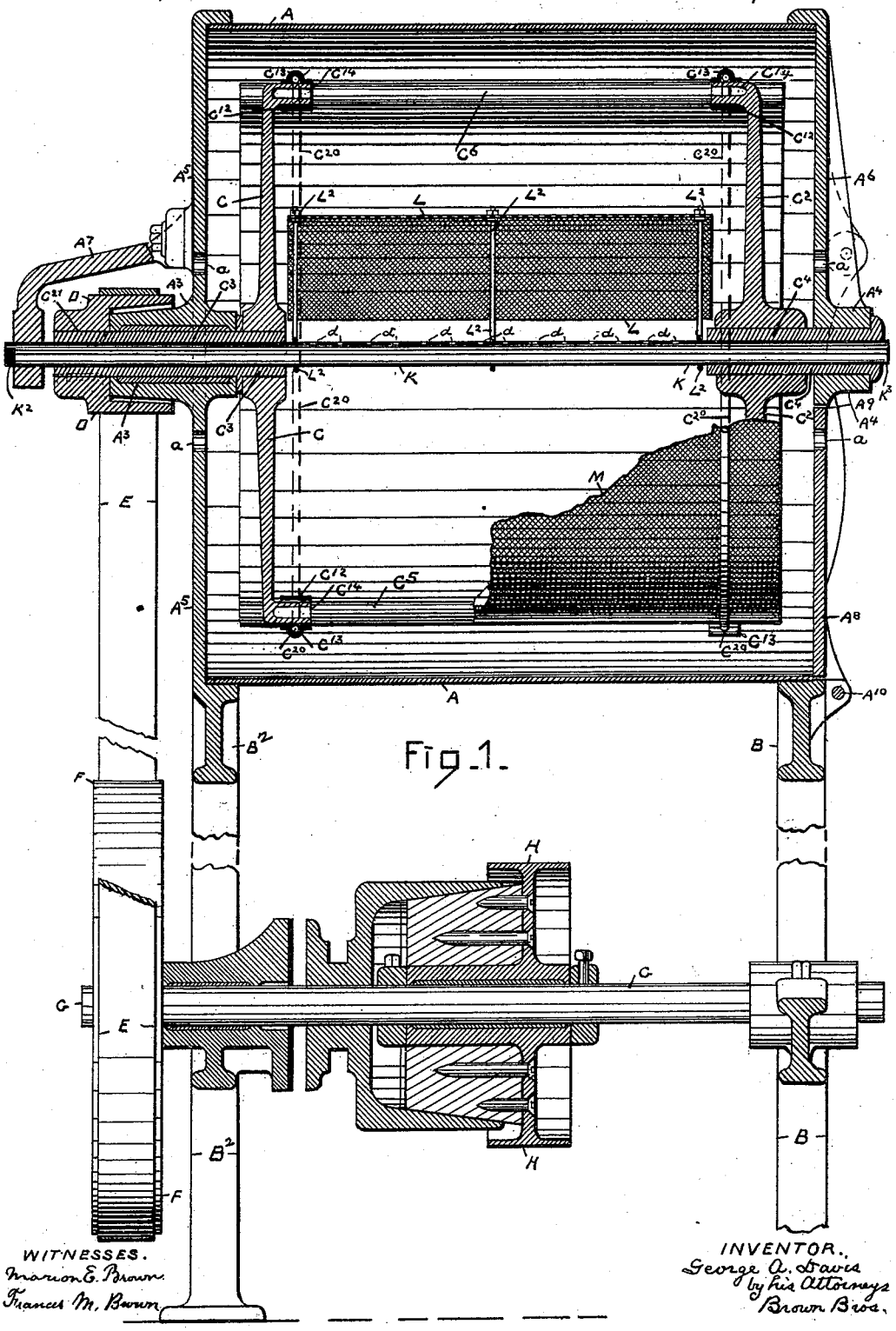

Fig. 1.

WITNESSES.
Marion E. Brown
Frances M. Brown

INVENTOR.
George A. Davis
by his Attorneys
Brown Bros.

(No Model.) 2 Sheets—Sheet 2.

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Fig. 4.

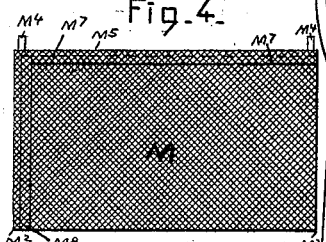
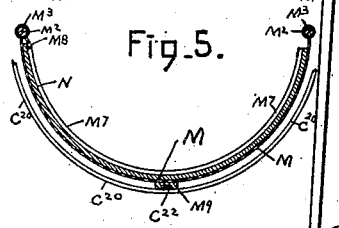


Fig. 5.



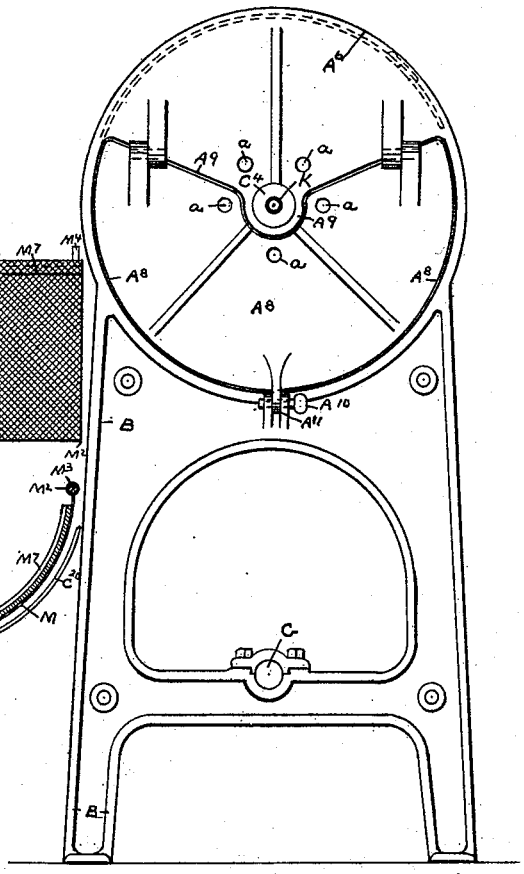


Fig. 2.

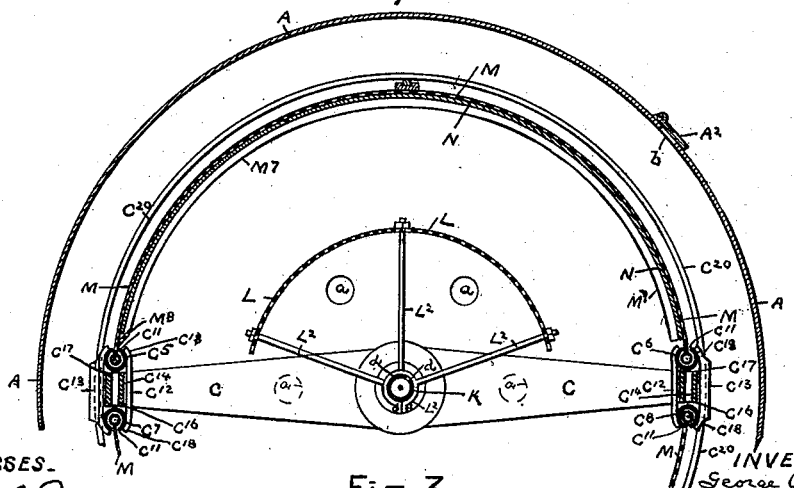


Fig. 3.

WITNESSES.
Marion E. Brown
Frances M. Brown.

INVENTOR.
George A. Davis
by his Attorneys
Brown Bros.

UNITED STATES PATENT OFFICE.

GEORGE A. DAVIS, OF WALTHAM, ASSIGNOR TO HIMSELF, CHARLES H. TAYLOR AND GEORGE W. WILLIAMS, OF BOSTON, AND WILLIS B. CHASE, OF SOMERVILLE, MASSACHUSETTS.

MACHINE FOR DRYING MATRICES.

SPECIFICATION forming part of Letters Patent No. 492,147, dated February 21, 1893.

Application filed November 1, 1890. Serial No. 370,053. (No model.)

To all whom it may concern:

Be it known that I, GEORGE A. DAVIS, a citizen of the United States, and a resident of the city of Waltham, in the county of Middlesex and State of Massachusetts, have invented an Improved Machine for Drying Matrices, of which the following is a full, clear, and exact description.

The machine of this invention, in substance, is composed of a closed and stationary shell or casing adapted for admission and escape of air, a whirl located and journaled and rotating within said shell, means to rotate said whirl, a stationary pipe axially coincident with and lengthwise of, and having lateral openings within said whirl, a reticulated arc-shaped basket adapted to be held on and means to hold said basket on and to allow it to be removed from said whirl, a reticulated fender within said shell and held on and between said perforated pipe and basket, all and separately as hereinafter particularly described and pointed out in the claims.

In the drawings, forming part of this specification, Figure 1 is a longitudinal central vertical section of the machine. Fig. 2 is an end view of Fig. 1 on a reduced scale. Fig. 3 is a transverse vertical section in detail of the whirl and other parts as will hereinafter appear. Figs. 4 and 5 are respectively a plan and a vertical section, line 5—5, Fig. 4 of the screen-basket.

In the drawings, A represents a stationary and horizontal cylindrical shell or casing, closed at all parts, and at its opposite ends supported on parallel vertical supports B, B. This shell A at its opposite ends has air ports *a* for the entrance of air to it and along its length it has a side longitudinal opening or slot *b* for air, steam, &c., to escape from it, and this slot has a hinged cover A^2 to open and close it.

C C are two arms of similar shape and length. Each arm C, midway of its length has a tubular journal C^3, C^4, and the arms at their outer end-portions are joined by two pairs of tubes C^5, C^6, and C^7, C^8 respectively. These tubes are severally axially at corresponding distances from and parallel with the axial line of the journals C^3, C^4 of the arms and with said arms they make the whirl or whirling frame of the machine.

C^{11} is a slot or way lengthwise of and at the side of and entering the tube of each pair of tubes C^5, C^6 and C^7, C^8 which is the farther removed from the other tube of the same pair. The several tubes are open at one and the corresponding end.

C^{12}, C^{13}, Figs. 1 and 2, are clamps one for each pair of tubes C^5, C^6 and C^7, C^8. The parts of each clamp are on opposite sides of and suitably secured to a stud C^{14} which is held onto and projected at a right angle from the inner side of the outer end-portion of each arm C. Both parts of each clamp project, as at C^{18}, beyond the opposite edges C^{16}, C^{17} of each stud C^{14} and those projecting portions overlap and clamp the tubes, to which they belong, to said studs and thereby to the arms C.

C^{20} is a rod encircling the whirling frame and secured to the outer part C^{13} of each clamp, C^{12}, C^{13}. The whirling-frame, by its journals C^3, C^4, is hung in bearings A^3, A^4 of the opposite heads or ends A^5, A^6 of the shell and all so that said frame is free to be rotated or whirled around within the casing A and preferably about the axis of the shell, Fig. 1. The journal C^3 of the whirl has a projection C^{21} beyond the head A^5 of the shell and on this projection is fixed a pulley-wheel D.

E is a vertical belt belting the pulley D to a larger pulley F held on one end of a horizontal shaft G turning in suitable bearings of the lower portion of the end-uprights B, B and having a loose vertical pulley H. The loose pulley H and shaft G are suitably adapted, as well known, for the pulley to be clutched to and unclutched from the shaft so that by means of a belt, not shown, belting the pulley to a suitable driving shaft, the whirl within the shell A and through the connections described can be put into and out of rotation as may be desired.

K is a pipe extending lengthwise through and projecting at each end from the tubular journals of the whirl. This pipe, at one end K^2, is closed and it is there made fast to a bracket or arm-support A^7 held on the head A^5 of the stationary shell A and at its opposite end K^3 projects from the head A^6 of

shell A and is open and there it is in any suitable manner to be connected with a gas-supply. The gas-pipe K within and between the end arms C, C^2 of the whirl and on its upper side has two longitudinal rows of perforations or jet-holes *d* at which in the operation of the machine of this invention and as hereinafter described the gas supplied to the pipe is to be burned.

The head A^6 of the shell A at which gas connection is made as stated, has a door A^8 that embraces substantially its lower half and this door at its upper edge is hinged to the remaining part of said head and it is also cut away, as at A^9 about the bearing A^4 for whirl-journal C^4 so as to clear same, and if necessary it is to be further cut-away to also clear gas-pipe connection as it is swung to open and close shell A.

A^{10} is a fastening-pin to fasten, as at A^{11}, the door A^8 closed and to permit that door to be unfastened for being opened and closed.

L is a perforated or reticulated screen or fender, placed within the whirl and located about the jet-holes and shaped to partially encircle the gas-pipe K and it is attached to the gas-pipe and made stationary by means of rods L^2 which at their opposite ends are fixed to the fender and to the gas-pipe.

M is a basket preferably made of wire-netting but it may be made of any other material having open meshes or which is perforated or reticulated. The basket, as shown, is arc-shaped in cross section and at each side edge M^2 it is stiffened by a rod M^3 held on it in any suitable manner and both rods at their end M^4 project from the corresponding end M^5 of the basket. This basket M receives the matrix which is to be dried. N is the matrix. The matrix encircles and lies by its back face, that is its unmolded face, on the inner face of the basket and it is entered at one of its edges under a lip M^7 and at one of its end-edges under a lip M^8, each at the corresponding side and end-edges of the basket. The whirl carries this basket and the basket is placed in the whirl—(the door A^8 of the shell A having first been opened preparatory therefor)—by first entering the projecting ends M^4 of its side-rods M^3 into the open ends of two of the side slotted tubes held on the whirl as has been described, the slots of which are toward each other and then forcing the basket by its side-rods along said tubes and bringing it within the whirl and between its arms or flyers C, C, where it is left, the door A^8 closed and fastened and so far the machine made ready for operation. The matrix-basket M placed in the machine as described is within and has its outer side toward the encircling rods C^{20} of the whirl and preferably as shown, the basket is supported along its central line and from end to end by a bar M^9 which is fastened to the basket and as the basket is forced into the whirl as stated, engages and slides along a rod C^{22}, that is suitably located therefor and held on the encircling rods C^{20} of the whirl.

For the operation of a machine organized and prepared with a matrix all as has been explained, the gas is first turned on and lighted at the jet-holes *d* of the stationary central gas-pipe K and then by having properly placed the driving mechanism for the whirl into suitable connection the whirl is put into rotation carrying around with it the matrix held by it. In this manner the matrix is passed through and subjected to the air contained within the shell heated by the burning gas at the jet-holes of the central stationary gas-pipe, and all operating to secure, under a proper rate of rotation as stated of the whirl and matrix and a proper burning of gas at the jet-holes of the gas-pipe, a most efficient and expeditious drying of the matrix.

In the operation of the machine as has been described, and to support combustion of the gas within the shell air is supplied to the shell through the air-ports *a*, at its opposite ends.

The stationary fender L, located as explained relative to the jet-holes of the gas-pipe, confines the gas-flames to and about the pipe and thereby while positively preventing any contact of them with the inner surface of the matrix it at the same time in no manner interferes with or tends to decrease the effectiveness of the gas-flames to heat the air within the shell.

While gas has been described as the medium under combustion in the shell to heat the air of the shell and thus in co-operation with centrifugal force to assist to dry the matrix, obviously other mediums suitable for drying purposes, such as hot air, superheated steam, &c., may be entered through the gas-pipe into the shell, and therefore the invention in this relation, is not to be limited to gas alone.

The perforated or screen basket M for the matrix herein described serves to hold the matrix in shape while under rotation as explained, and also to allow the moisture of the matrix and vapors generated therefrom to freely pass from and to the outer surface of the matrix as it is being dried as explained. Again this screen basket is a most convenient means to receive and to hold the matrix preparatory to its being, and, as it is placed, and while in the whirl of the machine, and also to facilitate the removal of the matrix after it is dried from the whirl.

The matrix basket and the fender L are each preferably made of wire-netting but either may be made of a perforated or slotted plate of metal or other material—or of any material of a porous or foraminous character.

The projecting pins M^4 at one end of the matrix-basket facilitate the introduction of the basket as explained into the slotted-tubes of the whirl. Furthermore the rod M^9 of basket in co-operation with its rest upon the encircling rod or rods C^{20} of the whirl, add increased stiffness to the basket to resist the tendency and liability thereof to be forced

outwardly from the action of centrifugal force thereon in the operation, as has been explained, of the machine.

The construction of the matrix-basket at one end and one edge to overlap the matrix at its corrrsponding end and edge, obviously not only facilitates the proper placing of the matrix on the basket but also acts to retain the matrix in place.

The air inlets are essential if combustion of gas or such like is to be had within the shell, but if hot air, superheated steam, or such like is to be entered into the shell through the central pipe K then said air-inlets could be dispensed with although even in such cases it might be desirable to use them.

While the mechanism comprising this invention has been described in connection with the drying of type-form matrices it is to be distinctly understood that the invention is not to be limited to that especial purpose as it is plain that it may be used for other purposes.

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

1. In a machine for drying a type-form matrix, &c., the combination of a closed and stationary shell or casing adapted for admission and escape of air, &c., substantially as described, a whirl located and journaled and rotating within said shell, means connected to a journal of and adapted to rotate said whirl, a stationary pipe extending axially and lengthwise of said whirl and to the outer side of said shell and having lateral openings along its length, a reticulated basket of arc shape in transverse section and adapted at its inner side to receive said matrix and to be held on said whirl and means to hold said matrix on and to permit it to be removed from said whirl, substantially as and for the purpose and operation described.

2. In a machine for drying a type-form matrix, &c., the combination of a closed and stationary shell or casing adapted for admission and escape of air, &c., substantially as described, a whirl located and journaled and rotating within said shell, means connected to a journal of and adapted to rotate said whirl, a stationary pipe extending axially and lengthwise of said whirl and to the outer side of said shell and having lateral openings along its length, a reticulated basket of arc shape in transverse section, and adapted at its inner side to receive said matrix and to be held on said whirl, and a stationary reticulated fender held on and located between said perforated pipe and said basket, substantially as and for the purposes and operation described.

3. In a machine for drying a type-form matrix, &c., the combination of a closed and stationary shell or casing, adapted for admission and escape of air, &c., substantially as described, a whirl located and journaled and rotating within said shell and composed of radial arms, and of tubes joining and held on said radial arms and each having a longitudinal slotted way leading into it, a reticulated basket adapted to contain the matrix, &c.; and to extend between and to be entered endwise into and along and at its edges to lie within said ways and the tubes and an intermediate rod encircling the outer side of and held on said tubes, substantially as described, for the purposes specified.

4. In a machine for drying a type-form matrix, &c., the combination of a closed and stationary shell or casing, adapted for admission and escape of air, &c., substantially as described, a whirl located, journaled and rotating within said shell and composed of radial arms and of tubes joining and held on said radial arms and each having a longitudinal slotted way leading thereinto, and a reticulated basket adapted to contain the matrix, &c, and to extend between and to be entered endwise into and along and at its edges to lie within said ways and the tubes, substantially as described, for the purpose specified.

5. In a machine for drying a type-form matrix, &c., the combination of a closed and stationary shell adapted for admission and escape of air, &c., substantially as described, a whirl located, journaled and rotating within said shell and composed of radial arms, and of tubes joining and held on said radial arms and each having a longitudinal slotted way leading thereinto, an intermediate rod encircling the outer side of and held on said tubes, a reticulated basket adapted to contain the matrix, &c., and to extend between and to be entered endwise into and along and at its edges to lie within said ways and the tubes, and a rod lengthwise of and held on the outer side of said basket and adapted to bear on said encircling rod of said whirl tubes, substantially as described, for the purposes specified.

In testimony whereof I have hereunto set my hand in the presence of the two subscribing witnesses.

GEORGE A. DAVIS.

Witnesses:
ALBERT W. BROWN,
FRANCES M. BROWN.