(No Model.)

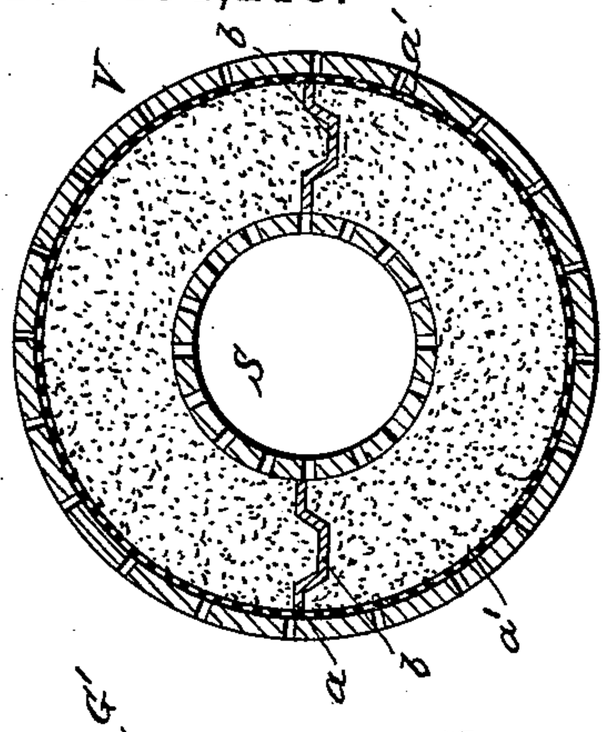
2 Sheets—Sheet 1.

H. W. JOHNS & H. W. JOHNS, Jr.

CENTRIFUGAL MACHINE FOR MAKING PULP TUBES.

No. 464,218. Patented Dec. 1, 1891.

Fig. 5.



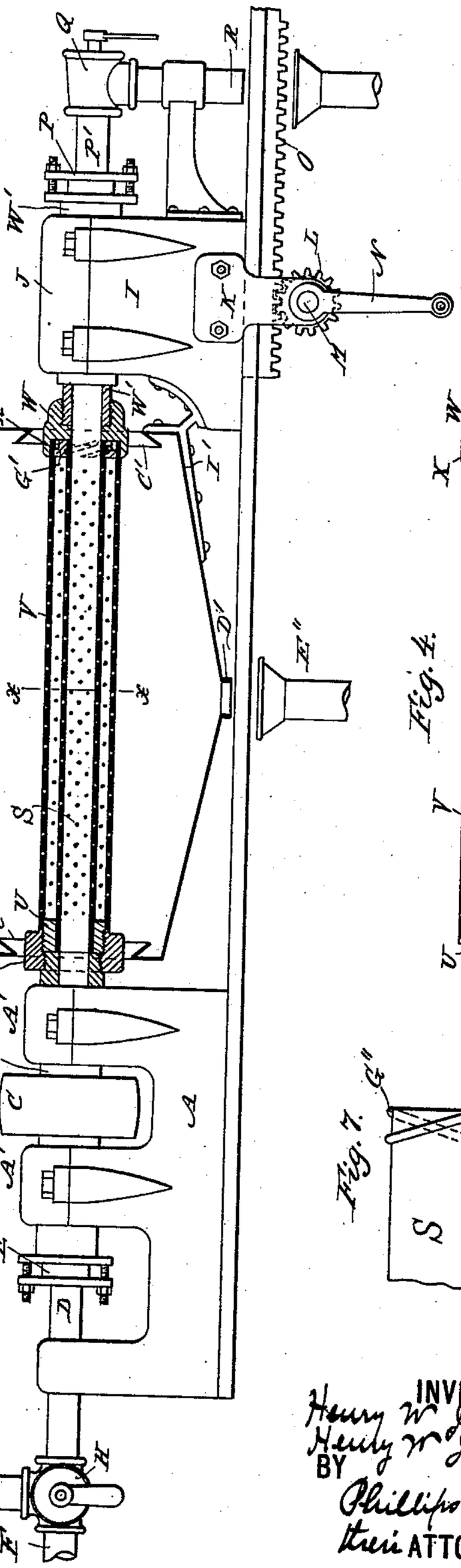


Fig. 3.

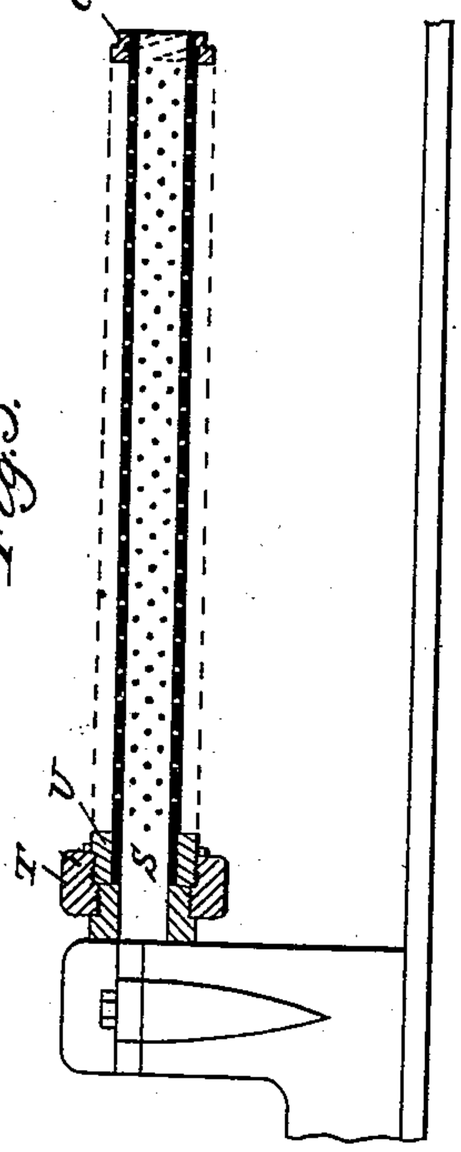


Fig. 4.

Fig. 6.

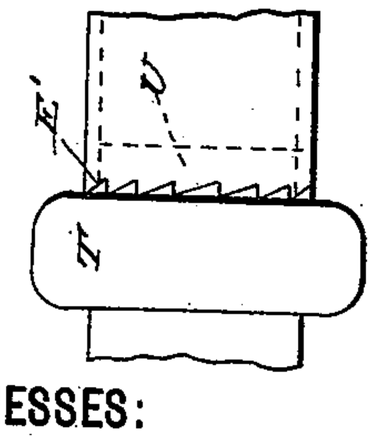


Fig. 7.

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(No Model.) 2 Sheets—Sheet 2.

H. W. JOHNS & H. W. JOHNS, Jr.

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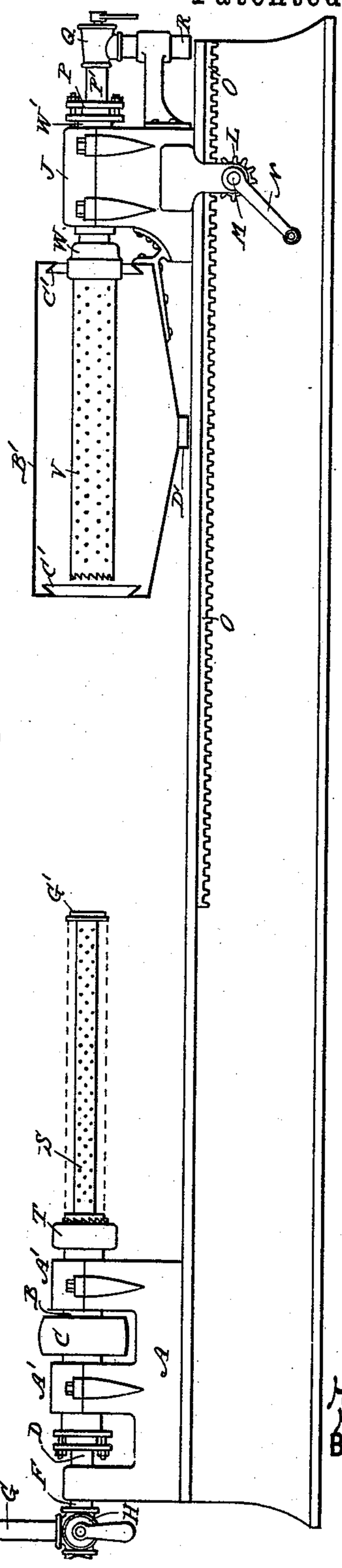

Fig. 2.

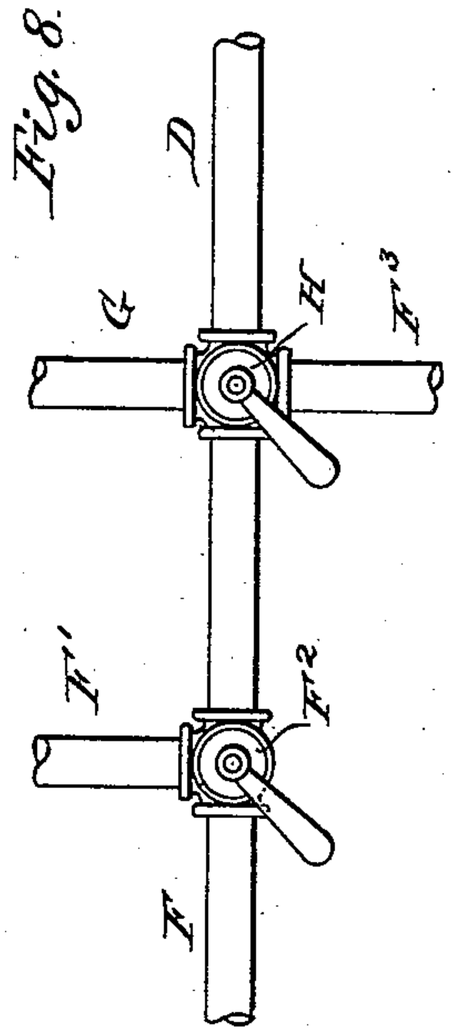

Fig. 8.

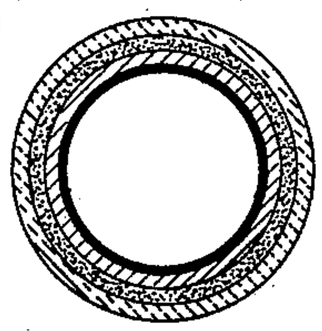

Fig. 9.

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UNITED STATES PATENT OFFICE.

HENRY W. JOHNS AND HENRY W. JOHNS, JR., OF NEW YORK, N. Y.

CENTRIFUGAL MACHINE FOR MAKING PULP TUBES.

SPECIFICATION forming part of Letters Patent No. 464,218, dated December 1, 1891.

Application filed September 13, 1890. Serial No. 364,865. (No model.)

To all whom it may concern:

Be it known that we, HENRY W. JOHNS and HENRY W. JOHNS, Jr., citizens of the United States, and residents of New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Centrifugal Machines for Making Pulp Tubes, of which the following is a specification.

Our invention relates to improvements in centrifugal machines for the purpose of making pipes or tubes from pulp or other material, either alone or mixed together or stratified, as preferred.

In the drawings the same reference-letters indicate the same parts in all the figures.

Figure 1 illustrates a side view, partly in section, of the machine in position to make pipe. Fig. 2 illustrates the machine when extended for the removal of the completed pipe. Fig. 3 illustrates a sectional view of the distributing-pipe, showing the relation of the supply-tube to it when the perforated cylinder is removed. Fig. 4 illustrates a detached view of the distributing-pipe and the perforated cylinder. Fig. 5 illustrates on an enlarged scale a transverse sectional view of the distributing-pipe and the perforated cylinder on the line $x\,x$ of Fig. 1. Fig. 6 illustrates a plan of the forward end of the perforated cylinder and the head-block. Fig. 7 illustrates a plan of the rear end of the pulp-distributing pipe. Fig. 8 illustrates an elevation of the supply-cock and pipes when a plurality of substances are employed for making the articles. Fig. 9 illustrates an end view of a pipe made in strata of different materials.

A is a head for the support of a stationary double bearing A′, through which passes a hollow shaft B, provided with a belt wheel or pulley C.

D is a pipe connecting with the hollow shaft by means of a stuffing-box E, so that the pipe D may remain stationary while the shaft B is rotated.

F is a pipe connecting with a hot-air blast or supply.

G is the supply-pipe through which the pulp or other material comes to the machine.

H is a suitable valve (shown in the present instance as a three-way valve) placed at the junction of the pipes D, F, and G, and so constructed that upon placing it in one position the pulp or other material will be allowed to enter the pipe D, and thence through the stuffing-box into the shaft B, and through it into the distributing-pipe S, and thence into the rotary cylinder, hereinafter described, and when the valve H is turned to another position the pulp will be cut off and hot dry air will be allowed to enter and pass in like manner to the rotary cylinder.

I is a movable head, which supports a bearing J.

K is a frame attached to the head I, and the frame is provided with a pinion L set on a shaft M, to which is keyed a crank N.

O is a rack fastened on the frame of the machine, with which the pinion L engages, so that upon turning the crank the head I and all parts attached to it are moved away from the stationary head A and the parts attached to it. Any other equivalent means may be employed.

P is a stuffing-box similar to the stuffing-box E, and a pipe P′ leads from it to a cock Q, which is adapted to shut off the flow of pulp and, when desired, to allow it to pass and enter the pipe R.

S is a perforated pipe, which we call the "distributing-pipe." The perforations may be round or elongated holes, and if elongated they may run parallel with the length of the pipe or transversely or spirally around it. This pipe is fastened to the end of the shaft B by any suitable means. We show a threaded ring T, screwed on the end of the shaft B, and another ring U, which is fastened to the distributing-pipe, which threads into the ring T. Of course the distributing-pipe revolves with the shaft B and remains attached to it at all times unless replaced by another distributing-pipe of a different size to make tubes having bores of different diameters. At Fig. 4 we illustrate such an enlarged distributing-pipe. It is attached to the ring U in the same manner that the smaller distributing-pipes are, all that is necessary being to cut out the interior of the ring, reducing its thickness somewhat, so that it will receive the larger pipe.

V is the exterior perforated cylinder. Its interior diameter is the same as that of the exterior of the desired pipe or tube. It is or may be fastened by screw-threads to a ring W, which has a horizontally-projecting flange X, threaded on its interior surface, into which the threads cut on the cylinder-screw. This ring W is rigidly attached to the end of the shaft W′, which turns in the bearing J. Thus the perforated cylinder V is attached to the movable bearing J and moves with it.

B′ is a shield to catch the flying water thrown off by the centrifugal action. It is rigidly attached to the head I by a bracket I′, as shown, and is at all times connected with it.

C′ C′ are inwardly-projecting annular rims attached to the interior of the ends of the shield, flaring outwardly on all sides, so that such portion of the water as strikes against the sides of the shield and is deflected toward the ends thereof will upon falling be caught by these inwardly-projecting rims and prevented from dropping back again upon the cylinder. Through an escape-pipe D′ the water caught by the shield is led away.

The cylinder V is detachably locked or engages in any preferred manner with the shaft B, so that it will partake of its movement. A good way is shown in Fig. 6, in which the end of the cylinder is serrated, as at E′, and the face of the ring T is provided with grooves or serrations, so that the serrations on the end of the cylinder will at once interlock with them when it is brought up against the face of the ring by the crank N.

G′ is a disk which is attached to the end of the pulp-distributing pipe preferably by double-quick-pitched threads, (see Fig. 7,) so that it can be quickly taken off the end of the pipe. Any other means, however, may be employed for this purpose.

A′ is a lining of wire-gauze, which may be placed against the inner surface of the cylinder V to give the required fineness of perforations for certain kinds of pulp.

In Fig. 5 we show a means whereby the pipe as made upon the machine will not require to be thereafter slit open for application to steam or other pipes to be covered by it. *a a* are diaphragms rigidly attached to the pulp-distributing tubes at opposite sides and extend longitudinally through the interior of the cylinder V, and in them may be formed longitudinal corrugations *b b*. These may be of the shape, size, and number shown, or otherwise, as desired. The diaphragms may also be perforated.

The operation of the apparatus as thus far described is as follows: The machine is first put in operation by applying power to the belt-pulley C. Thereupon the cylinder and the pulp-supply pipe revolve together. The valve H is then so turned that the pulp, which may be in a heated condition, the temperature being such as preferred to effect more or less rapid drying, enters through the pipe D and from it into the pulp-distributing pipe S, as already described. From it the pulp is thrown by the centrifugal action into the perforated cylinder V and is compacted against its interior wall, the surplus moisture being thrown out through the perforations in the cylinder and caught in the shield B′ and conducted away through the pipe D^2 to a suitable drain E^2, or if the liquid is of value—as, for instance, if it contains fireproofing, adhesive, or other substance useful in the manufacture of the pipe—then it may be caught in any suitable receptacle with which the pipe E^2 shall connect. During the first part of the operation of the machine the cock Q, which is set in the pipe P′, it being an extension of the shaft W′, although distinct from it and stationary, connecting with it through the stuffing-box P, may be partially closed, so that greater force will be given the ordinary pressure of the pulp-head into the cylinder. This will not ordinarily be necessary however; but after the pipe has been practically formed within the cylinder then this cock will be opened and the cock H turned so as to cut off the flow of pulp and to admit the hot dry air through the pipe F. The hot air will then blow freely through the distributing-pipe S, and the cock Q may be turned off to retard its escape. All surplus pulp or material used which may be fed to the machine faster than the centrifugal force will throw it outwardly will pass through the distributing-pipe and the shaft W′, and thence to the pipe P′ and through the cock Q into the vertical pipe R, with which the cock Q connects, and be thence discharged into a bell-mouthed pipe shown below it, and will thus be caught and preserved for future use. The pulp, especially if already heated and surplus moisture driven off, is in best condition for drying under the action of the hot blast; and in a very short time the pipe will become partially if not entirely dry and fit to be removed from the cylinder. At the desired time the cock H is so turned as to cut off both the hot air and the hot pulp, and the crank N being turned the head I and all the parts connected with it are run back by the engagement of the pinion L in the rack O or by the proper manipulation of equivalent devices, and in so doing the perforated cylinder V is pulled off from the pulp pipe which remains on the distributing-pipe, the disk G′ preventing it from coming off with the perforated cylinder. When the head I has been fully retracted, the parts are in the position shown in Fig. 2. The two pieces or halves of the pulp pipe may then be removed in a partially if not completely dried condition, and if the diaphragms *b b* be not used the disk G′ is unscrewed and the pipe pulled off endwise. The parts are then returned to their original position, and the machine is ready for a repetition of the operation. In some cases it will not be necessary to employ the hot air—for instance, when lining a pipe or

other article already made with a layer or coating of other substances—such, for instance, as a cement—and in many other instances. In such cases the hot-air pipe may be arranged as shown in Fig. 8—that is to say, a branch pipe F′ may connect with it and a cock F^2 be placed at the junction so arranged that when turned in one direction connection with the hot-air supply will be cut off and connection with the receptacle containing some other ingredient for the manufacture of the pipe—as, for instance, sawdust—will be established through the pipe F′. In this way the pipe F, when not used for supplying hot air, may be employed as the channel through which one of the ingredients of the pipe may be supplied; also, other pipes may connect with the pipe D, through which still other materials may pass to the rotary cylinder. We show such another pipe at F^3, Fig. 8. It connects with the valve H, as does the pipe G. In this construction of course the valve H will require more ports than when it connects with three pipes only.

It will be observed that the range of articles which may be made on our machine is very great—that is to say, we can make articles by it all of one material with or without the hot blast; also, that we can mix the materials in any one of the reservoirs or sources of supply, and can thus make articles of mixed materials; or we can make a stratified article of different materials—as, for instance, an outer layer of pulp, then a layer of pulp and sawdust, then a layer of asbestus or cement, and an inside lining of any other material—and that the order in which these various substances shall be arranged in the pipe or other article may be varied at will, and that any material which can be reduced to such form or condition or to adapt it to use in a centrifugal machine may be employed by us in the manufacture of our products. In Fig. 9 we show an end view of a pipe made of differing materials deposited in layers or strata.

It will be obvious to those who are familiar with such matters that there may be many modifications made in the details of construction of the machine and still the essential features thereof be employed. We do not therefore restrict ourselves to the details of construction shown.

We claim—

1. The combination, in a centrifugal machine, of a rotary perforated cylinder, a material-supply pipe, a valve or cock in said pipe, a distributing-pipe extending longitudinally through the cylinder from end to end, and a hot-air pipe so constructed and arranged that the material and also the hot air may be introduced into the interior of the cylinder, substantially as set forth.

2. The combination, in a centrifugal machine, of a stationary bearing supporting a material-supply pipe and a longitudinally-extending distributing-pipe, a movable bearing supporting a rotary cylinder, means whereby the movable bearing and the rotary cylinder may be separated from the stationary bearing, distributing-pipe, and supply-pipe, and a pipe to conduct the material to the machine and another pipe to conduct hot air to the supply-pipe, substantially as set forth.

3. The combination, in a centrifugal machine, of a hollow rotary shaft, a distributing-pipe attached to it, a second hollow rotary shaft in line with the first, a perforated cylinder attached to it, both of said shafts opening into the distributing-pipe within said cylinder, and means whereby the two shafts may be longitudinally separated from each other, substantially as set forth.

4. The combination, in a centrifugal machine, of a fixed bearing supporting a hollow shaft, a distributing-pipe attached at one end to the end of the shaft and connecting at its other end with another hollow shaft, a perforated cylinder outside of the distributing-pipe, and a material and a hot-air pipe also connecting with said shaft, substantially as set forth.

5. The combination, in a centrifugal machine, of two hollow shafts in alignment with each other, to one of which is attached a belt-pulley, a rotary perforated cylinder placed between the two shafts, a material-supply pipe and a hot-air pipe connecting at one end of said hollow shafts through the stuffing-box, and a stop-cock at the other end of the other hollow shaft, connecting with it through a stuffing-box, substantially as set forth.

6. The combination, in a centrifugal machine, of a hollow rotary shaft, a perforated distributing-pipe supported at one end upon said shaft and supported at its other end on a second hollow shaft, and an exterior perforated cylinder rigidly attached to the said second shaft and supported on its other end on the first shaft, substantially as set forth.

7. The combination, in a centrifugal machine, of a rotary shaft supporting a perforated distributing-pipe having a detachable disk on its end, and another rotary shaft supporting an exterior perforated cylinder adapted to slip over the said disk and to inclose the distributing-pipe, substantially as set forth.

8. The combination, in a centrifugal machine, of a rotary shaft supporting a perforated distributing-pipe, and an exterior perforated cylinder constructed and arranged to move over and cover, and also away from and expose, the distributing-pipe and engaging surfaces between the perforated cylinder and the parts to which power is applied, whereby rotation will be given simultaneously to the distributing-pipe and to the perforated cylinder, substantially as set forth.

9. The combination, in a centrifugal machine, of a rotary shaft, a perforated cylinder, a material-supply pipe, a distributing-pipe connecting with the supply-pipe and extending longitudinally through the said cylinder, and an air-supply pipe connecting with the

hollow shaft through a valve, whereby the material and hot air may pass to the machine through the hollow shaft, substantially as set forth.

10. The combination, in a centrifugal machine, of a rotary perforated cylinder supported upon hollow shafts at its two ends, a pipe extending through the said cylinder for the distribution of material, connected with one of the shafts at one end, and a pipe for the overflow connected with the other shaft at the other end, substantially as set forth.

Signed at New York, in the county of New York and State of New York, this 10th day of June, A. D. 1890.

HENRY W. JOHNS.
HENRY W. JOHNS, JR.

Witnesses:
PHILLIPS ABBOTT,
FREDERICK SMITH.