

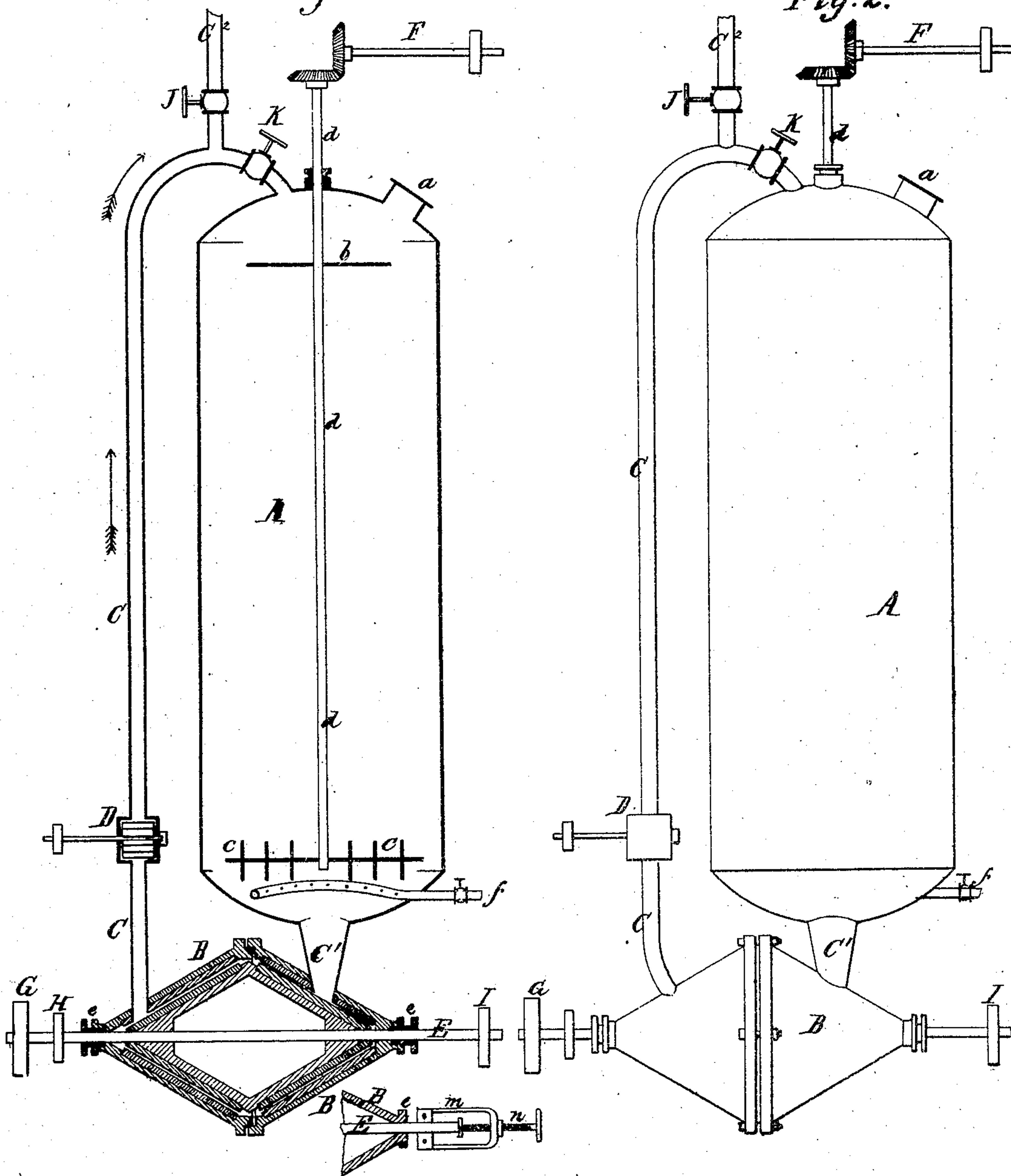
*H. B. Meech,*  
*Manufacture of Paper Pulp.*

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*Fig. 1.*

PATENTED JUL 11 1871

*Fig. 2.*



*Witnesses.*

*H. C. Jones.*  
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*H. B. Meech by*  
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# UNITED STATES PATENT OFFICE.

HARRISON B. MEECH, OF TROY, N. Y.

## IMPROVEMENT IN PROCESSES AND APPARATUS FOR THE MANUFACTURE OF PAPER-PULP.

Specification forming part of Letters Patent No. 116,980, dated July 11, 1871.

*To all whom it may concern:*

Be it known that I, HARRISON B. MEECH, formerly of Fort Edward, Washington county, but at present a resident of Troy, in the county of Rensselaer and in the State of New York, have invented a new and useful Improvement in the Manufacture of Paper-Pulp; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing making a part of this specification, and in which—

Figure 1 represents a central vertical section of my invention, showing the circulation of the stock in process of reduction, and Fig. 2 an elevation of the same.

My invention relates to a machine for the manufacture of paper-pulp in which a complete reduction of the stock takes place, the boiling, grinding, and maceration being accomplished at the same time, and in which the process of bleaching can be advantageously effected; and it consists in certain mechanical combinations and chemical processes, as more specifically set forth in the following specification and claims.

A in the drawing represents a cylindrical upright boiler, into which straw, grass, wood-shavings, or other fibrous substance to be reduced to pulp is introduced through the man-hole *a* at the top of the boiler. This boiler is provided with a revolving distributing-disk, *b*, about half the diameter of the boiler, and an agitator, *c*, near its top and bottom, respectively, both of which are attached to and revolve with the shaft *d*. Steam is introduced into the boiler by means of the pipe *f*. B is the grinding-machine, preferably made as shown, into which the stock enters from the boiler through the pipe C<sup>1</sup>. This machine consists of a revolving cylinder, placed horizontally, and tapering from its center in such a manner as to produce a figure in the form of two cones joined at their base. The outer surface of this double-cone cylinder forms one of the grinding-surfaces, the other grinding-surface being upon the inner side of the casing, which incloses said cylinder and conforms to its shape. The distance between said grinding-surfaces corresponds relatively to the thickness of the packing introduced at the joint of the two cones forming the casing referred to. The inner double-cone cylinder is attached to the shaft E, which passes through stuffing-boxes *e e* at each end of the casing, and is driven by the main pulley G. C

represents a pipe which passes through the outer cylinder or casing near the end opposite to which the pipe C<sup>1</sup> enters, and passes up alongside of and enters the top of the boiler A. This pipe is used to conduct the stock, after it has passed through the grinding-machine, back into the boiler, to be reboiled and reground, or to the pipe C<sup>2</sup>, through which it is conducted into vats. The circulation through this pipe is produced by a fan, as shown, or other pump, D, which is operated by a belt which passes over pulley H upon shaft E. This shaft also has a pulley, I, from which a belt passes to the pulley upon shaft F, which connects with and turns, by means of gears, the shaft *d*, to which are attached the distributing-disk and agitator within the boiler. Instead of the pulley I a swivel-joint, *m*, and screw, *n*, will usually be attached to the shaft E, by means of which the inner rotating conic cylinder may be adjusted and the grinding regulated. The shaft F will then have other connections.

The operation is as follows: The straw or wood to be reduced to pulp, after having been cut into proper lengths, (about one inch,) is introduced into the boiler A through the man-hole *a* until it reaches to within a few inches of the disk *b*. The boiler is then filled to about the same height with a weak solution of pure caustic alkali (about  $\frac{1}{2}^{\circ}$  Baumé) or other solvent, such as a clear liquor made by boiling sulphur and lime together and allowing it to settle. Steam is then admitted through the pipe *f*, and the mass preferably boiled for two hours, more or less, before the grinding process is commenced. The grinding-cylinder is then put in operation, together with the connecting-pulleys and shafts. As this cylinder revolves, the stock which enters at the mouth C<sup>1</sup> is carried around between the grinding-surfaces, and the centrifugal force draws it toward the center, that being the point of the greatest diameter of the cylinder. Thence it is drawn by the operation of the pump to the mouth of the pipe C, through which it is forced and made to re-enter the boiler, falling upon the revolving disk *b*, from which it is sifted off and deposited evenly in the boiler to be again boiled and ground as before. This continuous operation goes on until the stock is sufficiently reduced, when the valve K is closed and valve J opened, and the stock in the form of pulp conducted into vats to be washed and bleached.

In bleaching I prefer to use an apparatus sim-



ilar to that above described. In this case a weak solution of chlorine liquor and chlorine gas is introduced and the machine set in motion, as in the similar apparatus used for reducing. As the pulp passes through the grinding-cylinder it is separated into a thin stratum, which enables the chlorine liquor to come in contact with all the fibers and do its work thoroughly and evenly; also, as the stock is forced back into the boiler it passes through and absorbs all the chlorine gas that may rise to the top of said boiler, thereby consuming all the bleaching qualities contained in the substances used and leaving the fiber in a fine condition to be made into paper. When the pulp is sufficiently bleached it is forced out through valve J, as in the reducing process before described.

For making pulp for brown or Manila paper the fibrous substance may be ground and boiled in my apparatus in a very weak solution of alkali or solvent, or simply in soft water.

What I claim, and desire to secure by Letters Patent, is—

1. The combination of the boiler A, double-cone grinder B, circulating-pipe C, and pump D, substantially as and for the purpose set forth.

2. The shaft *d*, distributing-disk *b*, and agitator *c* in combination with the boiler, as and for the purpose set forth.

3. The circulating-tube C with tube C<sup>2</sup> and cocks J and K, as described.

4. The process, herein described, of reducing straw, wood, or other fibrous substance to pulp for the manufacture of paper, the same consisting in boiling and grinding said substances in a weak solution of caustic alkali of about  $\frac{1}{2}^{\circ}$  strength Baumé, substantially as described.

HARRISON B. MEECH.

Witnesses:

D. E. SOMES,

F. C. SOMES.