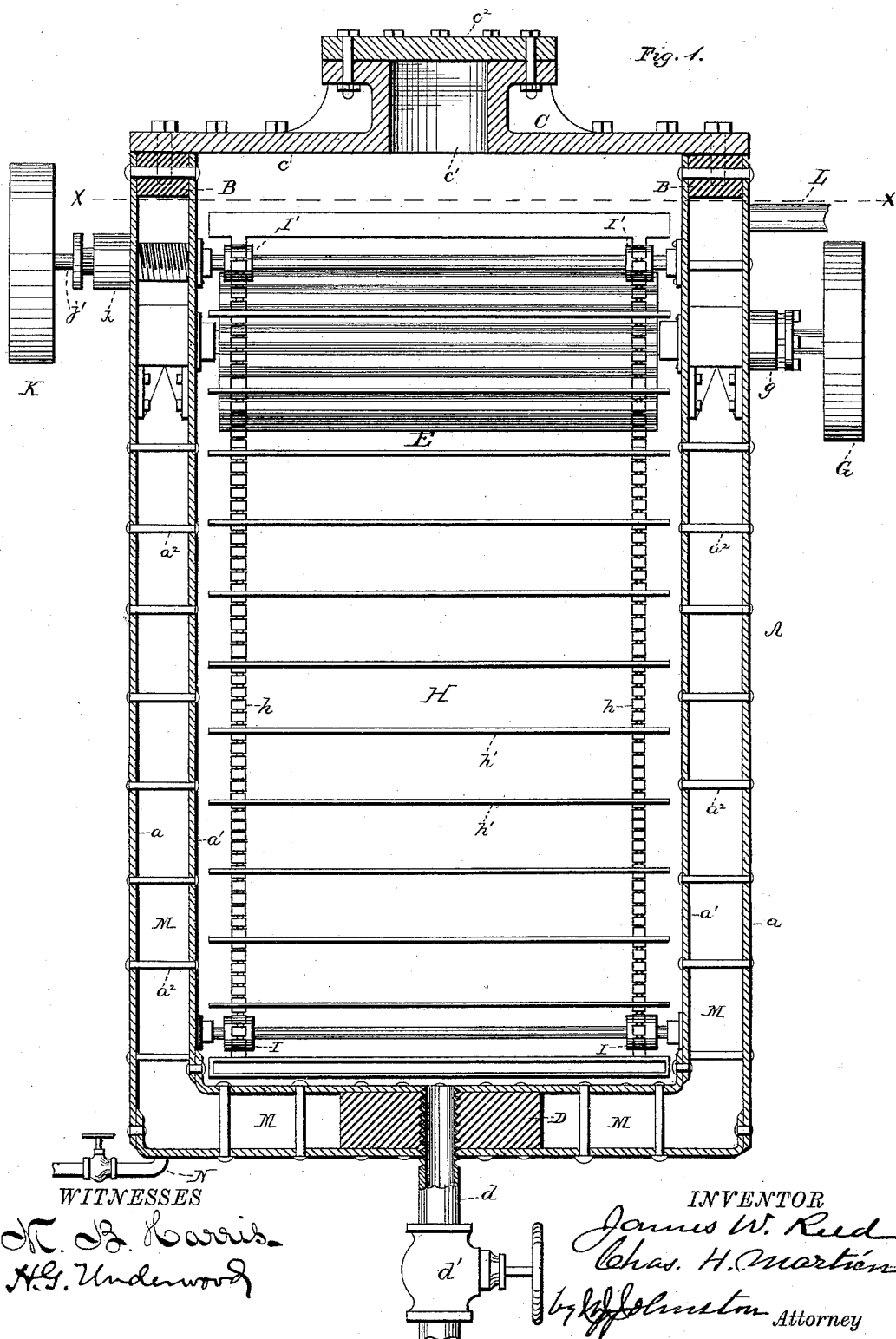


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PAPER PULP MACHINE.

No. 417,282.

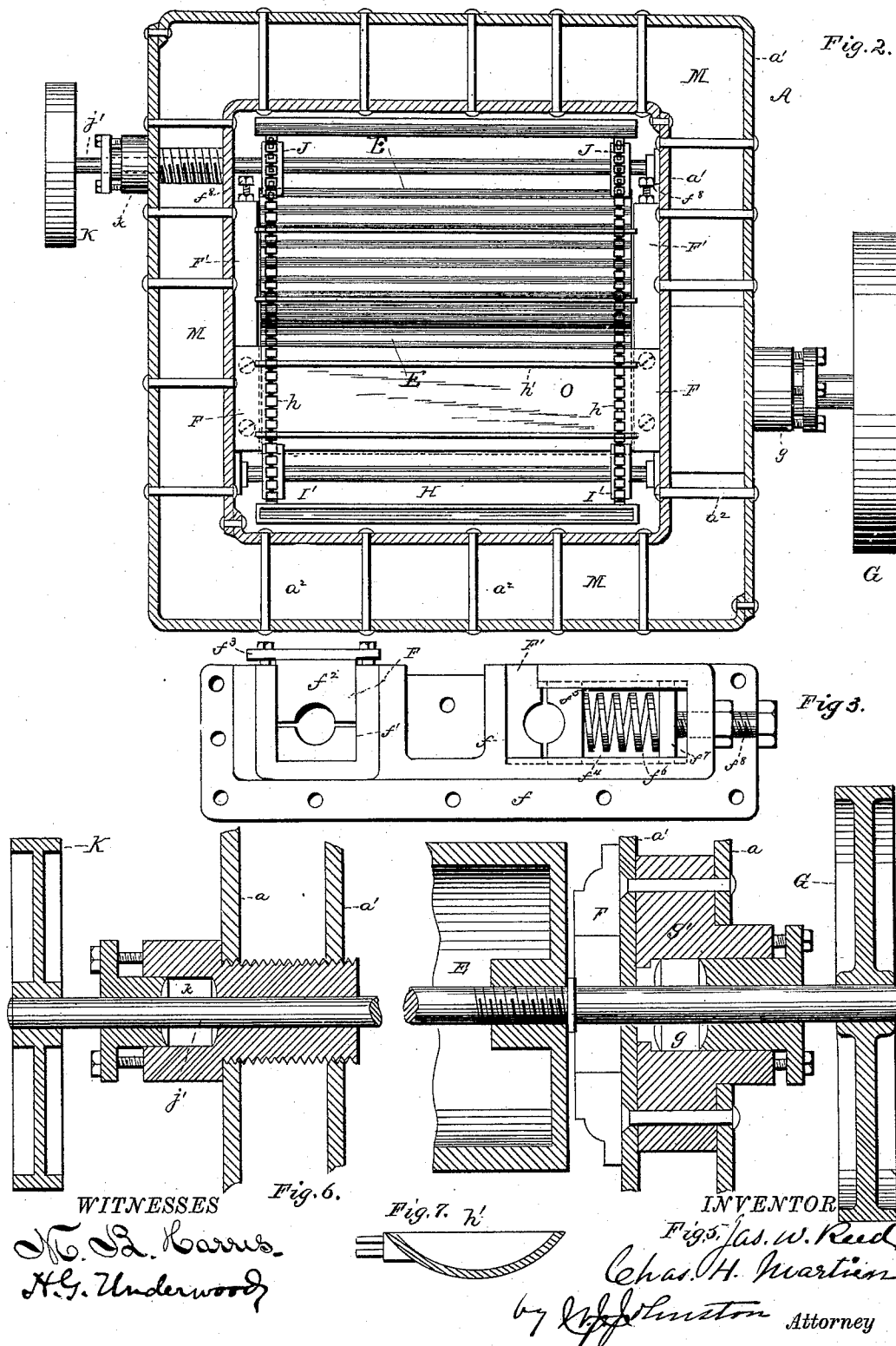
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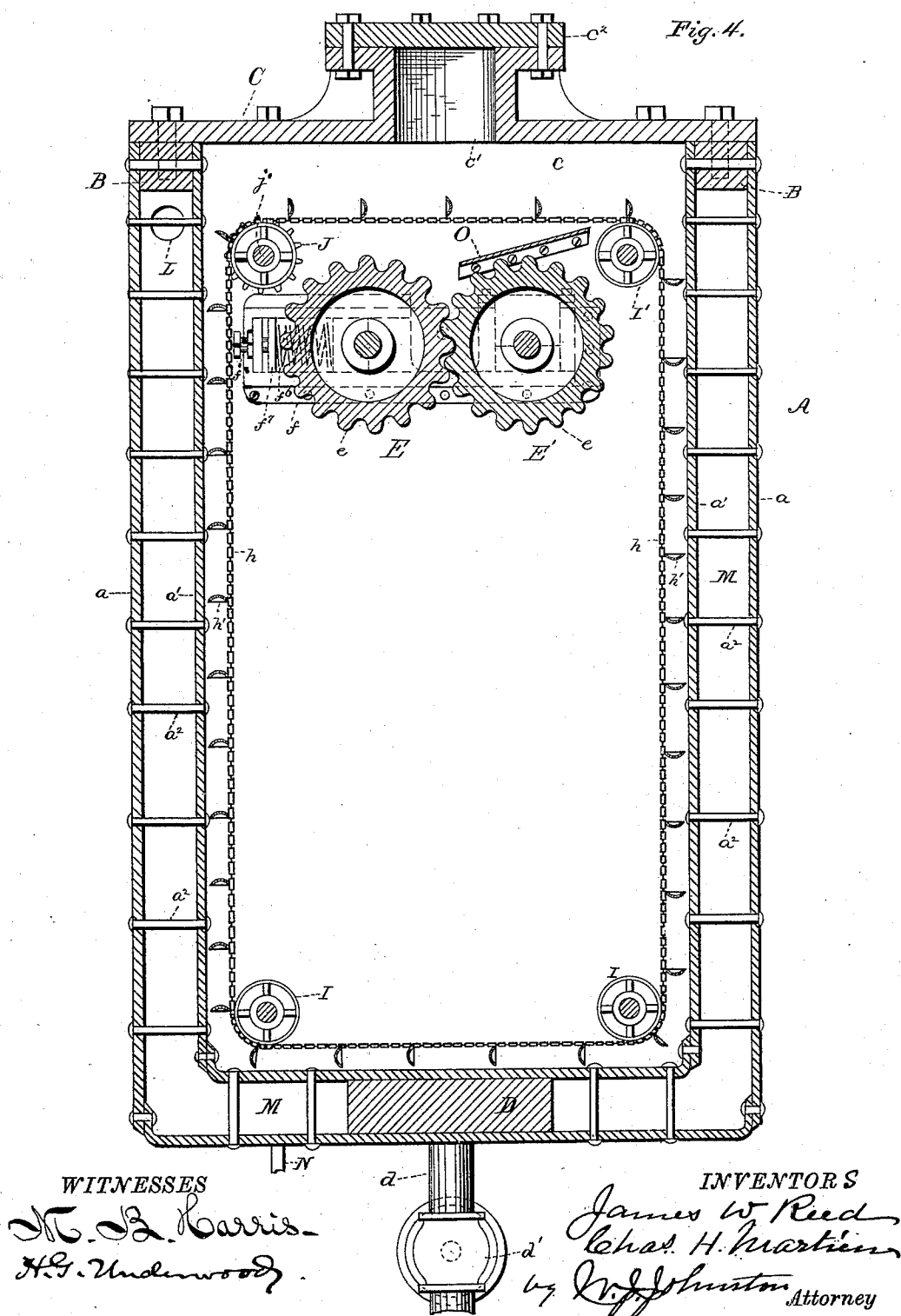
(No Model.)

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UNITED STATES PATENT OFFICE.

JAMES W. REED AND CHARLES H. MARTIEN, OF SIOUX FALLS, (DAKOTA TERRITORY,) SOUTH DAKOTA.

PAPER-PULP MACHINE.

SPECIFICATION forming part of Letters Patent No. 417,282, dated December 17, 1889.

Application filed June 15, 1888. Serial No. 277,266. (No model.)

To all whom it may concern:

Be it known that we, JAMES W. REED and CHARLES H. MARTIEN, citizens of the United States, residing at Sioux Falls, in the county of Minnehaha and Territory of Dakota, have invented certain new and useful Improvements in Paper-Pulp Machines; and we 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.

Our invention relates to improvements in machines for making paper-pulp from sawdust and equivalent materials that can be pulped by rollers; and it consists in the construction and novel combination of parts hereinafter described, illustrated in the accompanying drawings, and pointed out in the claims.

The object of the invention is to provide a cheap and simple contrivance for pulping sawdust for the manufacture of paper.

Figure 1 is a central vertical section of a pulp-machine embodying our invention, the interior mechanism not being in section. Fig. 2 is a horizontal section on the line $x x$, Fig. 1. Fig. 3 is a detail side view of one of the bearings, blocks, and brasses. Fig. 4 is a vertical transverse section of our invention through the center. Fig. 5 is a vertical detail section of the pulley G and stuffing-box. Fig. 6 is a similar view of the pulley K and stuffing-box. Fig. 7 is a central transverse section of one of the buckets.

Referring to the drawings by letter, A designates the steamer, composed of the outer shell a and inner shell a' , held and braced together by the stay-bolts a^2 , of suitable size and at suitable distances apart. Both shells are preferably rectangular in cross-section. The said steamer rests upon supports (not shown) of any desired construction, and the shells form the steam space or jacket M between their sides and bottoms.

B is a casting open centrally and bolted or riveted between the upper ends of the shells flush with the edges thereof, and C is a casting having its lower outstanding flange c bolted down to the flat upper end of the casting B, there being packing between the two to make a steam-tight joint. The said casting

is provided with a man-hole c' about a foot in diameter, and has an upper outstanding flange connected by vertical equidistant ribs to the lower flange, as shown.

c^2 is a cover bolted to the upper flange of the casting C and covering the man-hole opening.

D is a block-casting bolted centrally between the floors of the two shells and perforated centrally to receive the discharge-pipe d , opening at its upper end into the interior of the inner shell, said pipe being provided at a suitable point with the stop-cock d' .

E E' are similar transverse rollers within the upper portion of the inner shell and provided with the longitudinal rounded corrugations e , having similar depressions between them. The corrugations of the roller E' enter the depressions of the roller E and turn the latter. The said rollers are made hollow for lightness, and their shafts are journaled in boxes F F', respectively, which boxes are attached to castings f , secured by bolts or otherwise to the inner face of the shell a' at proper points. Each box F rests in a vertical recess f' in the corresponding casting f , and is composed of an upper and a lower section having registering semicircular bearing notches or grooves in their meeting ends, the upper section f^2 being provided with outstanding flanges f^3 at its upper end, which flanges are bolted to the casting f outside of the recess f' and hold the said section down on the lower section. The box F' on the same side rests in a recess f^4 , extending downward from the upper surface of the casting f and then longitudinally outward therein, and is composed of two lateral sections having semicircular bearing-notches in their meeting ends, the outer section f^5 being pressed upon by the coiled spring f^6 in the recess f^4 , which spring is itself pressed upon by the follower f^7 , resting against the inner end of the adjusting-screw f^8 , passing through a suitably-threaded opening in the casting f .

The object of having brasses in the box F' to play laterally is in case of any foreign matter or clods getting between the rollers to allow the same to be pressed apart, the spring f^6 returning the roller F' to its normal position.

One end of the shaft of the roller E extends outside of the steamer and has thereon a pulley G, driven by a belt from any suitable motor. The shaft adjacent to said pulley passes through a stuffing-box *g* of ordinary construction, having its recess formed in an extension *g'* of the casting *f* to the outer side of adjacent box F, the said stuffing-box preventing the escape of steam. The rollers may be attached to their shafts by keys or may be screwed thereon, as shown.

H is the elevator, composed of the two similar chains *h* and the equidistant buckets *h'*, having their ends secured to said chains, and with their concave surfaces up when ascending, the buckets standing outward from the chains, as shown. The chains travel over the two pairs of smooth-faced pulleys II, having their shafts journaled in suitable bearings secured to opposite sides of the inner surface of the inner shell near the lower end thereof, the similar pair of smooth-faced pulleys I', journaled in similar bearings secured to the inner surface of the inner shell near its top, and vertically above one pair of pulleys I and the pair of chain-wheels J, journaled similarly, and opposite the pulleys I' and vertically above the other pair of pulleys I. The shaft *j'* of the chain-wheels is extended out of the steamer at the side opposite to the drive-pulley G, and has upon it a pulley K, driven by a belt from any proper motor, and from the inner side of the pulley K the shaft *j'* passes through a stuffing-box *k*, secured to the inner and outer shell, as shown.

L is a steam-pipe from a boiler (not shown) entering the outer shell near the top thereof and allowing steam to pass into the space or jacket M.

N is a pipe extending from the outer shell at its bottom for the escape of water of condensation through a suitable drip-valve.

O is a chute secured between the opposite walls of the inner shell inward from the chain-wheels and between the chains to discharge the sawdust raised by the buckets between the rollers.

The sawdust or other waste material to be treated is usually first prepared by mixing it with a strong solution of caustic soda for the purpose of aiding in disintegrating its fiber. It is then introduced into the interior of the steamer A through the man-hole and the cover secured tightly thereon. Steam is then introduced into the space M between the inner and outer shells surrounding the space containing the material under a pressure sufficiently strong to boil the material, and the

elevator and macerating-rollers are set in motion by their actuating mechanism. The boiling process is continued for a sufficient length of time, during which the material is caused to pass continuously between the macerating-rollers by the elevator, which keeps it in continuous circulation until its fibers are thoroughly disintegrated and it is reduced to pulp of the proper consistency. It is then discharged or blown out under pressure into a settling-tank.

The rollers and elevator are preferably operated from an engine, the boiler of which feeds the steam space or jacket of the steamer.

Having described our invention, we claim—

1. In a machine to pulp sawdust, the combination, with the steamer having the interior closed chamber surrounded by the steam-jacket, of the pair of similar corrugated intermeshing rollers journaled in bearings within the chamber, the shaft of one of which is extended at one end to the outside of the steamer through a stuffing-box and provided with a drive-pulley, and the elevator within the chamber, operated by sprocket-wheels on a shaft journaled in bearings within the chamber, one end of which shaft is extended through a stuffing-box to the outside of the steamer and provided with a drive-pulley, substantially as and for the purpose described.

2. In a pulping-machine, the steamer consisting of the inner and outer shells, forming a steam-jacket surrounding an interior closed chamber, the steam-pipe opening to the jacket between the shells for the purpose of admitting steam, a discharge-pipe for the water of condensation leading from the bottom of the steam-chamber, the block-casting between the bottoms of the shells, the discharge-pipe opening into the inner shell through the block and provided with a stop-cock, the stay-bolts connecting and bracing the shells, the casting B, secured within the upper ends of the shells and flush with their edges, the casting *c*, forming the top of the steamer, bolted to the casting B, and provided with an opening or man-hole for introducing the material to be pulped, and a tight-fitting lid or cover, the joints being securely packed to prevent steam-leakage, all constructed and combined substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

JAMES W. REED.

CHARLES H. MARTIEN.

Witnesses:

F. W. PETTIGREW,

I. E. THIBEOU.