2 Sheets—Sheet 1.

J. P. LABROUSSE.

STOCK-GRINDERS FOR PAPER-PULP.

No. 171,822. Patented Jan. 4, 1876.

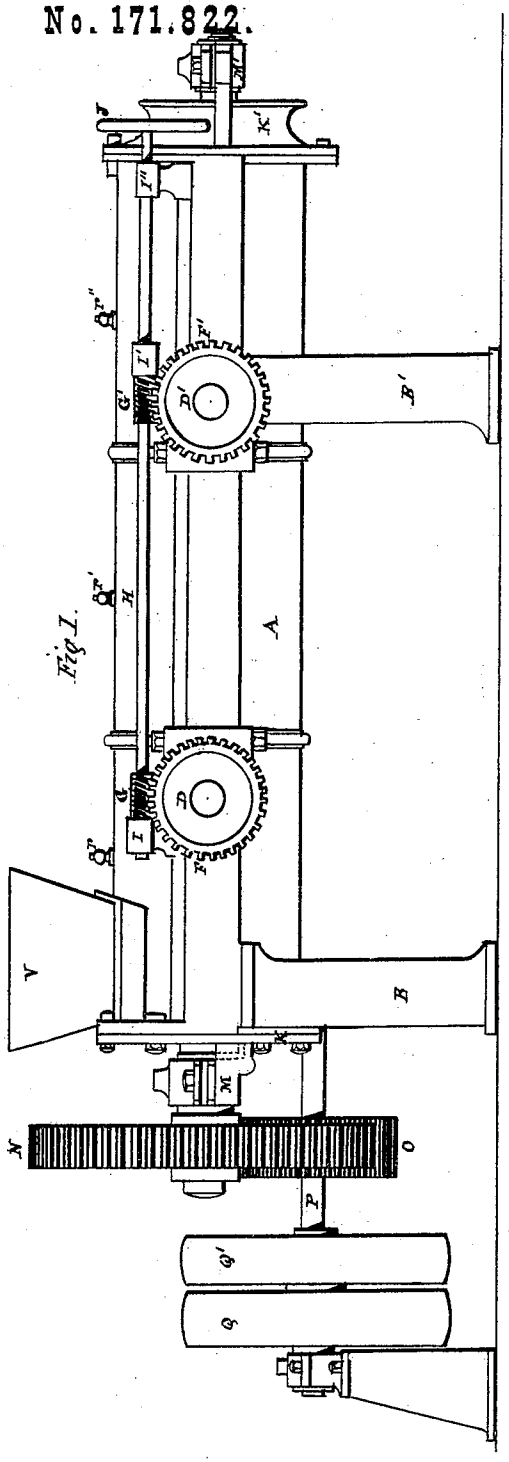

Fig. 1.

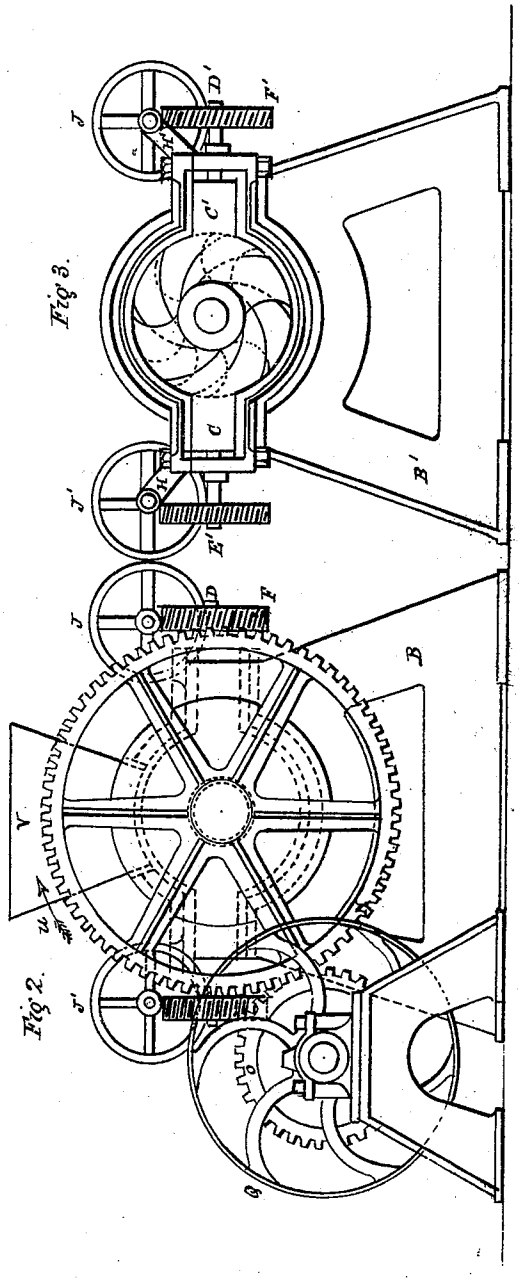

Fig. 2.

Fig. 3.

Witnesses:
Wm. L. Coombs
H. K. Cohen

Inventor:
Jean Prosper Labrousse.
By James L. Norris.
Atty

2 Sheets—Sheet 2.

J. P. LABROUSSE.

STOCK-GRINDERS FOR PAPER-PULP.

No. 171,822. Patented Jan. 4, 1876.

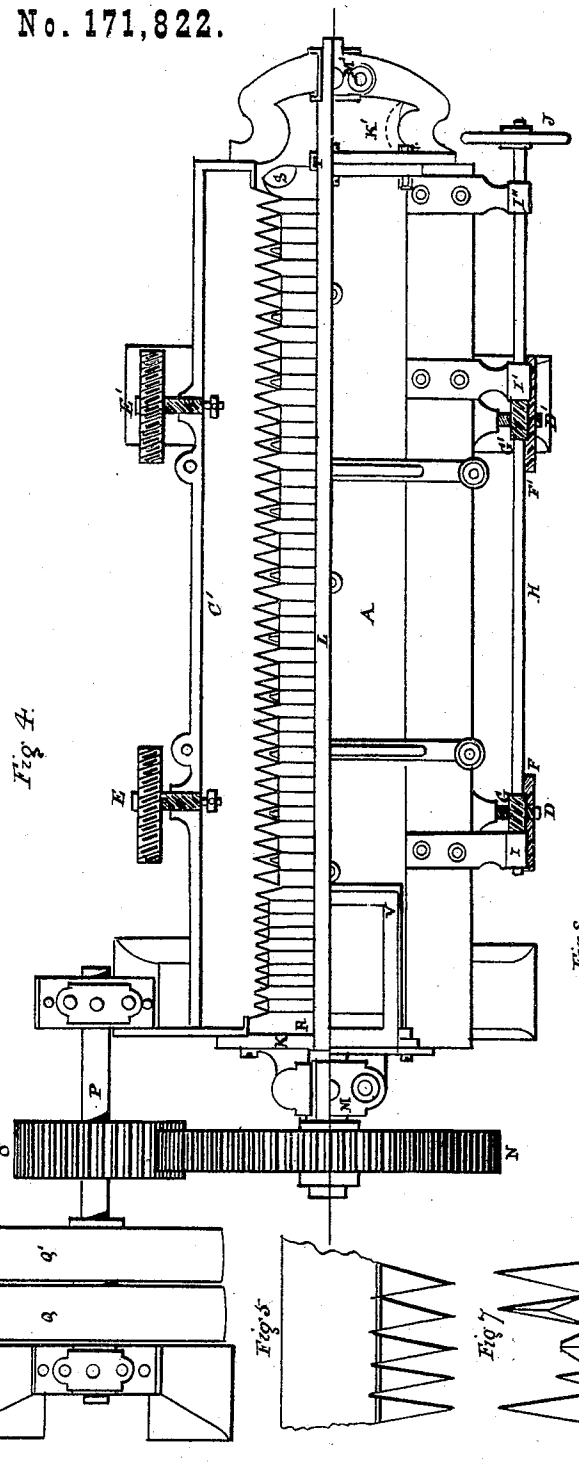

Fig. 4.

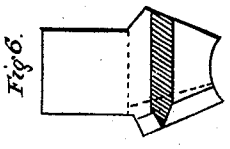

Fig. 6.

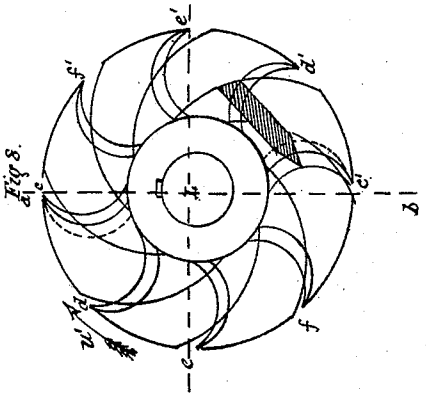

Fig. 8.

Fig. 5. Fig. 7.

Witnesses
W. L. Coombs
H. K. Cohen

Inventor:
Jean Prosper Labrousse
By James L. Norris.
Atty.

UNITED STATES PATENT OFFICE.

JEAN PROSPER LABROUSSE, OF SAINT JUNIEN, HAUTE VIENNE, FRANCE.

IMPROVEMENT IN STOCK-GRINDERS FOR PAPER-PULP.

Specification forming part of Letters Patent No. **171,822**, dated January 4, 1876; application filed November 30, 1874.

To all whom it may concern:

Be it known that I, JEAN PROSPER LABROUSSE, of Saint Junien, Haute Vienne, France, have invented certain Improvements in Paper-Pulp-Making Machines, of which the following is a specification:

This invention relates to the reduction of various matters suitable for conversion into paper-pulp—such, for instance, as straw, wood, rags, and so on—the machinery for effecting this being so arranged that, by the simple change of the position of the tools, it can reduce any one of the substances above enumerated.

The apparatus consists of a hollow cylinder, A, in two parts, united by bolts, and supported by the two uprights of the frame B B′. This cylinder is supplied internally with two pieces, C and C′, in form of a comb placed and working with gentle friction in the chambers or rectangular parts bearing the cylinder A. (See Figs. 1 and 4.) The letters C C′ represent two metallic bars setting in longitudinal recesses on opposite sides of the cylinder A, their inner edges being provided with a series of comb-teeth. Said metallic bars are provided with adjusting-screws D D′, each provided with the wheels F F′ at the outward ends, which gear into and are operated by the worm-gearing on the shaft H, each of said shafts being provided with a hand-wheel, J, for operating the same. By means of said screws and gearing the metallic combs C may be adjusted toward or away from central shaft L, which is provided with screw-blades, as hereinafter described. The cylinder A is closed at one end by the cap K having an opening of the same diameter as the shaft L. This cap is bolted with the cylinder, and bears a bracket, M. At the other end of the cylinder a cap, K′, is fixed, but this latter has a circular opening (*vide* Fig. 4) a little smaller than the inside of the cylinder, and it likewise bears a bracket, M′. In these two brackets a shaft, L, is placed, on which is fixed a cog-wheel, N, which gears with the pinion *o* fixed on the shaft P. On this same shaft P two pulleys, Q Q′, are placed, one loose, and the other fixed for receiving the movement, which is consequently transmitted to the shaft L, and on which also is fixed, first, against its shoulder, a circular plate, R, of the same diameter as the interior of the cylinder, but capable of turning freely, and having a slight space between the cap K and itself; second, a series of blades; third, a screw, S, the whole being firmly connected by the nut T, so as to form one piece only with the shaft L.

In order to show more clearly the form and disposition of the blades on the shaft, as well as that of the teeth of the pieces C C′, two views are shown, on a larger scale, (*vide* Figs. 7 and 8,) of a part of the shaft L, armed with its blades, and two views, Figs. 5 and 6, of a part of one of the pieces C C′.

As shown by Fig. 8, a transverse section of the conical part of one of the blades is illustrated, showing that the conical part is formed of two conical surfaces, and, moreover, that the two edges are chamfered off so that this side presents only one rounded edge, which is no longer in the axis of the blade, since one of the chamfers is greater than the other. The same is the case with the teeth of the pieces C C′, Fig. 6. A transverse section of one of the teeth shows that the cone of the teeth is formed of two conical surfaces, and that the edges of one or two other sides are chamfered off, but one more so than the other, so that this side only presents one rounded edge, and which is no longer in the axis of the teeth. It should be mentioned that these teeth, which are of a piece with those C C′, could be supported, or the pieces C C′ formed of several pieces, or as many as each have of teeth, provided that they are solidly united so as only to form the two parts C C′.

The direction of the rotary movement of the shaft L from left to right is shown by the arrow V. The first blade on the shaft L is placed against the plate R, Fig. 4, in a position in relation with the direction of motion, in the same position as shown, Fig. 8, and placed in relation to the vertical line *a b*, and in accordance with the movement shown by the arrow V′. The second blade is placed against the first one-eighth of a turn in rear of the first, the third is placed one-eighth of a turn in rear of the second, and so on. Against the last one the two-winged screw S is placed. This is of the same thread as the screws formed by the blades; for if a line is passed

from the points *c d e f*, Fig. 8, this line will be a screw-line of a left thread, having for its dimensions eight times the thickness of a blade. Again, if another line is passed by the points *c' d' e' f'*, another screw is formed—that is to say, that the shaft L, thus armed with its blades, (see Fig. 7,) represents a double-thread screw or a left thread, a section of which at its axis would have for its figure the same as that of the blades seen in Fig. 8, and on which screw the threads would be cut by a series of circular and conical notches, as shown, Fig. 7.

Figs. 3 and 4 show that the pieces C C' and the shaft L, armed with its blades, are so placed that the blades of the shaft in turning pass in the spaces existing between the teeth or blades of the pieces C C', and that the teeth of the pieces C C' pass between the spaces or conical notches existing between the blades or teeth of the shaft L. If, by means of the fly-wheels J J', the pieces C C' are approached toward the shaft L, their teeth will touch the teeth of the shaft by their conical surfaces, and produce friction.

It should be remarked in Fig. 4 that the first teeth of the pieces C C', which are in front of the opening or funnel V, are much shorter than the others; consequently those also of the shaft L, which face them. It is in order that the matter that is to be crushed, and which is inserted in this opening, should not be taken in too large a quantity at a time, which prevents gorging the machine. By this it will be observed that if some straw, for instance, is placed in the funnel V, and that the shaft P is set in motion, it communicates its motion to the shaft L in the direction of the arrow V. Then the blades or teeth of this shaft, which, as stated, only present a rounded edge, take the straw by their bent or concave side and engage it between the teeth of the piece C, so presenting it also to the side which only offers rounded edges, and the chamfers of all its teeth admit of the straw engaging between the teeth of the shaft and those of the piece C. The straw having already received a first crushing between these teeth, is again presented below to the teeth of the piece C', which are in the same condition as the first, and so on, in succession, the blades continue to take fresh straw and pass it between all these teeth; and it will be understood also that, by the disposition of the blades in form of a screw, and being more chamfered on the side where the paste should be pushed than the other, the straw or paste passes from one blade to another in following the screw formed by the blades of the shaft L, and reaches the screw S, which finishes by taking it as it leaves the cylinder. Moreover, the straw, which is only paste or paper-pulp, on leaving the cylinder, has been entirely crushed and torn between the teeth of the pieces C C' and of the shaft L without being cut or reduced to powder, as no cutting-edge is presented to it while in motion—that is to say, the paste or pulp is formed of fibers more or less long, but infinitely fine, which give solidity to the paper, and improve its quality. The same is the case with rags or other matter employed to make paper, according as it is desired that the paste should be more or less finely reduced. So the pieces C and C' of the shaft L are drawn closer or separated, so that the teeth of the pieces and those of the shaft more or less approach one another, so that there is more or less play between them.

In order that the teeth which first receive the substance to be crushed should not be overworked, the two pieces C C' can be placed so that when the teeth at the exit side of the pulp touch those of the shaft L, there will be more or less play between those at the opposite end—that is to say, those receiving the matter to be reduced.

Taps or cocks *r r' r''* are placed on the cylinder A to convey the requisite water for forming the paste; or, in other words, that in leaving the cylinder they are ready for making the paper. The paste in leaving can be directly conveyed to the paper-machine, or in a vat, where is an agitator, and from the vat to the paper-machine.

I claim as my invention—

The combination of the hollow cylinder A, adjustable, serrated, or dentated bars C C, and the shaft L mounted with screw-blades, the whole constructed to operate substantially as described.

JEAN PROSPER LABROUSSE.

Witnesses:
E. HÉBRÉ,
AL. HENDERSON.