

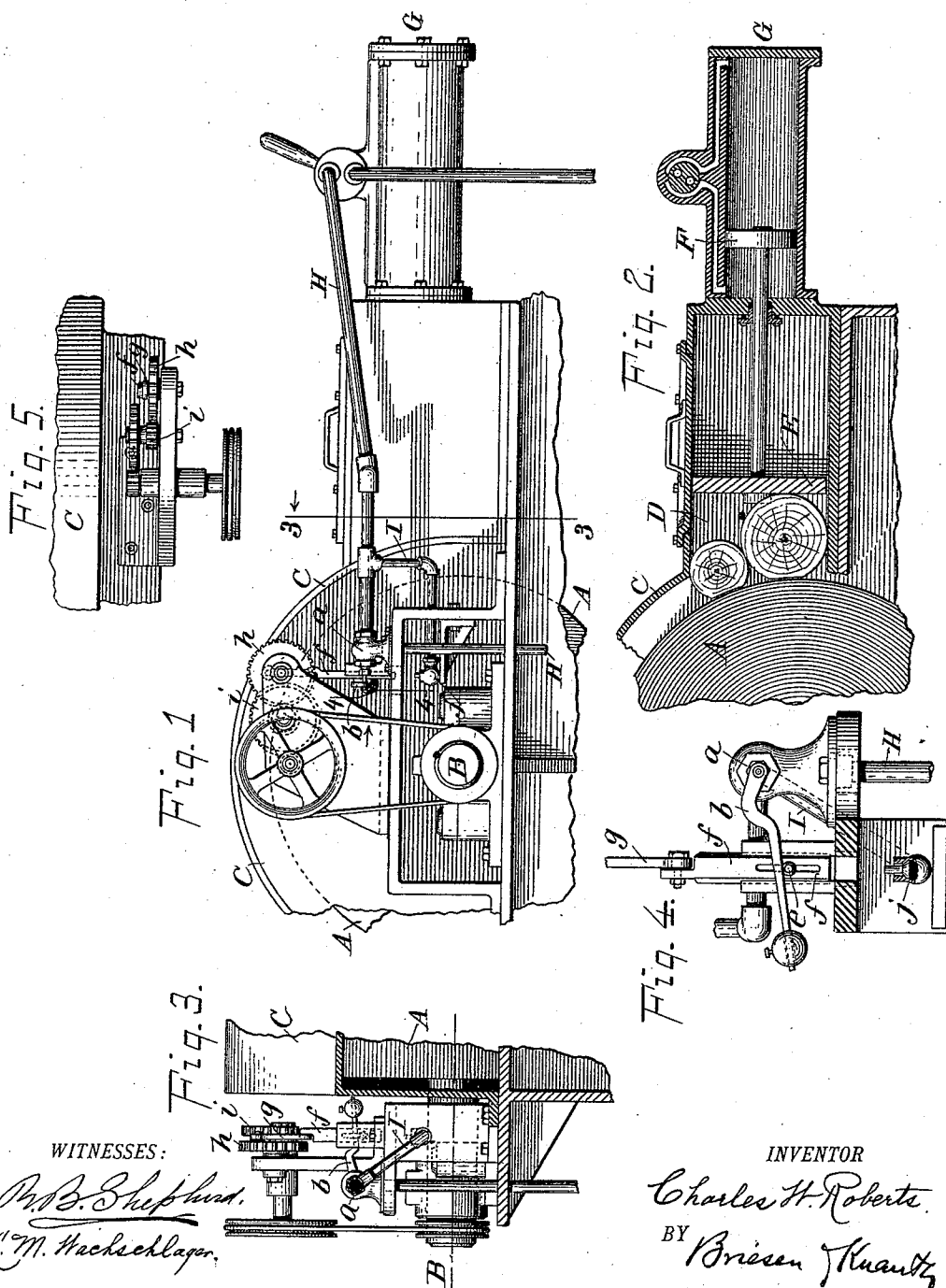
(No Model.)

C. W. ROBERTS.

METHOD OF AND APPARATUS FOR PRODUCING WOOD PULP.

No. 527,812.

Patented Oct. 23, 1894.



WITNESSES:

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METHOD OF AND APPARATUS FOR PRODUCING WOOD PULP.

SPECIFICATION forming part of Letters Patent No. 527,812, dated October 23, 1894.

Application filed September 19, 1893. Serial No. 485,806. (No model.)

To all whom it may concern:

Be it known that I, CHARLES WINSLOW ROBERTS, a resident of North Bennington, Bennington county, in the State of Vermont, have invented an Improvement in Methods of and Apparatus for Producing Wood Pulp, of which the following is a specification.

This invention relates to improvements in methods of and apparatus for producing wood-pulp. In machines of this character it has been customary to press the wood to be ground into pulp by means of hydraulic or other pressure against the periphery of a rotary stone, and to keep up this pressure until the wood has been practically consumed. While the ordinary machinery is in action, the wood being pressed tightly against the revolving stone exerts a pressure analogous to that of a brake on said stone, consequently requiring great force for overcoming this pressure. Meanwhile and as the stone revolves its surface becomes covered with the matter ground from the wood, and gradually becomes smoothed and less effective than at first.

Now, the object of my invention is to so arrange machinery of the kind referred to that the surface of the stone may from time to time be liberated from the particles of pulp adhering to it, and so that during the rotation of the stone and its action upon a given quantity of wood in a pocket, the stone will be given many opportunities for starting the grinding operation *de novo*, instead of simply as heretofore continuing in its hold upon the wood once pressed against it.

In order to accomplish these objects, my invention consists in alternately feeding the wood to the stone, and arresting the feed and then again resuming the feed, and so on, at intervals between the beginning of the grinding and the final grinding away of the wood in the receptacle. By this means I am enabled to produce a better quality of pulp with a less expenditure of power than was heretofore necessary.

In the accompanying drawings I have illustrated one form of contrivance for carrying my invention into effect; but right here I desire to have it stated that my invention is not limited to the arrangement of parts shown in the drawings, nor to any particular means for feeding the wood, whether the same be

hydraulic, steam or electric power, nor to any details, with the exception of those specifically pointed out in the claims.

In the drawings, Figure 1 represents in side elevation a portion of a pulp-grinder containing my invention. Fig. 2 is a vertical longitudinal section of a portion of said pulp-grinder. Fig. 3 is a cross-section on the line 3—3, Fig. 1, looking in the direction of the arrow. Fig. 4 is a detail cross-section on the line 4—4, Fig. 1, looking in the direction of the arrow; and Fig. 5 a detail top view of the transmitting mechanism shown in Fig. 1.

In the drawings the letter A represents the rotary stone mounted upon a suitable shaft B, and arranged to revolve within a suitable housing C. This housing communicates with a pocket or chamber D, (Fig. 2) in which the wood to be ground is intended to be contained. Within this pocket is a plunger E, moved by a piston F, which piston has motion imparted to it by water or other means admitted to a cylinder G. The same pulp-grinder may have but one pocket D, with its corresponding plunger and piston, &c., or a series of pockets, and instead of moving the plunger E by means of a piston F, it may be moved by any other mechanical contrivance. The drawings are intended to show a grinder which is operated by water, which is admitted to the cylinder G by a pipe H. In this pipe is a suitable valve at *a*, which has a weighted crank or projection *b* by means of which said valve can be moved to admit water to the cylinder G, or to entirely withhold it therefrom. The crank or projection *b* of the valve *a* can be moved to open the valve by means of projecting pins *e* on a slide *f*, which slide connects by a pitman *g* with a crank-wheel *h*, which crank-wheel, preferably by intermediate gearing *i* and pulleys *x z*, receives rotary motion from the shaft B, as indicated. The intention is to have the slide *f* move quite slowly so as to close the valve in the supply pipe at the point *a*, say at the end of every ten seconds. The said valve will be closed by the weight on its crank lever or by analogous means, and will thereafter be opened by the pin *e* upon the slide *f* ascending. The water supply pipe H has a branch pipe I in which there is a relief-valve at *j*, provided with a stem *k*, which valve-stem is directly

beneath and in the path of the slide *f*, as shown in Fig. 4.

It follows from the foregoing description that as the slide *f* descends the valve at *a* which admits water by the pipe *H* to the cylinder *G* is closed, thereby necessarily arresting the forward motion of the plunger *E*, and that in continuing to descend the said slide *f* strikes the valve-stem *k* of the valve at *j*, thereby opening an escape for the water in pipes *H* *I*, relaxing the pressure behind the piston *F* and permitting the plunger *E* to slightly retract from behind the wood which it had up to that time pressed against the grinding-stone *A*.

I will repeat that in many machines of this character heretofore made for grinding wood-pulp, there is a steady continuous feed or pressure from the time the wood is put into the pocket of the grinder until the wood is ground into pulp, after which the plunger is drawn back and the pocket again filled with wood. Under my process and with my apparatus the pocket is first filled with wood, the pressure then thrown on and the plunger made to start forward, forcing the wood against the stone for say ten seconds of time. Then the plunger is made to stop and to slightly retreat (by opening the valve at *j*), and after that made to start forward again; but in many cases the relief-valve *j* may be omitted, in which case that part of my invention which consists in arresting the plunger from time to time will be brought into action without means for retracting it; in other words, the plunger is made to stop without retreating, and then to start forward, and so continue to start, stop, and retreat (when the valve at *j* is used), or to start and stop and start (when the valve *j* is not used).

Under the old system of grinding with steady continuous feed, forcing the wood against the stone, the action is very much like that of a brake, but with my alternating feed, whenever the plunger stops or stops and retreats, the wood ceases to press against the stone, the power is released from the brake-like action of the wood, and the speed runs up slightly, at the same time preventing the stone from becoming heated and the particles from adhering and being pressed upon each other, as in the continuous feed. While liberated from pressure, the stone *A* revolving in the pulp-vat or pulp-pit is to a large extent freed from the adhering particles of wood, so that in restarting the pressure, the stone revolving at a higher rate of speed than before, takes a new bite, so to speak, on the wood, and in addition thereto readjusts the wood for

the new grinding step. The relieving of the pressure, and the stopping of the plunger, allows of the carrying of a much higher pressure while the wood is in contact with the stone than can be had where continuous pressure is exerted. As a matter of fact the higher the pressure the better the fiber will be when ground. When the wood is pressed against the grinding stone by a steady continuous pressure, as heretofore, the grain or grinding face of the stone becomes filled and packed with pulp; but upon stopping the plunger according to my process the stone does not have a chance to become heated or packed and partially clears itself in the pulp-pit, so that when the plunger starts again, the stone presents a clean cutting surface to the wood. As the result of this I obtain an improved quality of pulp with the aid of higher pressure, and an increased production with the same degree of power which is used in other known methods of grinding, the increase of output being quite considerable.

The apparatus represented in the drawings and hereinabove particularly described is illustrative of one form only, in which my invention may be clothed. Other equivalent means for arresting at stated intervals the forward feed of the wood and for relaxing the pressure will readily occur to the skilled mechanic.

Having described my invention, what I claim is—

1. The herein described method of producing wood-pulp which consists in feeding wood against a grind-stone, arresting the feed at recurring intervals between the beginning of the grinding and the final grinding away of the wood in the receptacle sufficiently to allow the stone to temporarily attain a higher rate of speed during each period of arrest, and resuming the feed after each arrest, substantially as specified.

2. In an apparatus for grinding wood into pulp, the combination of a wood receptacle, a grind-stone and a fluid pressure operated plunger for moving the wood toward the grind-stone, a fluid supply pipe for the plunger operating mechanism, a valve in the fluid supply pipe, and mechanism connected to the shaft of the stone for opening and closing the valve at intervals during one complete forward movement of the plunger, substantially as described.

CHARLES WINSLOW ROBERTS.

Witnesses:

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J. A. CONNELLY.