

J. H. Hawes.
Wood Grinder.

Nº 89,221.

Patented Apr. 20, 1867.

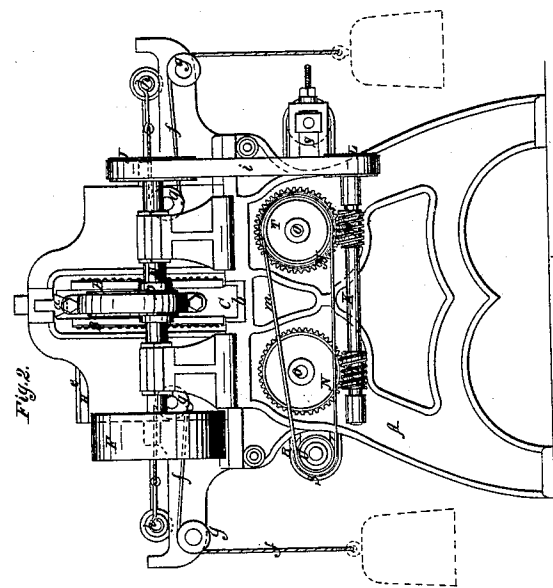
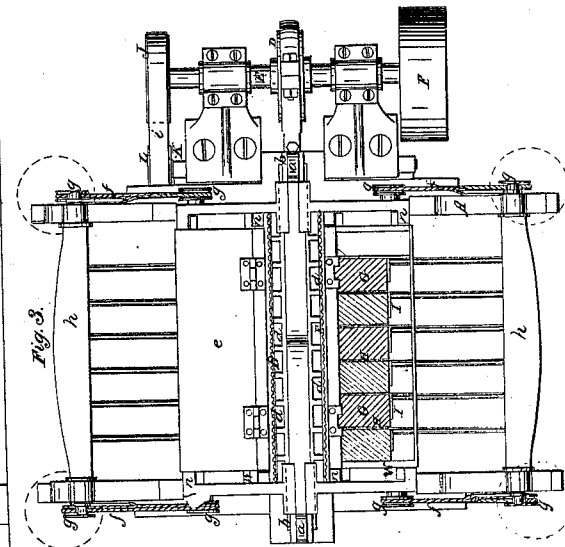
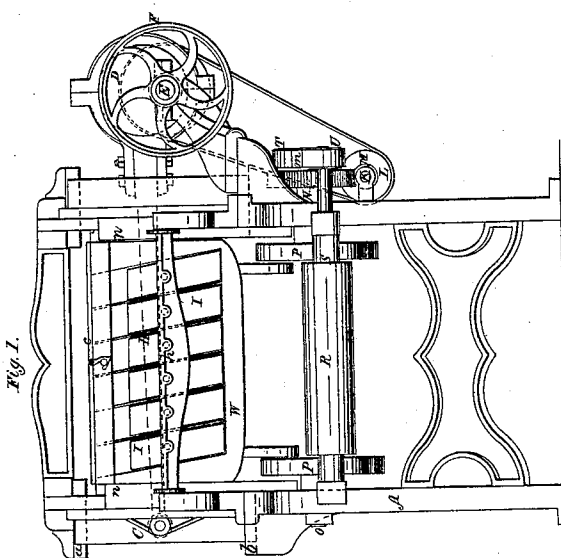
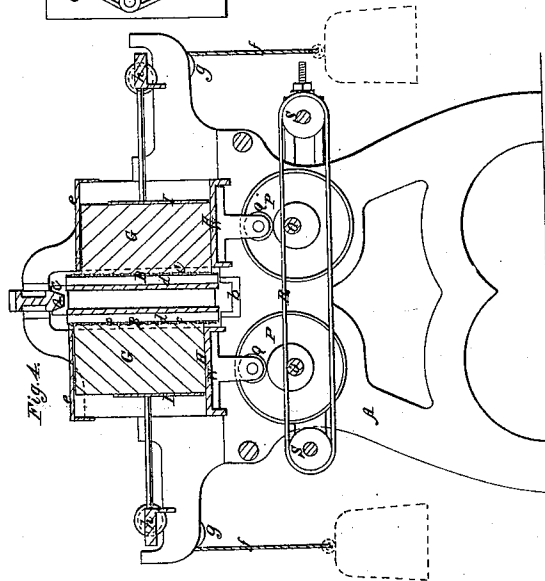
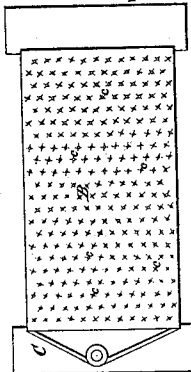


Fig. 3.



Witnesses.

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UNITED STATES PATENT OFFICE.

JACOB H. HAWES, OF STOCKBRIDGE, MASSACHUSETTS, ASSIGNOR TO THE
HAWES PATENT WOOD PULP COMPANY, OF SAME PLACE.

IMPROVEMENT IN REDUCING WOOD FOR PAPER-STOCK.

Specification forming part of Letters Patent No. **89,221**, dated April 20, 1869.

To all whom it may concern:

Be it known that I, JACOB H. HAWES, of Stockbridge, in the county of Berkshire and State of Massachusetts, have invented a new and useful Improvement in Reducing Wood for Paper-Stock, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, forming part of this specification, and in which—

Figure 1 represents a front or end view of a machine embracing my improvement; Fig. 2, a side view of the same; Fig. 3, a plan thereof; Fig. 4, a longitudinal vertical section of said machine; and Fig. 5, a front view of one of the graters with grater-frame detached.

Similar letters of reference indicate corresponding parts.

In reducing wood for paper-stock both grindstones and rasping devices have been employed; but both of these are more or less defective. A rasping operation in fact, though well adapted for reducing bodies or materials of granular structure, is unsuited to those of a fibrous character, while a grinding operation is likewise attendant with clogging or fouling and accomplishes in a very imperfect manner the desired result.

My invention embraces a machine made up of a grater or graters and a follower or followers holding the wood to be reduced in between them, the grater or graters being driven automatically to act upon the surface of the wood exposed to its or their action, while the follower or followers force up the wood against the grater or graters, the reduced wood or particles falling through the latter, which are thus relieved of fouling or clogging, while the sharp and jagged or peculiar character of the grating surface or surfaces effects a more perfect reduction than is attainable either by grinding or rasping. In some cases it may be preferred to give the wood an automatic movement along or over the face of the graters, which, in such case, may also move or be stationary, also be preferred to force up the graters against the wood; but the principle of action is the same in either case. Said movement may either be a reciprocating or a rotary one; but the former is considered preferable. The grater or graters may either be set vertical, horizontal, or otherwise.

The invention also includes such a compound movement or cross action of parts as that the reducing protuberances on the grater are prevented from grooving the wood; and it furthermore embraces particular combinations for securing an efficient and automatic action of the working parts of the machine.

Referring to the accompanying drawing, A represents the frame of the machine, the same being of any suitable construction. B B are graters, carried by a frame, C, which is set to reciprocate across the machine in upper and lower ways, *a b*, on opposite sides of the machine. These graters are shown as occupying vertical positions, and arranged parallel to each other, with their holes or grating protuberances *c* punched from their rear sides or faces, and with suitable passages *d d* at back of them for escape of the reduced wood or grated particles.

The reciprocating movement may be given to the grater-frame by means of an eccentric, D, on a main revolving shaft, E, to which motion may be communicated through belt by a pulley, F.

The wood to be reduced is cut into blocks G G of suitable size, and dropped through top openings covered by lids *ee* into fixed compartments or chambers H H, constructed to retain the blocks endwise and against lateral play, but admitting of said blocks' free movement up against or toward the graters B B by or through the action of followers I I, which may either be acted upon by springs or be forced up by weights attached, for instance, to cords or chains *ff*, which are passed over pulleys *gg* and secured or hooked onto cross-bars *hh*, to which the rods of the followers are secured.

It is preferred to cut the blocks G G, and to construct the chambers H H, in which they lie, so that, as regards the direction of the fiber, said blocks will partake of a compound obliquity—namely, be oblique to the plane of the grating surface, and oblique also to the line or directions in travel of the grater; but, as this feature forms the subject of a separate application for patent, no further reference need here be made to it.

The frame or frames of compartments H H, which carry the blocks G G, it is preferred

to give a slow up-and-down or cross movement to, for the purpose of varying the travel of the grating protuberances *c*, so that as they reciprocate across the machine they will be restrained from grooving or working in the same lines across the faces of the blocks, whereby a more perfect and regular reduction of the wood is secured and the blocks made to retain a more level or even surface to the action of the graters. Such action to the blocks *G G*, or it may be to the graters in place of the wood, or to both conjointly, may be produced in various ways or by means of different mechanical devices. Thus, on the main shaft *E* may be hung a pulley, *J*, which, through a belt, *i*, conveys motion to a shaft, *K*, through a pulley, *L*. This shaft *K* has fast on it screws *M M*, which are arranged to gear with worm-wheels *N N* fast to cross-shafts *O O*. On these cross-shafts *O O* are eccentrically-grooved wheels or disks *P P*, made to receive rollers *Q Q*, connected with the frames *W W* of the compartments *H H*, so that as said eccentrically-grooved disks revolve they communicate a slow up-and-down movement to the frames *W W*, which may be suitably guided in or by ways *n n* to direct such vertical play.

R is an endless traveling apron, carried by end drums or rollers *S S*, to the shaft of one of which motion may be communicated by pulleys *T U* and connecting-belt *m* for the purpose of carrying off the reduced wood or grated particles as the same are received onto the apron from the spaces *d d*.

The ready clearance afforded for the grated particles through the graters prevents all fouling or choking of the latter, while the sharp and peculiar character of the reducing-surface which is incidental to a grater, and more especially when combined with a double movement of the grater, or grater and wood, to prevent grooving of the latter, as described, serves to effect a fine and most perfect and regular reduction of the wood for paper-stock.

In the machine constructed as represented in the accompanying drawings, two graters are shown, and so arranged as that a counter-acting pressure is produced by the forcing up of the wood on opposite sides of the frame *C* which carries the graters, whereby lateral friction is avoided in or to said frame against the ways in which it slides or reciprocates. It also is desirable, under such a duplicate arrangement of graters, that the frames which carry the blocks of wood to be reduced should have their slow cross movements relatively to the reciprocating travel of the graters in reverse directions simultaneously, so as to pro-

duce a counteracting draft on the carrying slide or frame of the graters. This is the case in the machine shown in the accompanying drawing, wherein the eccentrically-grooved disks that operate said frames or slides are set to occupy reverse positions. A single grater, however, may be employed. Said grater or graters may either be constructed as described, or their rasping-surfaces drilled or otherwise perforated.

What is here claimed, and desired to be secured by Letters Patent, is—

1. The combination of a grater or graters and wood-holding frame or frames with a follower or followers so arranged and operating as that by the travel of the grater over the edge or face of the wood presented to it, or travel of the wood over the face of the grater and action of the follower or followers, said wood is automatically worked up and reduced, and its reduced or grated particles passed off through the grater for the purpose of producing paper-stock, substantially as specified.

2. The combination of the block-holding frames *W W*, divided into compartments *H H*, as described, with the automatic followers *I I* and the reciprocating graters *B B*, having clearance spaces or passages *d d* at their backs, essentially as and for the purpose herein set forth.

3. In a combination of mechanism for reducing wood to paper-stock by grating, giving to the wood or blocks a reciprocating cross movement relatively to the travel of the graters, substantially as specified.

4. The arrangement of the reciprocating grater-frame *C* with its graters *B B*, clearance spaces or passages *d d*, and endless apron *R*, essentially as shown and described.

5. The up and down sliding wood-holding frames *W W*, arranged to reciprocate in reverse directions simultaneously, in combination with the grater-frame *C*, arranged to reciprocate in a crosswise direction thereto, and provided with opposite graters *B B*, against which the wood is pressed in reverse directions simultaneously, substantially as specified, and whereby increased freedom is secured to the operation of the grater slide or frame.

6. The combination of the eccentrically-grooved disks *P P*, the rollers *Q Q*, connected with the cross or vertically-sliding wood-holding frames *W W*, and the reciprocating graters *B B*, essentially as shown and described.

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Witnesses:

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