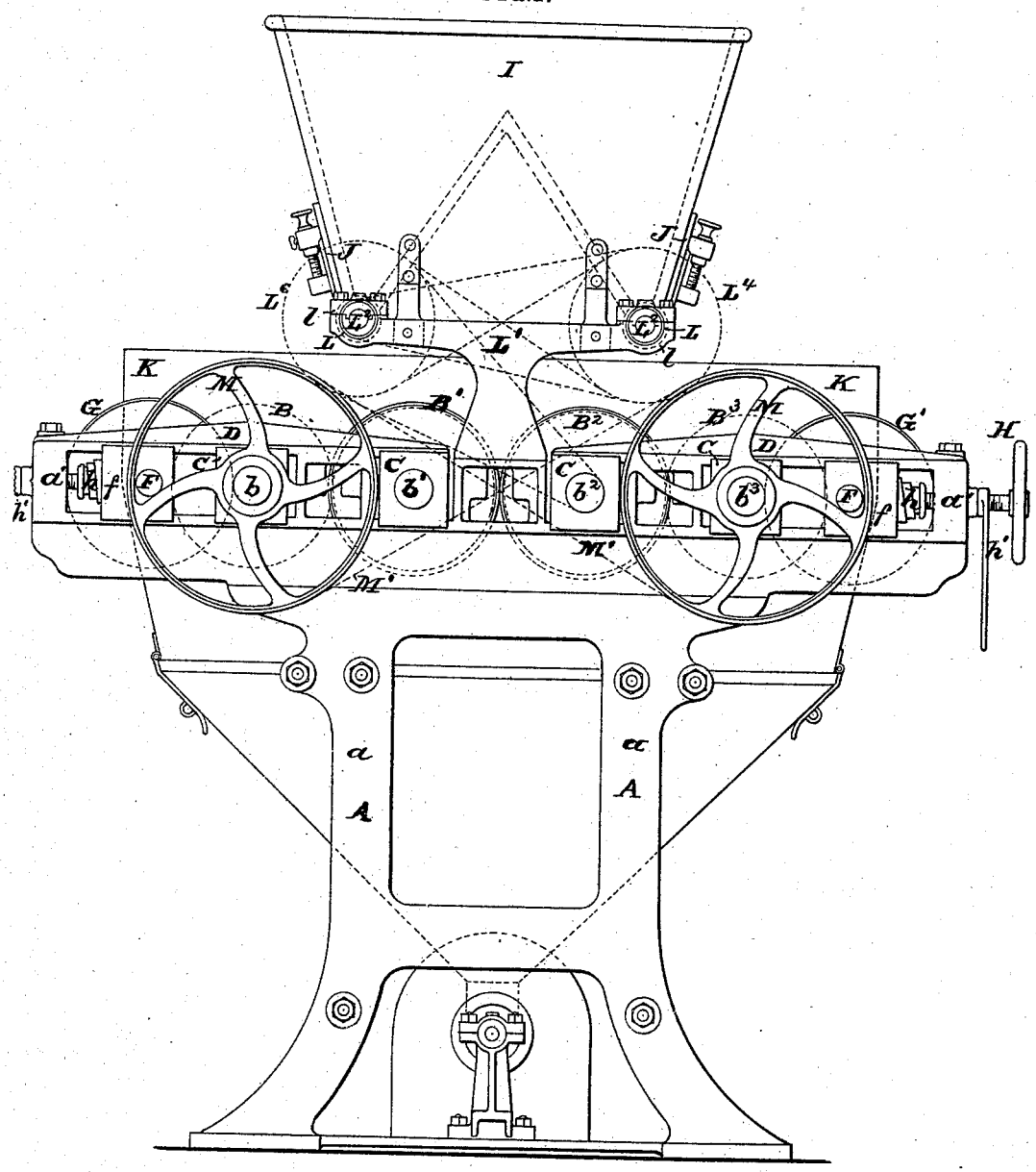
3 Sheets—Sheet 1.

W. BRAUN.

Roller Apparatus for Crushing and Grinding Grain

No. 211,292. **Patented Jan. 14, 1879.**

FIG. 1.



ATTEST:

Saml. S. Boyd

Paul Bakewell

INVENTOR:

Wilhelm Braun

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atty.

3 Sheets—Sheet 2.

W. BRAUN.

Roller Apparatus for Crushing and Grinding Grain.

No. 211,292. **Patented Jan. 14, 1879.**

FIG. 2.

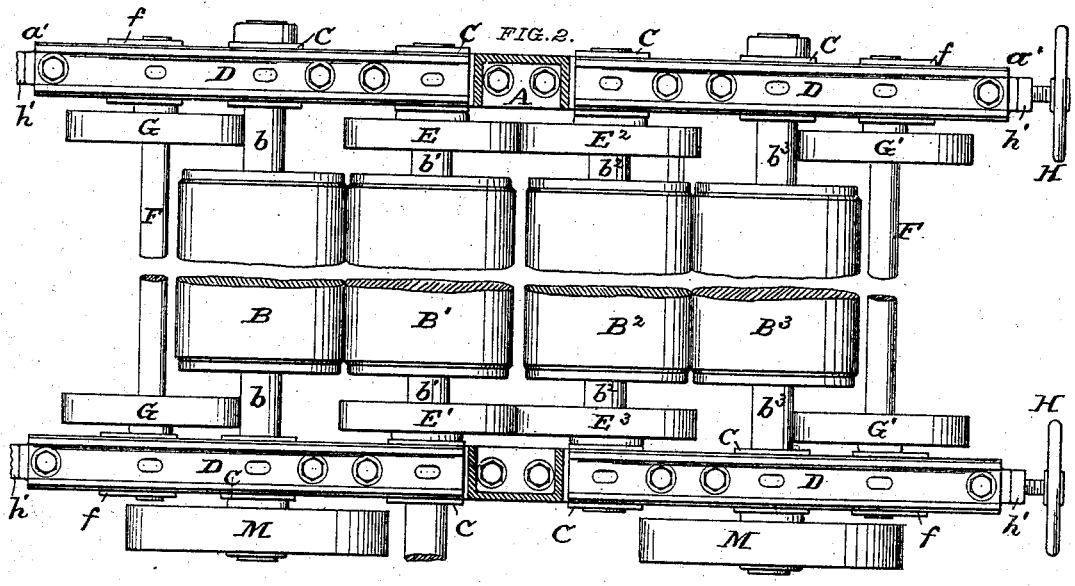

FIG. 3.

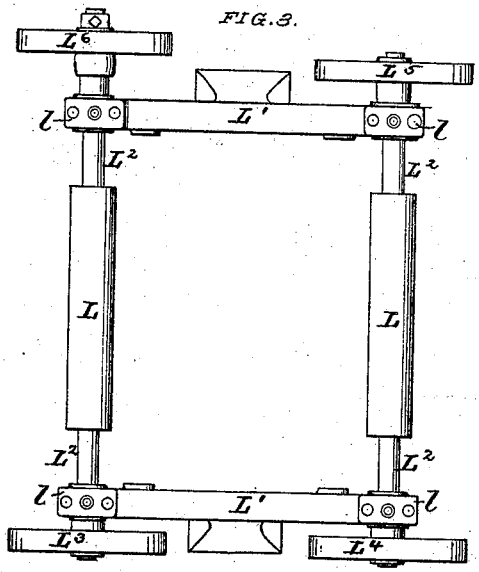

FIG. 4.

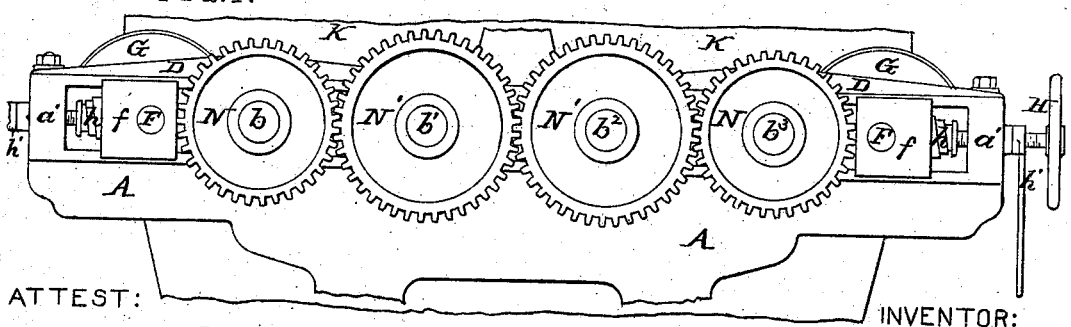

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FIG. 5.

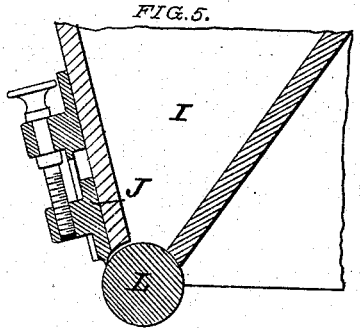
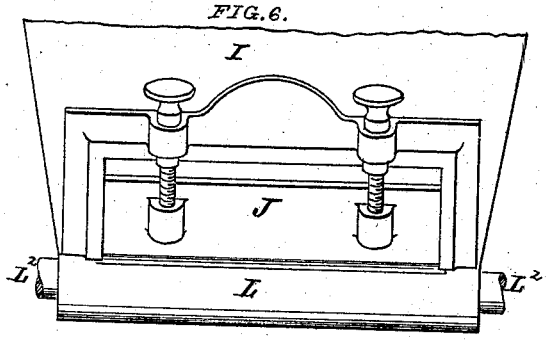
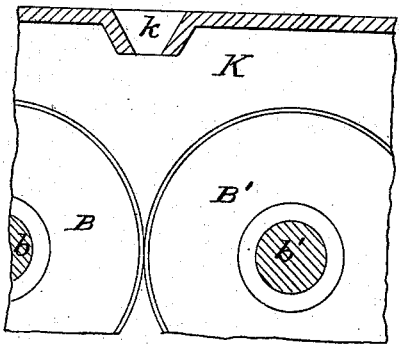


FIG. 6.





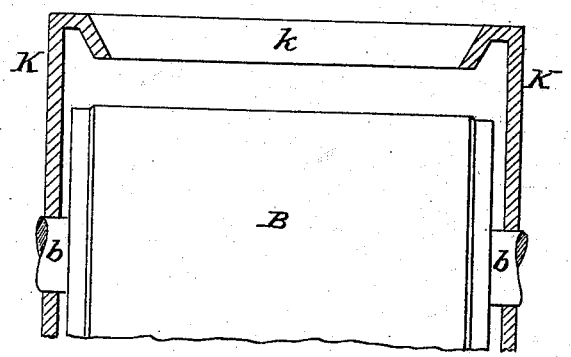


FIG. 7.

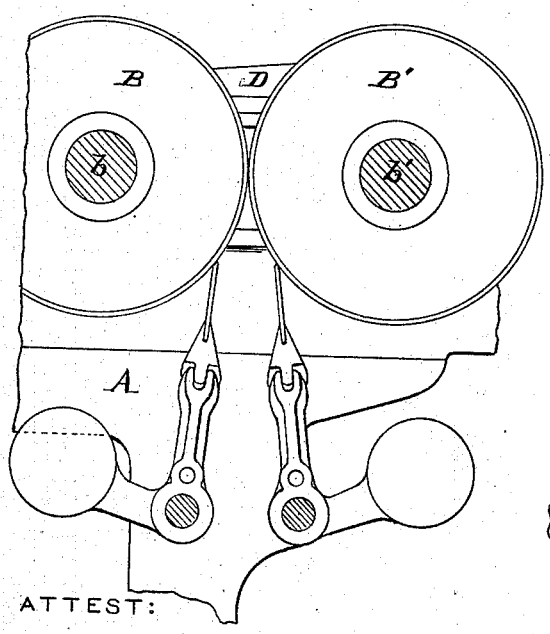
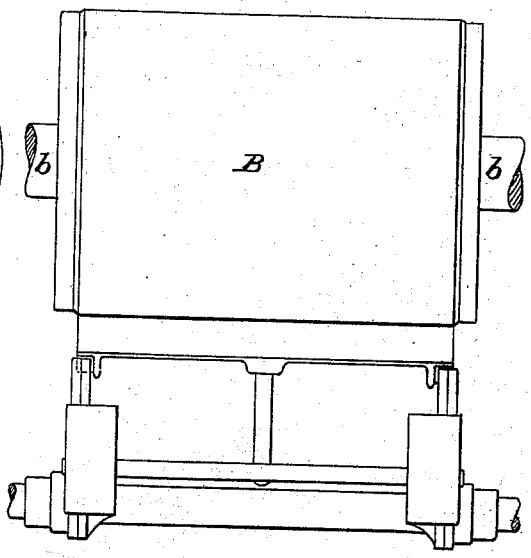


FIG. 8.



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UNITED STATES PATENT OFFICE.

WILHELM BRAUN, OF CARLSBAD, AUSTRIA, ASSIGNOR TO JOHN WEBER, OF USTER, SWITZERLAND.

IMPROVEMENT IN ROLLER APPARATUS FOR CRUSHING AND GRINDING GRAIN.

Specification forming part of Letters Patent No. **211,292**, dated January 14, 1879; application filed May 20, 1878.

To all whom it may concern:

Be it known that I, WILHELM BRAUN, a resident of Carlsbad, Austria, have invented new and useful Improvements in Machines for Crushing and Grinding Grain, Flour, and Meal, of which the following is a full, clear, and exact description, reference being had to the annexed drawing, making part of this specification, in which—

Figure 1 is a side elevation of the machine containing the improvements; Fig. 2, a plan, the hopper being removed; Fig. 3, a plan showing the rolls for feeding the grain from the hopper, and the mechanism immediately therewith connected; Fig. 4, a side elevation of a portion of the machine, showing a modification in the gearing, and as when one of each pair of the rolls is to be rotated at a different rate from that of the other; Figs. 5 and 6, details, being, respectively, a vertical longitudinal section and an end elevation of that portion of the construction that is connected with the feeding of the grain into the cylinders; and Figs. 7 and 8, details, being similar views of the mechanism for cleaning the cylinders.

The same letters of reference represent the same parts.

In many of the operations and processes in milling it has been found advantageous to substitute cylinders for millstones for the purpose of crushing the grain or flour in place of grinding it.

The present invention has relation to machines having such cylinders, and to the means for hanging, arranging, adjusting, and operating them. It is especially adapted to machines having porcelain cylinders.

Referring to the annexed drawing, A represents the frame of the machine, consisting mainly of two uprights, *a a*. B B^1 B^2 B^3 represent the cylinders or rolls for crushing the grain. They are attached to the shafts *b* b^1 b^2 b^3, which are hung in boxes C C C C C C C C, that rest upon the uprights, and confined thereon by the caps D D D D. The cylinders are in pairs, forming a double run, B B^1 and B^2 B^3.

The axles or shafts b^1 b^2 of the two inner cylinders are further and respectively provided with rollers E E^1 E^2 E^3, that come in contact, as shown, and so as to bear and turn upon each other—that is, the rollers E E^1 upon the rollers E^2 E^3, respectively.

F F represent shafts arranged, respectively, at either end of the machine and hung in boxes *f f f f*, that are arranged similarly to the boxes C C. These last-named shafts are respectively provided with rollers G G G′ G′, that bear and turn upon the shafts *b* b^3, respectively.

H H H H represent set-screws passing through the ends of the uprights *a a*, and so as to bear against the boxes *f f f f*, or rather against springs *h h h h*, that in turn bear against the boxes *f f f f*. By means of the set-screws the boxes can be moved on the uprights, and so as to cause the rollers G G G′ G′ to bear against the shafts *b* b^3 and move them, and thereby bring the cylinders B B^3 closer to the cylinders B^1 B^2, respectively.

Thus made and arranged, it is seen that the strain is almost entirely taken away from the boxes C C, the office of the latter being confined to keeping the shafts of the cylinders in position vertically. The rollers E E^1 E^2 E^3 remove the strain from the four inner boxes C C C C, and the rollers G G G′ G′ remove the strain from the four outer boxes C C C C, and, as the rollers G G G′ G′ are much larger in diameter than the shafts *b* b^3, the shafts F F turn much slower than the shafts *b* b^1 b^2 b^2, and hence the boxes *f f f f* are not liable to be heated. This important advantage, therefore, is derived from this arrangement: The cylinders can be readily adjusted to any desired point, and there firmly held, without any vibration of any of the parts, and without incurring any liability of heating the cylinder-axles, the latter being virtually sustained in roller-bearings. When the screws H are properly adjusted they are fastened by the nuts *h′ h′ h′ h′*. This mode of hanging and adjusting the cylinder-axles is valuable, irrespective of the composition of the cylinders; but it is especially serviceable when the cylinders are made wholly or partly of porcelain. In such case it is very desirable to avoid heating the cylinder-axles, as, in expanding under the influence of the heat, they strain the porcelain, and the latter, from its brittle nature, is liable to be broken.

The grain is fed into the cylinders from the

hopper I, past the adjustable gates J J, and through openings *k k* in covers K K, that are used to protect the cylinders from dust. L L represent the feed-rolls. They are hung in suitable bearings *l l l l* in the frame L^1, that supports the hopper. The feed-roll shafts L^2 L^2 are furnished with pulleys L^3 L^4 L^5 L^6, that are belted, as indicated, by the dotted lines in Fig. 1, the pulley L^6 being driven by a belt leading from the shaft b^2. The advantage of this system is that the belts slip whenever any unusual substance attempts to pass the feed-rolls, and such substances are thus kept from falling into the cylinders. Provision is thus made for the protection of the latter, which, as above stated, are held so that they cannot yield or vibrate. The outer shafts, *b* b^3, are furnished with pulleys M M, of equal size, over which a belt, M′, passes. The shaft b^2 is provided with a driving-pulley. (Not shown.) The cylinders are thus made to turn with equal velocity, and the belt, by slipping, serves to prevent any large substance from passing into the cylinders. The cylinders are thus, by rotating evenly, made to crush the grain without in the least grinding it. Instead of belting, I can use the gearing N N′ N′ N, (shown in Fig. 4,) and, by making the inner gears, N′ N′, larger than the outer ones, N N, a differential speed is imparted to the rolls, and the latter thereby can be made to grind as well as crush. Either four or six or other suitable number of gear-wheels can be used.

I claim—

1. The combination, in a machine for crushing and grinding grain, flour, or meal, of the rolls B^1 B^2, shafts b^1 b^2, and rollers E E^1 E^2 E^3, substantially as described.

2. The combination, in a machine for crushing and grinding grain, flour, or meal, of the rolls B^2 B^3, shafts b^3 F, and rollers G′ G′, substantially as described.

3. The combination, in a machine for crushing and grinding grain, flour, or meal, of the uprights *a a*, shafts b^3 F, cylinder B^3, rollers G′ G′, boxes *f f*, and screws H H, substantially as described.

4. The combination, in a machine for crushing and grinding grain, flour, or meal, of the rolls B^2 B^3, shafts b^2 b^3, uprights *a a*, boxes C C C C, shaft F, and rollers G′ G′, substantially as described.

5. In a machine for crushing grain and flour, and having porcelain rolls, the combination of the roll-shaft and the rollers G′ G′, for the purpose described.

WILHELM BRAUN.

Witnesses:
FRANZ WACH,
FRANZ LANG.