

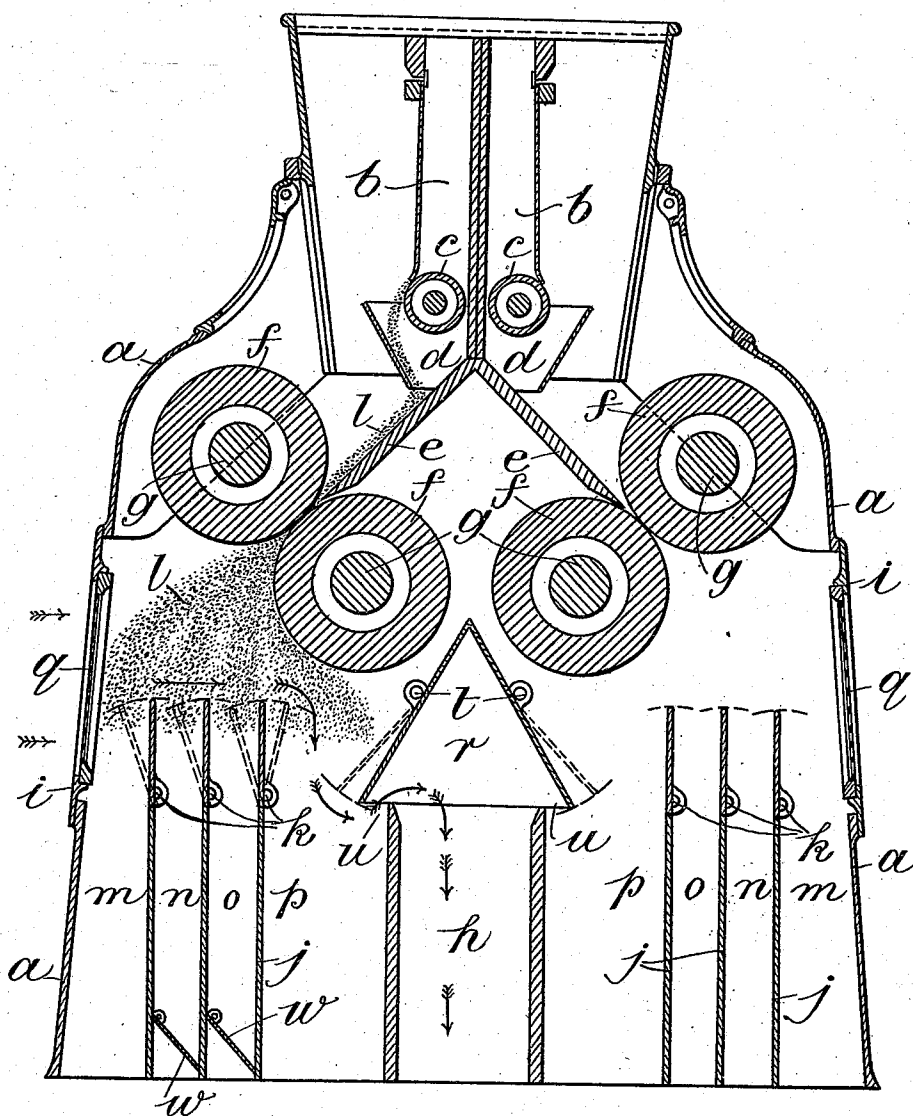
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G. BRIDDON & R. J. FOWLER.

ROLLER MILL.

APPLICATION FILED JAN. 10, 1907.



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UNITED STATES PATENT OFFICE.

GEORGE BRIDDON AND ROBERT JOHN FOWLER, OF MANCHESTER, ENGLAND.

ROLLER-MILL.

No. 881,296.

Specification of Letters Patent.

Patented March 10, 1908.

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To all whom it may concern:

Be it known that we, GEORGE BRIDDON and ROBERT JOHN FOWLER, subjects of the King of Great Britain and Ireland, and residents of Manchester, in the county of Lancaster, England, flour-milling engineers, have invented certain new and useful Improvements in Roller-Mills, of which the following is a specification.

This invention relates to improvements in roller mills used for crushing wheat or other granular substances but specially to such machines known as break rolls in flour mills. The object of the break rolls, as the name implies, is to break down the wheat grains so that the bran, semolina, middlings, dust and flour can be afterwards separated by machines commonly employed for the purpose.

Prior to the date of our invention roller mills have been used in which the rolls, arranged in pairs, have either had their axes in the same horizontal or vertical plane or in a plane at an angle to the horizontal. Where the axes are in the same horizontal plane the larger granules along with the smaller ones, or flour, descend to the bottom of the machine in a practically continuous stream in which the several classes of products are fairly evenly intermixed. In mills, however, in which the axes are in a vertical or inclined plane the broken products in passing from the rollers are, due to velocity imparted to them by the speed at which the rolls revolve, thrown some distance from the point of contact of the rolls, according to their specific gravity, the heaviest being thrown the farthest and the lightest the least distance and thus become separated. Separation is also further effected by the application of air currents. It should, however, be understood that while this separation is effected in the manner aforesaid it has never been taken advantage of hitherto since all the granules again come together at the bottom of the hopper which gathers them for the purpose of conveying to separators as hereinbefore described.

Now it is the object of our invention to retain the natural separation of the several classes of products as hereinbefore referred to in roller mills having the axes of the rollers in a vertical or inclined plane and to prevent their coming together again at the bottom of the mill.

Our invention therefore consists in providing roller mills of the type referred to with

means to keep the granules separated, after being crushed or broken by the rolls.

Our invention will be fully described with reference to the accompanying drawing which indicates a sectional elevation of a modern roller mill constructed in accordance with our invention.

The invention may be carried out in several ways but in general the means employed for so carrying it out are of an extremely simple though important character.

In the drawing *a* represents the ordinary framework of the machine, *b* the passages or spouts down which the material drops to the roller *c* arranged at the top of the hoppers *d*, the grain passing from these latter down inclined planes *e* to the break rolls *f* which are of ordinary construction and which may be arranged with their axes *g* in an inclined plane as represented or in a vertical plane. *h* represents the usual air conduit and *i* removable panels to enable the interior of the mill to be reached when required. All these parts are of ordinary construction; but in carrying out our invention we effect our object of retaining separation of the broken materials passed through the rollers *f* by placing a partition, or partitions *j* across the roller mill and preferably parallel with a plane passing through the axes of the break rolls between the adjacent edges of two or more streams of different sized granules, that is to say the upper edge of each partition is adapted to separate two separate streams of granules.

The partitions may vary in number according to the character of the separation required to be effected and the partitions may be fixed as indicated by broken lines and continued down to the base of the roller mill, their lower edges being located immediately above a plurality of collecting troughs each adapted to convey away the separated product. Each of these troughs may be constructed in a manner well known in connection with flour milling, and the several troughs, spouts, passages, conduits or the like may conduct the separated material to any suitable place in the flour mill or to another roller mill or machine in which still finer separation of the broken products may be obtained either in a similar manner to that described or by any of the usual methods or machines employed.

The partition or partitions *j* may be stopped off at a convenient point or curved

or otherwise formed into a base or bases to provide a trough or troughs each having a conveying device for the purpose already stated. Or, again, the partition or partitions may be adapted to be adjustable so that their upper edges may be set to divide the several streams of granules in any desired manner. Any suitable means of adjustment may be provided either located internally or externally of the machine frame *a*.

In the drawings we have shown the partitions *j* each divided into two parts and pivoted to the sides of the machine frame *a* at *k*. The partitions may be moved about their centers *k* either towards or from the rolls as indicated by broken lines at the left hand side of the drawing and either to retain the same width of space between the partitions or to increase or decrease it. The partitions generally may also be arranged at any required distance apart from each other as circumstances may dictate. The means for adjustment may be of any suitable and simple type.

It will be readily seen that as the wheat *l* becomes crushed or broken in passing through the break rolls it is thrown on the discharge side by centrifugal force a greater or less distance away from the nip of the rollers. Thus the larger granules fall into the farthest space *m* the next larger into space *n* the next smaller into space *o* while the remainder falls into space *p*. The latter is practically flour and being extremely light is carried partly round the lower roller more or less in the manner indicated at the left hand side of the drawing.

We would have it understood that while we employ partitions for effecting and retaining the granules in a separate condition after breaking we may employ in conjunction with the partitions an air current or currents to assist in the separation of the products as they are discharged from the rolls. This air current, or currents, may be induced into the roller mill by suction from the air conduit *h* at any point found most suitable for effecting the object we have in view. For instance, we may fit in the frames *i* gauze *g* through which the current of air may be drawn in the direction of the arrows to the air conduit *h*. Or we may provide a hole or holes in the frame. The air will therefore pass over the upper edges of the partitions *j*, under the conduit cover *r* and so to the con-

duit *h*. In this way the various sizes of granules are directed to their proper spaces *m*, *n*, *o* or *p*. The air current is induced through conduit *h* by any suitable fan or air exhausting device in connection with it.

The character of the air current may be varied by arranging the sides of the conduit cover *r* to be adjustable, their lower portions being pivoted at *t* as indicated in the drawing the broken lines showing the manner of adjusting the air inlet *u* with relation to the conduit *h*. The cover *r* may be hinged in one or in several pieces in their length. To prevent the possibility of the air current ascending the spaces *m*, *n*, *o*, *p*, owing to the usual valves or slides in any of the conveying spouts being left open and so interfering with the separation of the broken products as aforesaid we arrange pivoted valves *w* at the bottom of the spaces as indicated at the left hand side of the drawing, such valve being normally pressed against the opposite partition by springs or the like the pressure of which can be overcome as required by the weight of the separated products passing down the spaces between the partitions.

By means of our invention we may entirely dispense with some of the machines at present used for separating the broken materials as they usually leave the roller mill. What we claim as our invention and desire to secure by Letters Patent is:—

An improvement in roller flour mills, consisting in means for effecting and retaining the separation of the broken products after leaving the break rollers comprising in combination with a casing, an air conduit arranged vertically of the casing, a plurality of partitions for dividing the separated products positioned on opposite sides of the conduit, each of said partitions having a section pivoted to the upper edge thereof movable to either side, valves located between the partitions, a cover positioned above the air conduit, and sections pivotally secured to the cover adjustable with relation to the air conduit, said casing having openings adjacent the upper edges of the partitions.

In testimony whereof we hereunto set our hands in the presence of two witnesses.

GEORGE BRIDDON.

ROBERT JOHN FOWLER.

Witnesses:

WILLIAM W. TAYLOR,

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