E. B. SYMONS.

SCRAPER FOR ROTATING RING CRUSHING MACHINES.

APPLICATION FILED FEB. 2, 1916.

1,249,852.

Patented Dec. 11, 1917.

2 SHEETS—SHEET 1.

Fig. 1

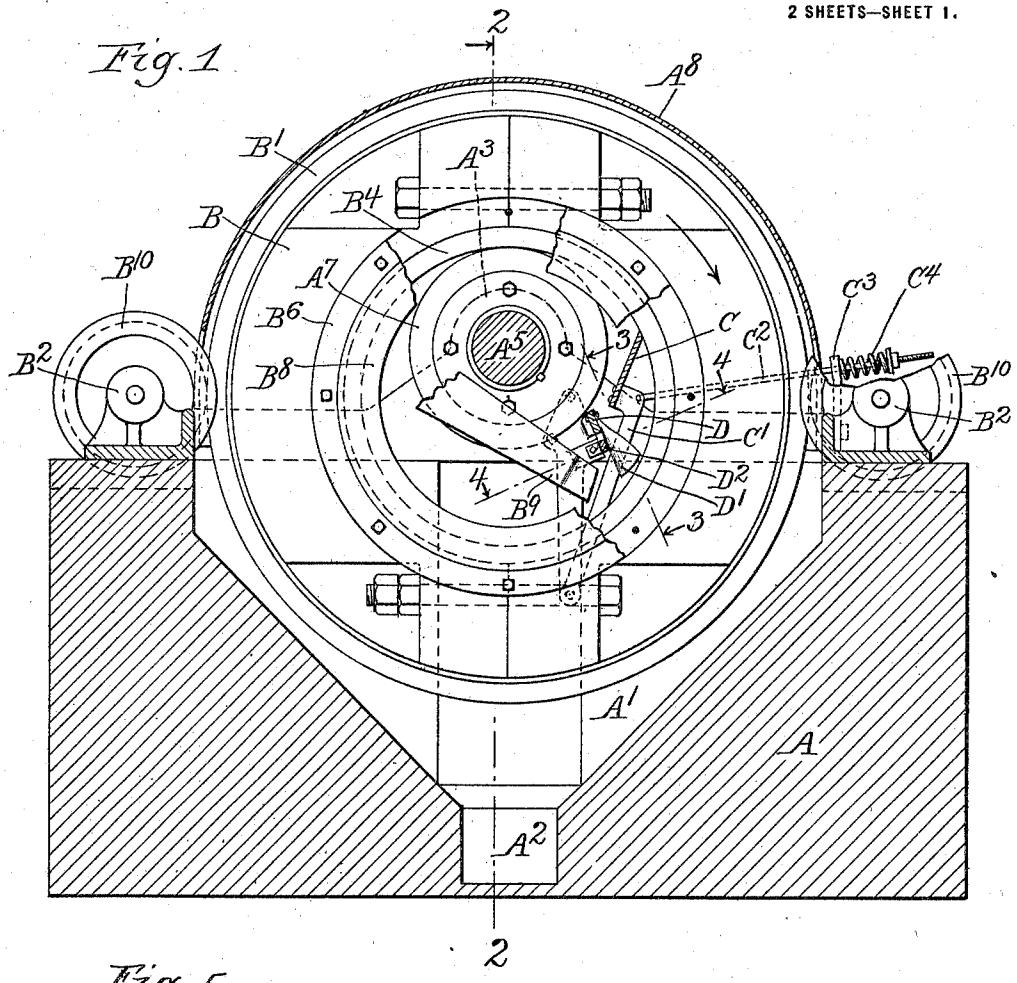


Fig. 5.

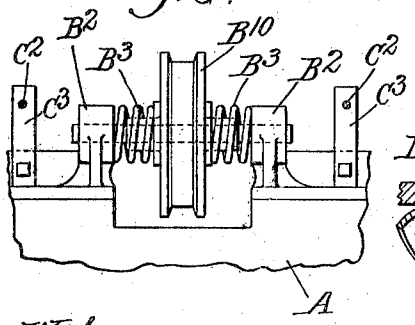
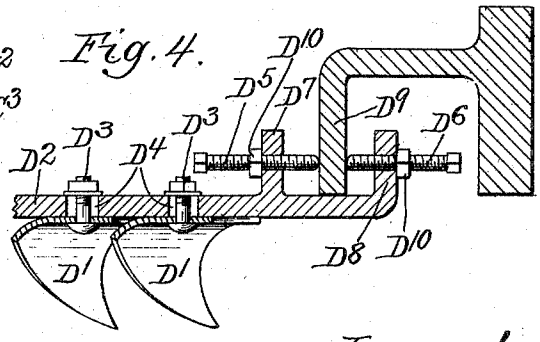


Fig. 4.



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Fig. 2.

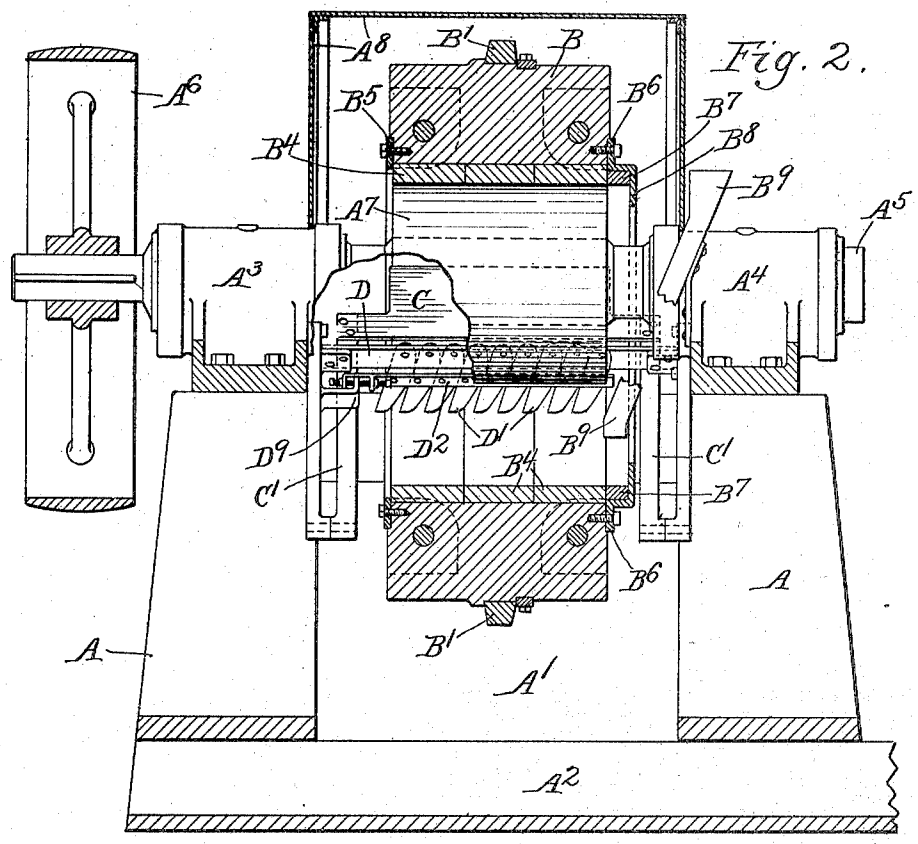
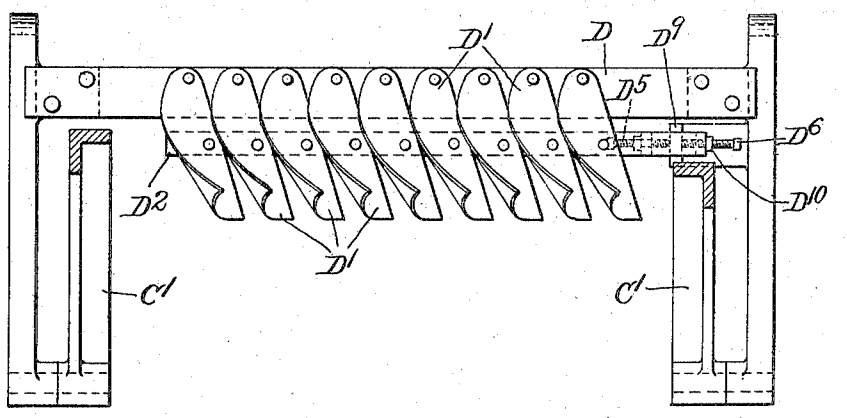


Fig. 3.



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UNITED STATES PATENT OFFICE.

EDGAR B. SYMONS, OF WINNETKA, ILLINOIS.

SCRAPER FOR ROTATING-RING CRUSHING-MACHINES.

1,249,852. Specification of Letters Patent. **Patented Dec. 11, 1917.**

Application filed February 2, 1916. Serial No. 75,629.

To all whom it may concern:

Be it known that I, EDGAR B. SYMONS, a citizen of the United States, residing at Winnetka, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Scrapers for Rotating-Ring Crushing-Machines, of which the following is a specification.

My invention relates to improvements in scrapers for rotating ring crushing machines, and has for one object to provide means for scraping the material off the ring after it has passed between the ring and crushing roller. It has for another object to gradually feed the material through the ring step by step after each crushing stroke of the roll against the ring. It has for still another object to turn over and stir up and otherwise agitate the material so as to prevent packing of the material on the ring. Other objects will appear from time to time in the specification. My invention is illustrated more or less diagrammatically in the accompanying drawings, wherein—

Figure 1 is a transverse section through the roller machine perpendicular to the axis of the roll.

Fig. 2 is a section along the line 2—2 of Fig. 1.

Fig. 3 is a section along the line 3—3 of Fig. 1.

Fig. 4 is a detail section on an enlarged scale along the line 4—4 of Fig. 1.

Fig. 5 is a side elevation detail showing one of the guide rollers and its spring mounting.

Like parts are indicated by like letters in all the figures.

A is a rigid foundation containing within its interior a hopper A^1, from the bottom of which leads a discharge trough or channel A^2. A^3, A^4, are pillow or bearing blocks anchored on the top of the base A and carrying the shaft A^5, which shaft is adapted to be rotated by power applied to the pulley A^6. The shaft A^5 carries between the bearing blocks A^3, A^4, a crushing roller A^7. A^8 is a shield or housing substantially closing the upper portion of the hopper and raised above the roller.

B is a rigid ponderous crushing ring. It rests upon the roller and hangs down into the hopper A^1. B^1 is an annular track on the ring B. It engages on either side the channeled rollers B^{10} which rollers are supported in bearings B^2 free to move for a short distance along axial lines, the springs B^3 being provided to yieldingly hold in the center these rollers. B^4 is an annular interlining for the inner periphery of the ring. It is held in position on one side by a collar B^5 bolted to the discharge side of the ring and on the other side by a collar B^6, which collar is offset to contain a wood filler B^7, and extends inwardly toward the center of the ring to provide a material holding flange B^8. It will be observed that the inside diameter of the ring is larger than the outside diameter of the roller, so that as the ring hangs on the roller, there is a sharp appreciable gap between the ring and roller at all places, except along a supporting line of contact, which line is parallel with the axis of rotation of the ring and roller, and which line is located immediately above the center of the roller. Rotation of the pulley and roller will, of course, cause the roller to drive the ring, the ring rotating at the same peripheral speed as the roller, and thus at a lower angle of velocity. B^9 is a feed chute whereby material to be crushed may be discharged into the interior of the ring at a point adjacent the feed edge of the ring. This material is discharged to the inner surface of the ring so as to fall upon the more or less soft and adhesive wood filler at a point above the bottom of the ring, so that the material as it falls down along the surface of the ring under the influence of gravity will have given to it a degree of velocity in the same direction as the direction the ring is rotating, thus the material fed to the ring rapidly takes up the ring velocity.

C is a scraper knife or blade extending across through the interior of the ring. It is mounted on the pivotal arms C^1. Rods C^2 extend outwardly from the arms through brackets C^3, and are drawn yieldingly outward to draw the scraper against the ring surface by the springs C^4. This scraper, it will be noted, is self-sharpening, because pressed diagonally against the surface of the roller as the scraper is worn away, a fresh cutting surface is always presented to the surface of the ring.

D is a supporting beam extending across inside the ring beneath the roll and slightly below and to one side of the lower discharge edge of the scraper blade. Upon this beam D are pivoted a series of deflecting plow-like guide members D^1. Each of these guide

members is also pivoted on an adjusting bar D^2 by means of a bolt D^3 which is adjustable in a slot D^4. The bar itself is bodily movable, and may be moved into and locked in adjusted position by means of the set screws D^5, D^6 in lugs D^7, D^8, engaging a stop D^9. Lock nuts D^{10} are provided for locking the set screws in position. The movement of this rod changes the inclination of all the guide members together in unison, while an adjustment of any one with respect to the rod may be provided to change the inclination of any one. Preferably my device is set up with the inclination gradually decreasing from the feed to the discharge side of the roller.

The use and operation of my invention are as follows:—

The roller is driven by power applied through the pulley in the usual way. When it rotates it carries the ring with it. If there is no material being crushed, the roll surface and ring surface will be in contact. With the roll and pulley in rotation the operator commences to feed off material through the chute as indicated. This material falls upon the filler strip at the edge of the ring and tends to slide downward toward the lowest part of the ring. This filler strip is of wood and tends to take hold of the material and give it further velocity beyond that caused by a free fall under the influence of gravity. This velocity is sufficient to cause the material to adhere to the ring and be carried over with it as it rotates. The material thus carried around the ring rides over the roll and is crushed between the ring and roll by the weight of the ring on the roll. This weight is very large and amply sufficient to partially crush the material. The material by this crushing blow or stroke will be more or less compacted on the surface of the ring. The ring goes on around carrying this compacted material with it until it reaches the scraper. The scraper with its sharp edge lifts or peels or scrapes this material off the ring, and the scraped material drops down along the back of the scraper and is discharged on to the upper edges of the deflectors or plows. These deflectors or plows turn the material over and discharge it to one side of its original path. It drops from them down along the surface of the ring in the same general direction without any very great loss in velocity. It is then carried around the ring again, and this process is repeated. In other words, each particle of material which is fed into the ring on the feed side is carried around and around the ring being crushed each time until after it has made as many short steps longitudinally as there are deflectors, it is discharged from the discharge end of the ring. Depending on whether the operator wishes to feed the material through the ring rapidly or slowly, he changes the angularity of the deflectors or plows. If the material is hard to crush and he wants it to go through slowly, he will give them a very slight inclination. If he wants it to go through fast, the inclination would be increased, and the step made by the material in each crushing will be increased. If the material starts in coarse it comes out fine, so that in order to keep the ring and roll parallel, and to keep a proper pressure on the material at all points it is necessary to increase the amount of material toward the discharge end. This effect is obtained by changing the inclination of the plows adjacent the discharge end. Preferably the inclination of the plows will progressively decrease from the feed to the discharge, so that the material will decrease in speed through the machine, thus banking up to provide the needed increased amount of material to give the desired even thickness of blanket over the surface of the ring.

I claim:

1. The combination with a rotating crushing ring of means for crushing material thereupon, means for positively removing the material from the surface thereof, and means comprising a series of separate pivotally mounted deflector blades arranged side by side across the effective surface of the ring for returning the material back to the surface of the ring in such a manner as to move it progressively across the surface of the ring, the inclination of said blades being adjustable.

2. The combination with a rotating crushing ring of means for crushing material thereupon, means for positively removing the material from the surface thereof, and means comprising a series of separate pivotally mounted deflector blades arranged side by side across the effective surface of the ring for returning the material back to the surface of the ring in such a manner as to move it progressively across the surface of the ring, the inclination of said blades being adjustable in unison.

3. The combination with a rotating crushing ring of means for crushing material thereupon, means for positively removing the material from the surface thereof, and means comprising a series of separate pivotally mounted deflector blades arranged side by side across the effective surface of the ring for returning the material back to the surface of the ring in such a manner as to move it progressively across the surface of the ring, the inclination of each blade being separately adjustable.

4. The combination with a rotating crushing ring of means for crushing material thereupon, means for positively removing the material from the surface thereof, and means comprising a series of separate pivotally mounted deflector blades for return-

ing the material back to the surface of the ring, the inclination of each blade being separately adjustable, together with means for simultaneously varying the inclination of all of them.

5. The combination with a rotating crushing ring of means for crushing material thereon, means for positively removing material therefrom, and a series of separate pivotally mounted plow-shaped deflector blades arranged side by side in the path of said material removed from the crushing surface of the ring.

6. The combination with a rotating crushing ring of means for crushing material thereon, means for positively removing material therefrom, and a series of separate pivotally mounted plow-shaped deflector blades arranged in the path of said material removed from the crushing surface of the ring and adapted to move the material progressively across the surface of the ring, and means for changing the inclination of such deflector blades.

7. The combination with a rotating crushing ring of means for crushing material thereon, means for positively removing material therefrom, a series of separate pivotally mounted plow-shaped deflector blades arranged in the path of said material removed from the crushing surface of the ring, and means for separately changing the inclination of such deflector blades.

8. The combination with a rotating crushing ring of means for crushing material thereon, means for positively removing material therefrom, a series of separate pivotally mounted plow-shaped deflector blades arranged in the path of said material removed from the crushing surface of the ring and adapted to move the material progressively across the surface of the ring, and means for changing the inclination of such deflector blades in unison.

9. The combination with a rotating crushing ring of means for crushing material thereon, means for positively removing material therefrom, a series of separate pivotally mounted plow-shaped deflector blades arranged in the path of said material removed from the crushing surface of the ring, and means for changing the inclination of such deflector blades in unison, together with separate means for adjusting their inclination.

10. The combination with a rotating crushing ring having a substantially cylindrical crushing surface of a scraper blade yieldingly held against such surface and inclined to the tangent to the ring at the contact point, and a series of adjustable guide deflectors or plows arranged side by side to catch the discharge from the scraper blade and to discharge the cut material back against the crushing surface in such a manner as to move it progressively across the surface of the ring.

11. The combination with a rotating crushing ring of a substantially continuous scraper blade, means for holding it yieldingly against the crushing surface of the ring, a series of plow-like deflectors arranged side by side to catch the discharge from the blade and to feed it back against the crushing surface.

In testimony whereof, I affix my signature in the presence of two witnesses this 15th day of January, 1916.

EDGAR B. SYMONS.

Witnesses:
MINNIE M. LINDENAU,
CHRISTINA DEANS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."