No. 802,777. PATENTED OCT. 24, 1905.

G. B. NUTT.

GRINDING ROLLS.

APPLICATION FILED AUG. 17, 1904.

2 SHEETS—SHEET 1.

FIG. 1.

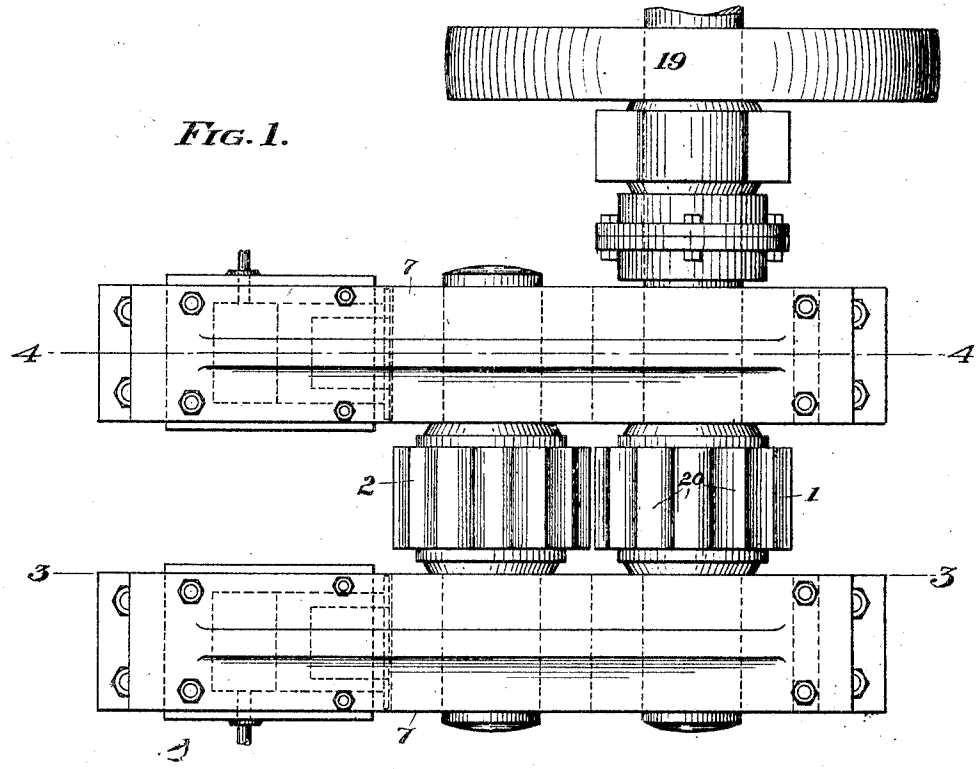
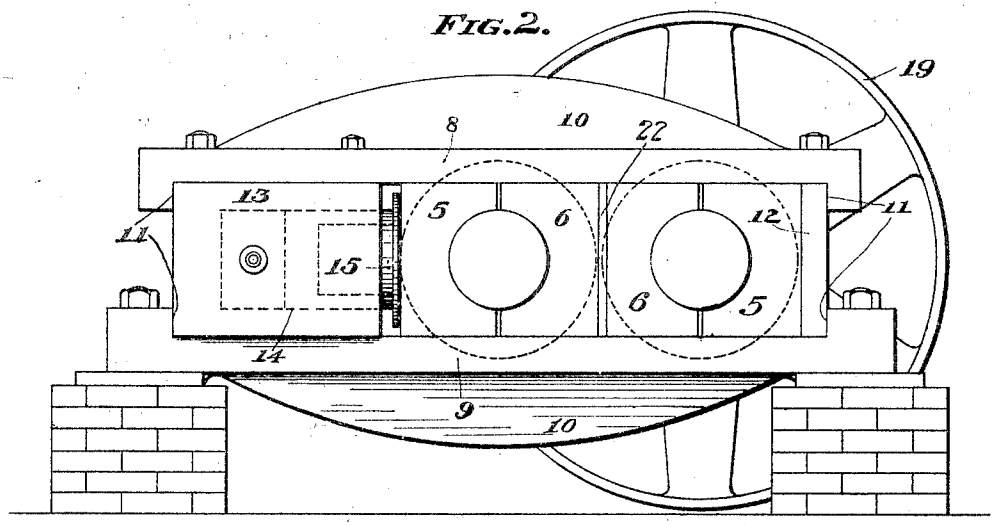


FIG. 2.



WITNESSES

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2 SHEETS—SHEET 2.

FIG. 3.

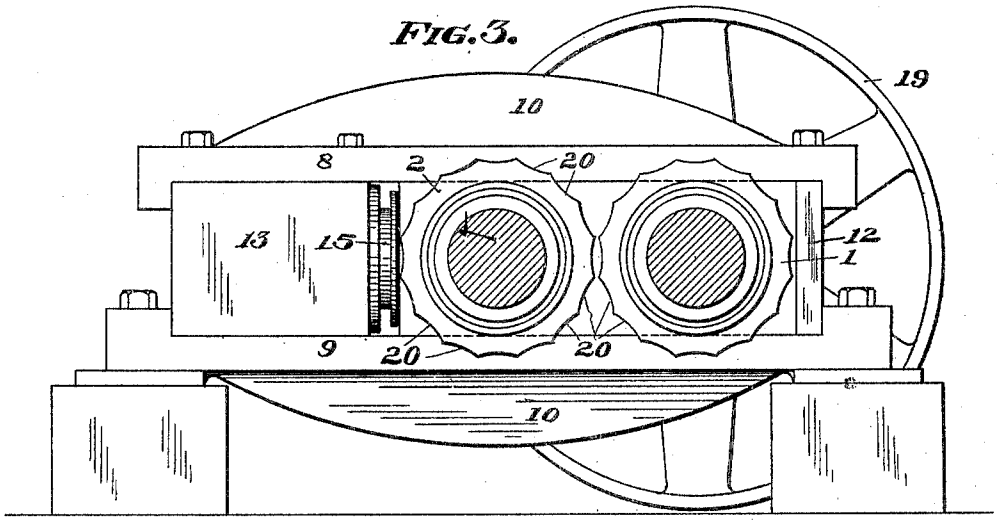


FIG. 4.

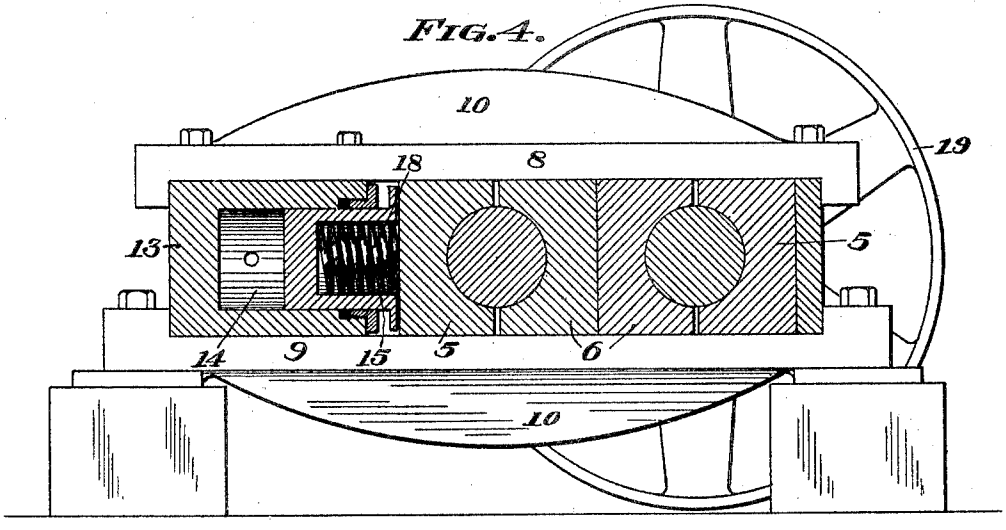
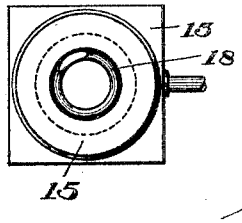


FIG. 5.



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UNITED STATES PATENT OFFICE.

GEORGE B. NUTT, OF PITTSBURG, PENNSYLVANIA.

GRINDING-ROLL.

No. 802,777. Specification of Letters Patent. Patented Oct. 24, 1905.

Application filed August 17, 1904. Serial No. 221,037.

To all whom it may concern:

Be it known that I, GEORGE B. NUTT, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Grinding-Rolls; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to grinding or crushing rolls, and more especially to rolls for the fine grinding of ores, cement, or other pulverizable material, although the invention may also be applied to grinding-mills of various kinds or to rolls for crushing sugar-cane or other substances.

The object of my invention is to provide simple and efficient bearing frames or housings for the rolls and provide the same with fluid-pressure means for giving the requisite pressure between the rolls for grinding or crushing the material, said fluid-pressure means being so arranged as to permit the rolls to yield to allow the passage of such hard substances as cannot be crushed by the rolls without liability of injuring or stopping them.

The invention also consists in details of construction hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a plan view of my improved rolls. Fig. 2 is a side elevation of the same. Fig. 3 is a vertical section on line 3 3, Fig. 1. Fig. 4 is a similar section on line 4 4, Fig. 1; and Fig. 5 is an end view of one of the power-cylinders.

My invention is applicable to a set of grinding or crushing rolls containing two or more rolls. In the drawings only two rolls 1 and 2 are shown; but, if desired, three or more may be comprised in the set. These rolls are provided with suitable journals or necks mounted in journal-boxes comprising outer members or brasses 5 and inner members or brasses 6. These boxes are mounted in suitable side frames 7 and preferably arranged in a horizontal plane, although this is not absolutely necessary, as they may be placed in a vertical or an inclined plane.

Each side frame comprises a top member 8 and bottom member 9, suitably strengthened by ribs 10 and having straight inner faces terminating in inwardly-projecting shoulders 11 at the ends. Secured between these top and bottom members at one end is a stationary abutment 12, which forms a spacing-piece for holding the top and bottom members apart the required distance and serving to take the thrust of the journal-box member 5 of the stationary roll 1. Secured between the members 8 and 9 at their opposite ends is a large rectangular or square casting or forging 13, which is cored out to form a cylinder 14, in which works a power-plunger 15. This cylinder 13 forms the spacing-piece at the opposite end of the top and bottom members and together with the stationary abutment 12 holds said members apart to provide ways for the sliding journal-boxes of the movable roll 2. Both the cylinders 13 and abutments 12 will be held in place in any suitable way, the shoulders 11 on the top and bottom members being a convenient and preferred way of holding these parts in position, it being understood that the pressure is entirely outward.

The cylinders 13 of the two side frames will be provided with suitable connections (not shown) for the admission of fluid-pressure—such as hydrostatic pressure, compressed air, steam, or the like—so as to force the plungers 15 against the journal-boxes of the movable roll 2, these power-cylinders furnishing the requisite pressure for crushing the material passing between the rolls. In order to permit the rolls to yield to allow indestructible matter to pass without danger of breaking the rolls and enable the rolls to quickly adjust themselves to variations of load, I provide a suitable cushion, this being shown in the form of helical springs 18, seated in seats bored or cored in the plungers 15 and projecting beyond the ends of the plungers and bearing against the journal-boxes of the movable roll. The rolls may, however, be used without these cushions, especially when an elastic medium, such as compressed air or steam, is used in the power-cylinders, the medium itself being a cushion to allow the rolls to yield.

The stationary-roll 1 will be driven in any suitable way, such as connecting to one of the journals thereof a belt-pulley 19 or other driving means, and the other roll or rolls may be driven by friction or by connecting gearing. The peripheries of the rolls may be of any form, and may, if desired, be entirely smooth. Preferably, however, they will be provided with roughened surfaces of any kind, such as concave flutes 20, so as to efficiently feed forward the material. In order to prevent these fluted surfaces from coming into contact, and thus injuring each other, the inner journal-box members or brasses 6 of the two rolls are of such a size that they will contact just before the peripheries of the rolls come in contact, thus holding said rolls so

that the fluted surfaces will just pass each other. When the material to be crushed is coarse, the boxes may be made of such size as to hold the rolls any desired distance apart. If necessary, liners 22, as shown in Fig. 2, or adjustable wedges may be used between the boxes in order to take up wear on the journals and hold the faces of the rolls apart the required distance.

The material will be supplied to the rolls in any convenient or approved manner. As long as the rolls are running idle the pressure-cylinders will merely hold the journal-boxes of the two rolls in contact and the journals and brasses of said rolls will be subjected to no pressure or wear. As soon as the material is fed to the rolls it serves to force them apart against the pressure in the power-cylinders, and the latter therefore serves as a holding means to give the requisite pressure to crush the material passing between the rolls, the material itself acting as a wedge and practically supplying the pressure for its own crushing. Should any indestructible body, such as a piece of iron or the like or exceedingly hard rock, pass through the rolls, the springs 18 will yield sufficiently to allow the same to pass without injuring the rolls.

The construction described is very simple and efficient. The housings or frames are composed of only a few parts, but are very strong, and the power-cylinders are incorporated directly in the same, and the parts are so united that they cannot spring or yield. The arrangement of journal-boxes having inner as well as outer brasses prevents the rolls from coming into contact when running idle and also prevents the roll-journals being subjected to pressure or wear when running idle. As soon as material is supplied to the rolls it will force them apart against the pressure of the power-cylinders, and thus give the requisite pressure for the crushing of said material.

What I claim is—

1. In grinding or crushing rolls, the combination of a pair of frames each comprising a top and a bottom member, stationary abutments secured between said members at one of their ends, power-cylinders forming spacing-pieces between said members at their opposite ends and secured therebetween, a pair of rolls, journal-boxes therefor mounted in the spaces between the top and bottom members of the frames, the journal-boxes of one of the rolls being arranged to bear against the stationary abutments of the frame, and plungers in said power-cylinders bearing against the journal-boxes of the other roll.

2. In grinding or crushing rolls, the combination of a pair of frames each comprising a top and a bottom member, stationary abutments secured between said members at one of their ends, power-cylinders forming spacing-pieces between said members at their opposite ends and secured therebetween, a pair of rolls, journal-boxes therefor mounted in the spaces between the bottom and top members of the frames, the journal-boxes of the two rolls being arranged to contact with each other to prevent the rolls from touching, the boxes of one of the rolls being arranged to bear against the stationary abutments between the frames, and plungers in the power-cylinders bearing against the boxes of the other roll.

3. In grinding or crushing rolls, the combination of a pair of frames each comprising a top and a bottom member having inwardly-facing shoulders formed at their ends, stationary abutments between said frames at one of their ends, power-cylinders between the top and bottom members of said frames at their opposite ends, said abutments and power-cylinders forming spacing-pieces and bearing against the shoulders on said members, a pair of rolls, journal-boxes therefor mounted in the spaces between the top and bottom members of the frames, the boxes of one of said rolls bearing against the stationary abutments in the frames, and plungers in said power-cylinders bearing against the boxes of the other roll.

4. In grinding or crushing rolls, the combination of a pair of frames or housings each comprising a top and a bottom member, stationary abutments between said members at one end, power-cylinders secured between said members at their opposite ends and forming spacing-pieces therefor, a pair of rolls, journal-boxes therefor mounted in the spaces between the top and bottom members of said frames, said boxes being arranged to contact to prevent the rolls touching, the journal-boxes of one of the rolls bearing against the stationary abutments of said frames, and plungers in said power-cylinders bearing against the journal-boxes of the other roll.

5. In grinding or crushing rolls, the combination of a pair of frames or housings, a pair of rolls provided with roughened faces, journal-boxes for said rolls mounted in said frames, the journal-boxes of one of said rolls being movable in the frames, and the journal-boxes of the rolls being arranged to contact to prevent the rolls from touching, power-cylinders arranged to act on the journal-boxes of the movable roll, and springs interposed between said boxes and power-cylinders.

6. In grinding or crushing rolls, the combination of a pair of frames or housings, a pair of rolls mounted therein, one of which is movable in the housings, power-cylinders, plungers therefor arranged to act on the journals of the movable roll, said plungers having their outer ends recessed, and springs in said recesses and bearing against the journal-boxes of the movable roll.

7. In grinding or crushing rolls, the combination of a pair of frames or housings each comprising a top and a bottom member, sta-

tionary abutments between said members at one end, power-cylinders secured between said members at their opposite ends and forming spacing-pieces therefor, a pair of rolls, journal-boxes therefor mounted in the spaces between the top and bottom members of said frames, the journal-boxes of one of the rolls bearing against the stationary abutments of said frames, plungers in said power-cylinders, and springs carried by said plungers and bearing against the journal-boxes of the other roll.

In testimony whereof I, the said GEORGE B. NUTT, have hereunto set my hand.

GEORGE B. NUTT.

Witnesses:
ROBERT C. TOTTEN,
G. KREMER.