(No Model.)

G. WATKINSON.

MILL FOR MIXING CAOUTCHOUC.

No. 525,638. Patented Sept. 4, 1894.

Fig. 1

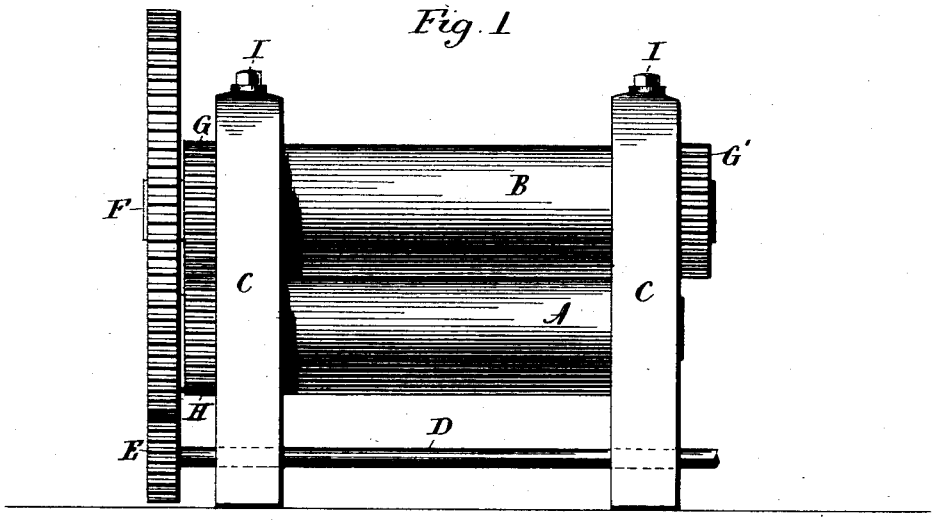
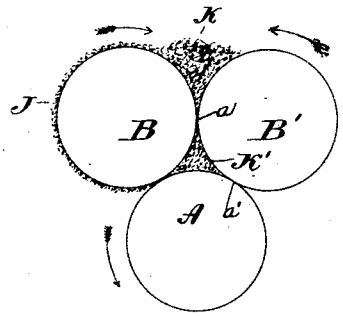


Fig. 2



Witnesses.
J. H. Shumway
Lillian D. Kelley

George Watkinson,
Inventor.
By attys
Earle Seymour

UNITED STATES PATENT OFFICE.

GEORGE WATKINSON, OF COLCHESTER, CONNECTICUT.

MILL FOR MIXING CAOUTCHOUC.

SPECIFICATION forming part of Letters Patent No. 525,638, dated September 4, 1894.

Application filed September 22, 1893. Serial No. 486,183. (No model.)

To all whom it may concern:

Be it known that I, GEORGE WATKINSON, of Colchester, in the county of New London and State of Connecticut, have invented a new Improvement in Mills for Mixing Caoutchouc, &c.; and I do hereby declare the following, when taken in connection with accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a view in front elevation of one form which a mixing mill constructed in accordance with my invention may assume; Fig. 2, a view in end elevation in the nature of a diagram, showing the three rolls.

Heretofore the mills employed for mixing crude caoutchouc or india-rubber with the vulcanizing, adulterating or coloring compounds which are combined with it during the process of manufacture, have comprised two hollow metal rolls, arranged in contact, or nearly in contact, and rotated toward each other. The mills have also contained means for driving and adjusting the rolls, steam and water pipes, and other accessories which are well known. In using the mills, the rubber has been placed in the depression formed above and between the two rolls, and allowed to soften, and then to form itself around one of them. The vulcanizing, adulterating or coloring material has then been placed in the said depression above and between the rolls, and by pressure and attrition is gradually incorporated into the rubber, and well mixed therewith, or kneaded thereinto. The incorporation of the said material with the rubber does not, however, take place at once, and considerable of the material drops down between the rolls, and has to be returned again and again to the depression above them, until all of it has been kneaded into the rubber, when the mixing process is complete.

The object of my present invention is to save the time and labor required to return the escaping material to the rolls, and to make the mixing process more speedy by enlarging the kneading capacity of the mill.

With these ends in view, my invention consists in providing the mill with an auxiliary roll located below the two main rolls, and arranged to intercept the material falling between them, and to press it upward and grind it into the mass of rubber revolving upon one of them.

In carrying out my invention, I employ a mixing-mill of any suitable construction, which it is unnecessary to detail because they are well known. To such a mill I add an auxiliary roll A, located centrally, or very nearly centrally below the front and back main rolls B and B′, which are arranged nearly in contact, or with only a narrow space between them, in a horizontal plane, and geared so as to rotate toward each other. The auxiliary roll A, is arranged in contact with the main roll B′, and geared so as to rotate in the opposite direction therefrom or toward the roll B. As shown in Fig. 1 of the drawings, the three rolls are mounted in two uprights C C, and driven from a driving-shaft D, journaled in the lower portions of the said uprights, and provided at one end with a small gear E, meshing into a large gear F, secured to one end of the bearing or journal of the roll B, which is provided with a small roll G, meshing into a corresponding roll H, carried by the auxiliary roll A. The opposite end of the front roll B, is provided with a gear G′, corresponding in size to the gears G and H, and meshing into a corresponding gear carried by the back roll B′, but not shown. Adjusting screws I I, mounted in the upper ends of the uprights, provide for adjusting the rolls. The other details of the mill are those generally employed, and do not need description or illustration.

The operation of my improved mill will be understood by reference to Fig. 2 of the drawings, in which the rubber J, is shown as formed upon the main roll B, while a body K, of loose, vulcanizing, adulterating or coloring material is represented as located in the depression above and between the rolls B and B′. A portion K′, of this material is also shown to have dropped down between the rolls B and B′ into the space formed below and between the same, and above the auxiliary roll A, which catches the said material as it falls, and forces it upward, and works it into the rubber revolving with the roll B.

It will thus be seen that the material dropping between the main rolls is automatically returned to the rubber, and that the mixing capacity of the mill is enlarged by the mixing action of the auxiliary roll, which doubles the mixing capacity of the mill, as it supplies a second point of contact for the kneading process, the rolls B and B′ having contact at *a*, and the rolls A and B′ having contact at *a*′.

I would have it understood that I do not limit myself to constructing the mill in any particular manner, my invention comprehending broadly the use of an auxiliary roll located below the two main rolls in position to co-operate therewith as described, in intercepting the material falling down between them and returning it to that one of the main rolls on which the rubber is being carried.

I am aware that a prior patent shows a rubber sheeting or grinding machine, having a series of rolls arranged one above the other, so that as the rubber drops between the upper pair of rolls it is caught by another pair of rolls and passed through them, after which it is dropped upon another roll, which coacts upon one of the rolls of the pair above it to again grind the rubber. I do not, therefore, broadly claim a rubber-making machine having more than two rolls, arranged so that the material falling between a pair of rolls is caught and acted upon again.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

The herein-described mill for mixing caoutchouc, comprising two main rolls B and B′, arranged in the same horizontal plane with a very narrow space between them, and geared to rotate toward each other, and an auxiliary roll arranged below the rolls B and B′ so as to catch the material falling between them, and so as to be in contact or substantially in contact with the roll B′, and to be separated by a narrow space from the roll B and to rotate in opposite direction from the roll B′ but toward the roll B, substantially as set forth, and whereby the material falling between the rolls is caught by the auxiliary roll, by which it is pressed upward and ground into the mass of rubber revolving on the roll B.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

GEORGE WATKINSON.

Witnesses:
LILLIAN D. KELSEY,
FRED C. EARLE.