No. 670,312. Patented Mar. 19, 1901.

A. & E. DES CRESSONNIÈRES.

KNEADING AND MIXING APPARATUS FOR SOAP.

(Application filed June 13, 1898.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.

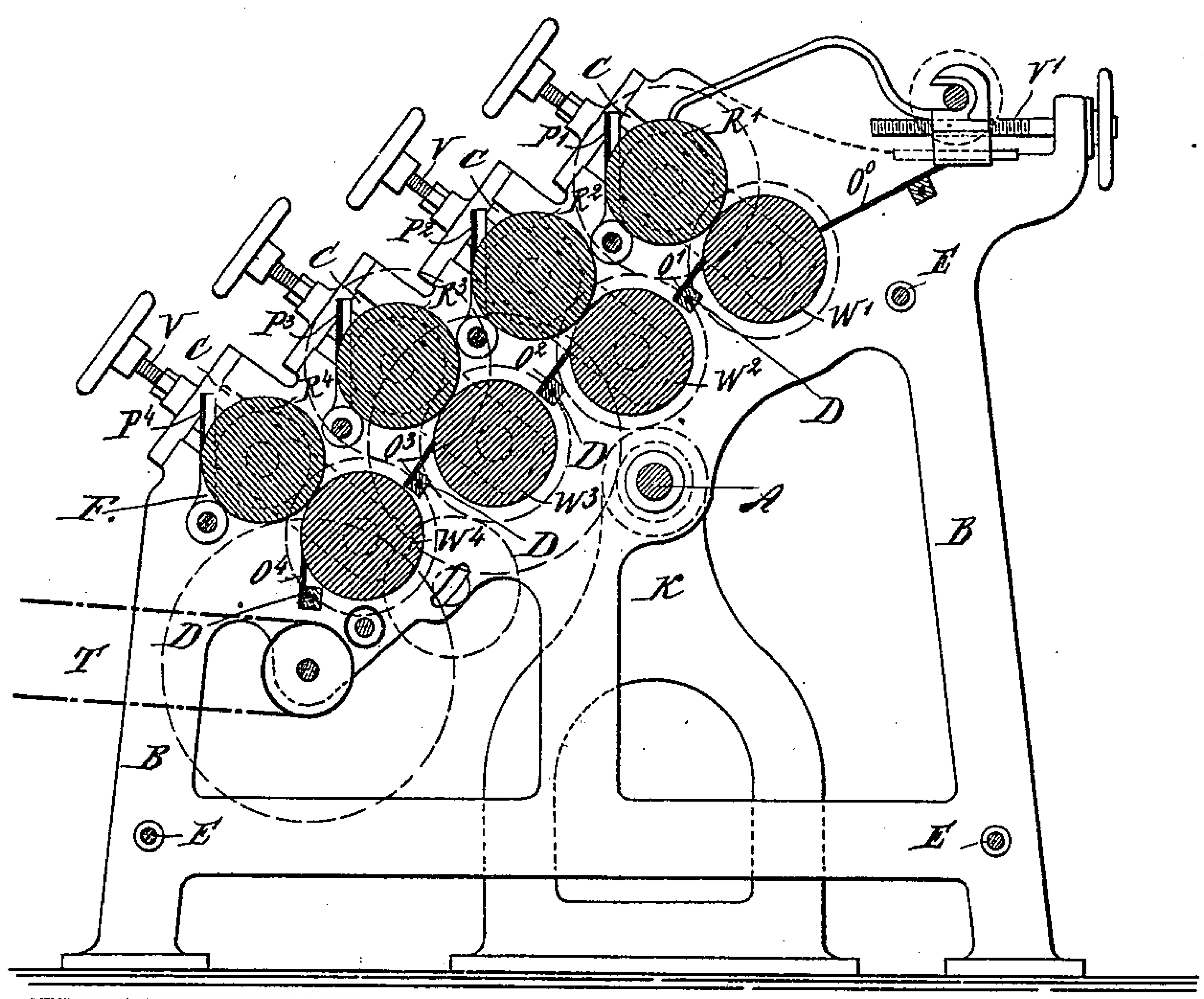

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Fig. 2.

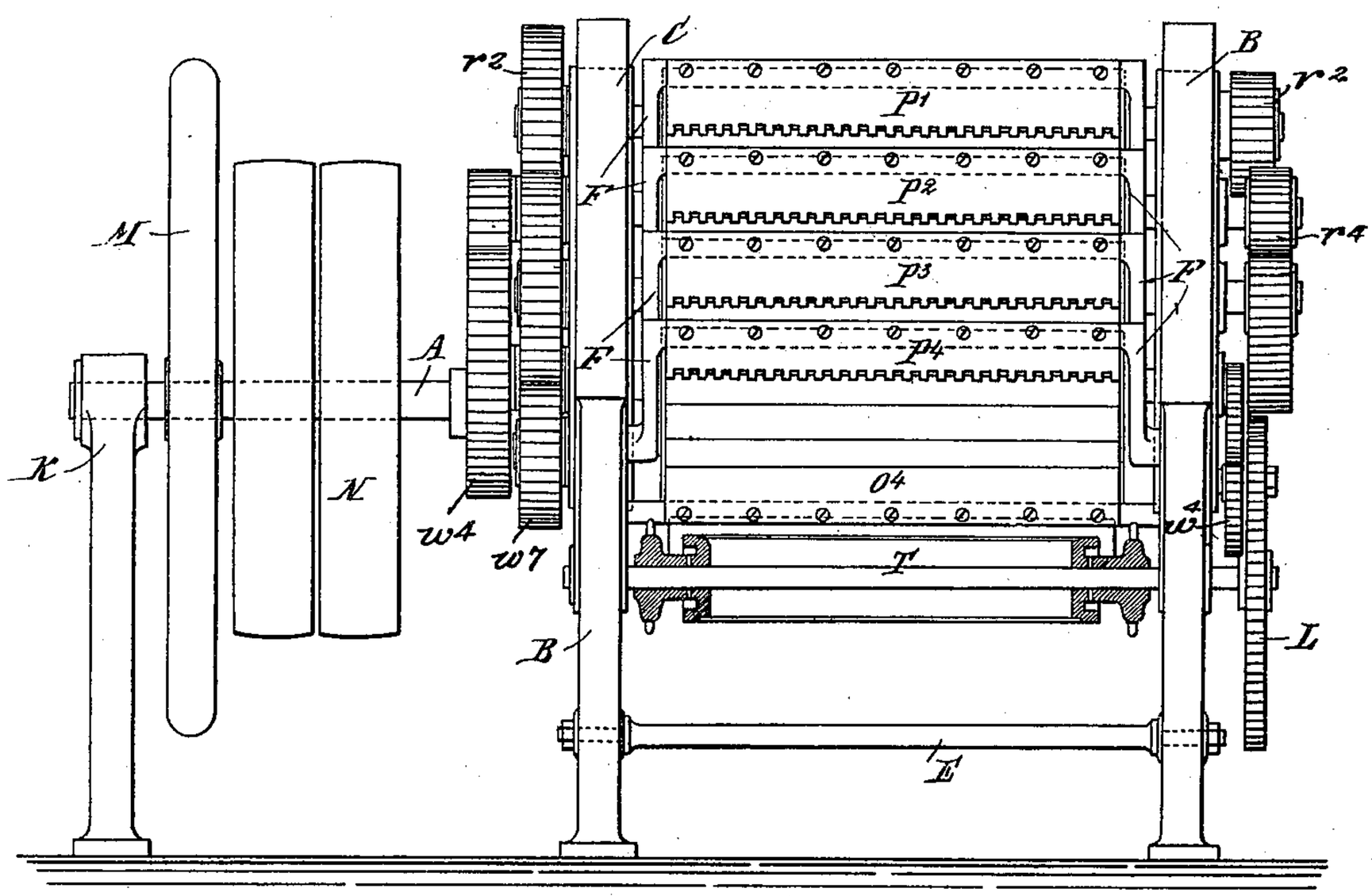

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Fig. 3

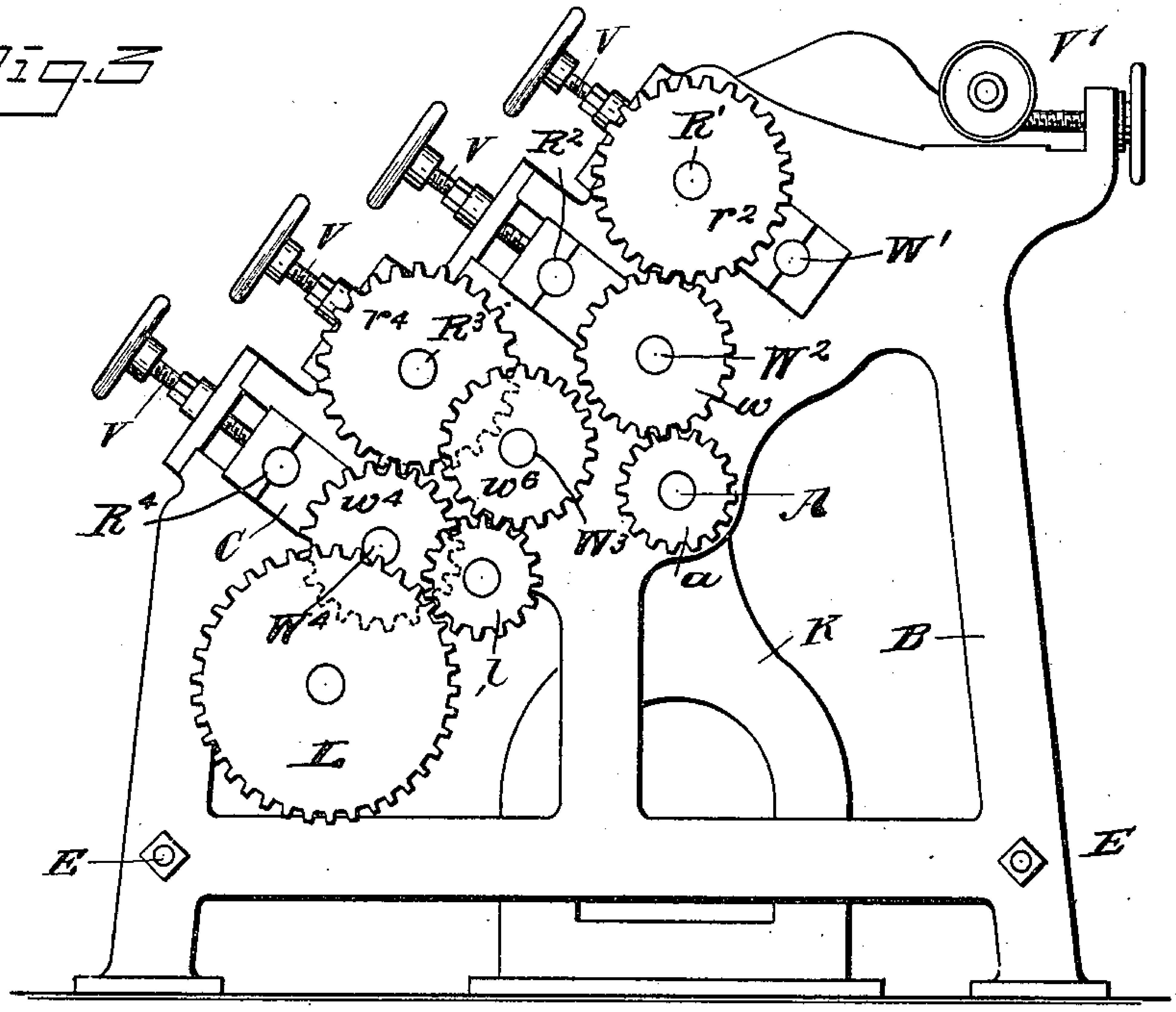
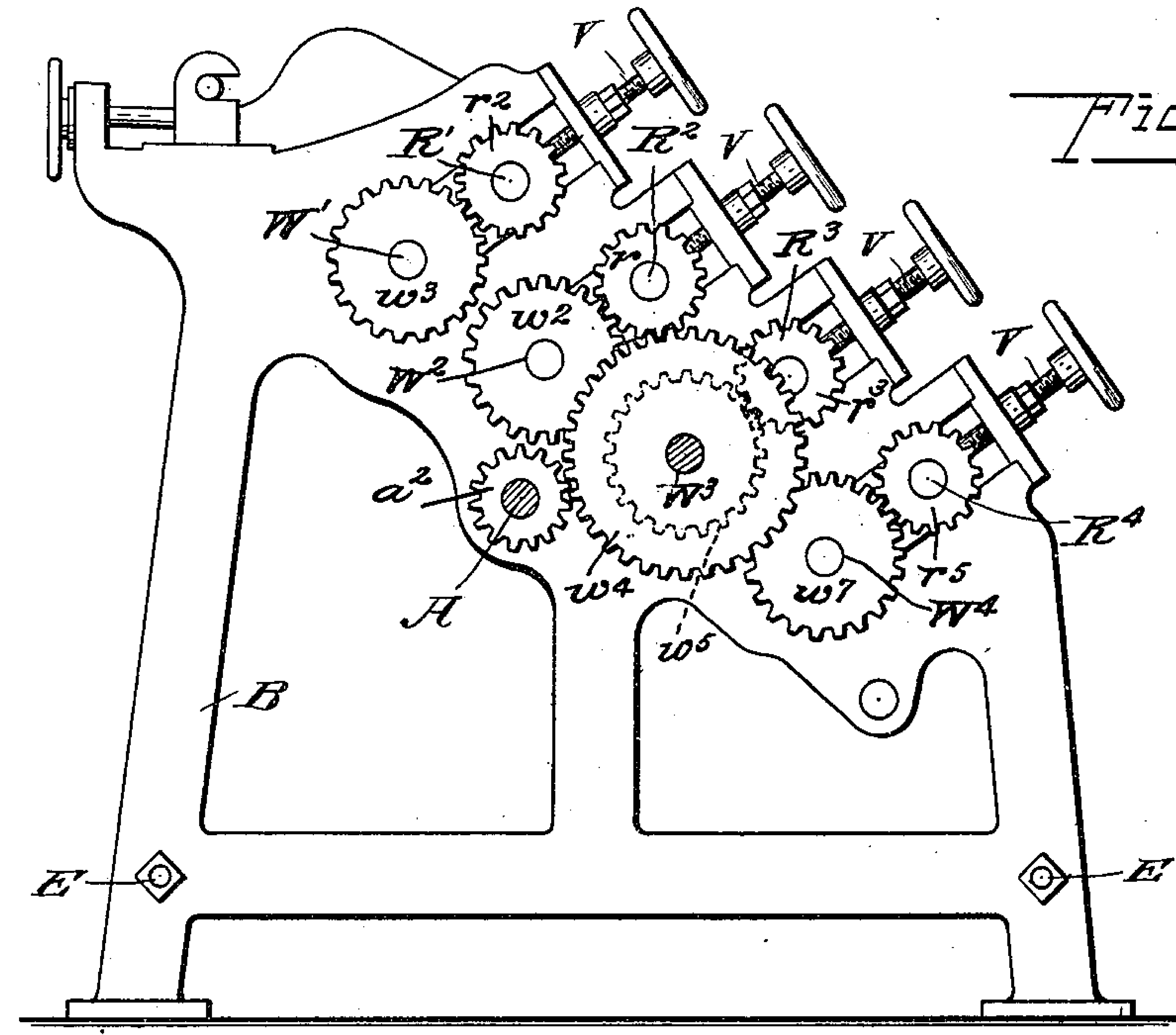


Fig. 4



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UNITED STATES PATENT OFFICE.

ANATOLE DES CRESSONNIÈRES AND ERNEST DES CRESSONNIÈRES, OF BRUSSELS, BELGIUM.

KNEADING AND MIXING APPARATUS FOR SOAP.

SPECIFICATION forming part of Letters Patent No. 670,312, dated March 19, 1901.

Application filed June 13, 1898. Serial No. 683,312. (No model.)

To all whom it may concern:

Be it known that we, ANATOLE DES CRESSONNIÈRES and ERNEST DES CRESSONNIÈRES, subjects of the King of Belgium, residing at Brussels, in the Kingdom of Belgium, have invented certain new and useful Improvements in Crushing or Kneading and Mixing Apparatus for Soap or other Like Material, (for which we have filed applications for Letters Patent in Belgium, dated February 14, 1898; in Germany, dated March 2, 1898; in England, dated March 2, 1898; in France, dated February 25, 1898; in Sweden, dated March 2, 1898; in Hungary, dated March 11, 1898, and in Austria, dated March 11, 1898,) of which the following is a full, clear, and exact description.

The object of the invention is to provide certain new and useful improvements in crushing or kneading and mixing apparatus for soap and other material, whereby an absolutely homogeneous mass is obtained without any loss of the material and with color or other substance thoroughly incorporated in the mass.

The invention consists of novel features and parts and combinations of the same, as will be fully described hereinafter and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional side elevation of the improvement with parts in section. Fig. 2 is a front elevation of the same with part in section. Fig. 3 is a side elevation, and Fig. 4 is a similar view of the opposite side.

The crushing or kneading and mixing apparatus which forms the subject of the present invention is designed to subject the soap to an alternate crushing and mixing treatment in shavings, instead of subjecting it to simple crushing by means of three cylinders, thus enabling an absolute homogeneousness of the paste to be obtained as regards its composition and allowing of its being mixed with color, while preventing waste of soap. The alternate action of crushing and mixing is obtained by the arrangement of crushers in couples of two cylinders, each provided with a scraping-comb and placed in such a way that the shavings arising from the two coupled cylinders are intermixed and intermingled for crushing by the next crushing-cylinders, and so on up to the last. The number of alternate crushings and mixings may evidently be made to conform to the nature of the substance to be treated in order not to overweight the machine with useless couples as soon as absolute homogeneousness is obtained, so that for certain substances two couples will perfectly suffice, while others require three. For toilet soap, more particularly, four couples produce absolute homogeneousness of the paste and a mixture of color, and therefore a machine with four couples of rollers will now be more particularly described.

The constructive characteristic of the machine consists in the arrangement of various couples of cylinders on an inclined plane, thus insuring the automatic feed of each successive couple by the preceding couple arranged on a higher level, the feed being commenced at the highest pair of cylinders, so as to avoid any waste of the material which would take place with a feed from the bottom.

B represents two standards or lateral frames firmly connected with one another by means of cross-bars E and having upper surfaces inclined to suit the arrangement of the successive couples of crushing-cylinders, which have their trunnions in slide-bearings adjustable in suitable slides C in the said frames or upper surfaces by means of screws V, with adjustable nuts for each of the couples $W' R' W^2 R^2 W^3 R^3 W^4 R^4$, in which W' to W^4 are the crushers of the lower row and R' to R^4 the crushers of the upper row of each couple. Each of the cylinders of each couple is individually provided with a scraper, and the scrapers $O' O^2 O^3 O^4$ of the lower set of cylinders are fixed on bars D of square section, pivoting in the frames B, and capable thus of being placed in such a way as to form a bridge between two consecutive cylinders to transfer the shavings released from a previous cylinder to the next. The scrapers $O' O^2 O^3 O^4$ are solid combs or scrapers, having for their object to radically

clean each of the lower cylinders in such a way as to return into the operation the slightest particle of material, and thus to prevent any possibility of waste. The bottom O^0 of the feed-box is mounted in the same manner in order to allow of its being adapted to any desirable position and is adjustable by means of a screw V'. The scrapers P' to P^4 of the upper row of cylinders are each fixed against the upper ends of two arms F, pivoting also on the frame B in such a way as to place themselves naturally vertically against the cylinders, and thus direct downward the shavings released. The scrapers P' to P^4 are toothed combs and have the teeth arranged differently, so as to alternately produce wide and narrow shavings and thick and thin shavings, with a view to rendering the mixing perfect. The last or lowest scraper O^4 is placed vertically and directs the shavings onto a traveling band T, which conveys them to the final operation.

With the object of obtaining a perfect action the cylinders are arranged for different speeds—that is to say, the couple W^2 R^2 revolve more rapidly than the couple W' R' and the couple W^4 R^4 more rapidly than the couple W^3 R^3. Moreover, all the cylinders of the upper row revolve more rapidly than the cylinders of the lower row, thus improving the crushing or kneading and becoming more heavily charged with material than the lower ones. Of course these speeds are optional and may be varied at will, according to requirements.

For imparting the above-described movements to the cylinders the following gearing is employed: The drive-shaft A, which has one end mounted in the standard K and the other end in the frame B, is provided at one end with the fixed pulley N and fly-wheel M. On the end of the drive-shaft A opposite that carrying the pulley and fly-wheel is a pinion *a*, which meshes with the gear-wheel *w* on the shaft of the cylinder W^2, and on the opposite end of the shaft of said cylinder is a gear-wheel w^2, which meshes with the pinion *r* on the shaft of the cylinder R^2. The gear-wheel *w* of the shaft of the cylinder W^2 meshes with the large gear-wheel r^2 on the shaft of the cylinder R', and on the opposite end of the shaft of said cylinder is a pinion r^2, meshing with a gear-wheel w^3 on the shaft of the cylinder W'. On the end of the drive-shaft A carrying the pulley and fly-wheel is a pinion a^2, meshing with a gear-wheel w^4 on the shaft of the cylinder W^3. To the shaft of the said cylinder is also secured a gear-wheel w^5, meshing with a pinion r^3 on the shaft of the cylinder R^3. On the opposite end of the shaft of the cylinder R^3 is a large gear-wheel r^4, which meshes with a gear-wheel w^4 on the shaft of the cylinder W^4, and on the opposite end of the shaft of said cylinder is a gear-wheel w^7, meshing with a pinion r^5 on the shaft of the cylinder R^4. For operating the traveling band T on the shaft of the cylinder W^3 is mounted the gear-wheel w^6, which meshes with the idler *l*, which in turn meshes with the large gear-wheel L.

The working of the crushing or kneading and mixing apparatus will be easily understood from the preceding. Soap sprinkled with color is introduced into the feed-box in front of the first and highest couple of cylinders for the first crushing and is gradually removed from the said cylinders W' and R' by the scrapers O' and P'. The shaving rises in a crest in front of the latter and bends over, falling down pell-mell in such a way as to mix most intimately the material and the color, by the multiple change of position of the shavings carried away with the part disengaged from the lower cylinder toward the second couple of cylinders, where the same action is repeated in order to produce a more perfect mixing, and so on in succession for each couple until absolute homogeneousness is obtained at the last couple, which deliver the soap to the traveling band T, which conveys it to the ultimate operations.

We declare that what we claim is—

1. A crushing or kneading and mixing apparatus for soap and like materials, consisting of a series of crushers arranged on an inclined plane, and formed of successive couples or pairs of cylinders arranged one in front of the other, and scrapers for said cylinders, said scrapers being adapted and arranged to automatically transfer from one couple of cylinders to the next lower couple the mixture of shavings which are intermingled as they are disengaged and which vary in size at each couple, substantially as and for the purpose hereinbefore set forth.

2. A crushing or kneading and mixing apparatus for soap and the like, comprising a series of cylinders arranged one above the other in pairs, the pairs being arranged successively in higher planes from the lowermost to the uppermost pair and each pair driven at a greater speed than the pair next above, and scrapers for the cylinders of each pair, substantially as described.

3. A crushing or kneading and mixing apparatus for soap and the like, comprising a frame having an inclined upper surface, a series of cylinders mounted in rows one above the other in the frame, forming pairs of cylinders, solid scrapers arranged between the lower cylinders of the pairs, and toothed combs arranged between the upper cylinders of the pairs, substantially as described.

4. A crushing or kneading and mixing apparatus for soap and other material, comprising pairs or sets of crushing-rolls arranged in an inclined plane, so that an upper set forms the feed for the next lower one, and scrapers in contact with the crushing-rolls at the discharge sides thereof, to break up the sheet of material formed by the latter passing between a pair or set of rolls to form shavings com-

mingling with each other, to then pass to and between the next lower set of rolls, substantially as shown and described.

5. A crushing or kneading and mixing apparatus for soap and other material, comprising pairs or sets of crushing-rolls arranged in an inclined plane, so that an upper set forms the feed for the next lower one, and scrapers in contact with the crushing-rolls at the discharge sides thereof, to break up the sheet of material formed by the latter passing between a pair or set of rolls to form shavings commingling with each other, to then pass to and between the next lower set of rolls, the scraper for the upper rolls being toothed, substantially as shown and described.

6. A crushing or kneading and mixing apparatus for soap and other material, comprising pairs or sets of crushing-rolls arranged in an inclined plane, so that an upper set forms the feed for the next lower one, scrapers in contact with the crushing-rolls at the discharge sides thereof, to break up the sheet of material formed by the latter passing between a pair or set of rolls to form shavings commingling with each other, to then pass to and between the next lower set of rolls, and means for driving the upper rolls in each pair at a higher rate of speed than the lower rolls, as set forth.

7. A crushing or kneading and mixing apparatus for soap and other material, comprising pairs or sets of crushing-rolls arranged in an inclined plane, so that an upper set forms the feed for the next lower one, and scrapers in contact with the crushing-rolls at the discharge sides thereof, to break up the sheet of material formed by the latter passing between a pair or set of rolls to form shavings commingling with each other, to then pass to and between the next lower set of rolls, the scrapers for the lower rolls being inclined to form a bridge between adjacent lower rolls, substantially as shown and described.

In witness whereof we have hereunto set our hands in presence of two witnesses.

ANATOLE DES CRESSONNIÈRES.
ERNEST DES CRESSONNIÈRES.

Witnesses:
E. PARETTE,
GREGORY PHELAN.