

(No Model.)

J. B. ALLFREE.

GRINDING ROLL.

No. 362,196.

Patented May 3, 1887.

FIG. 1.

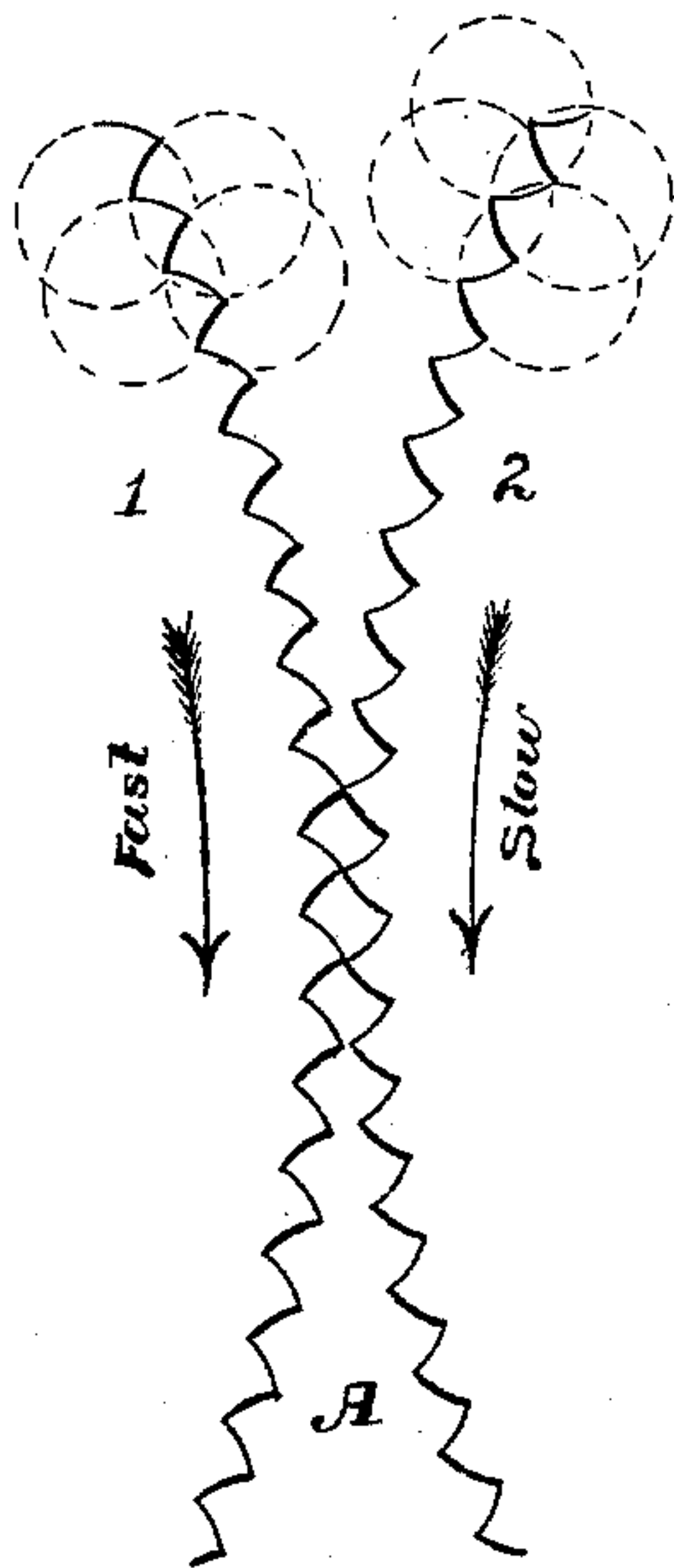


FIG. 2.

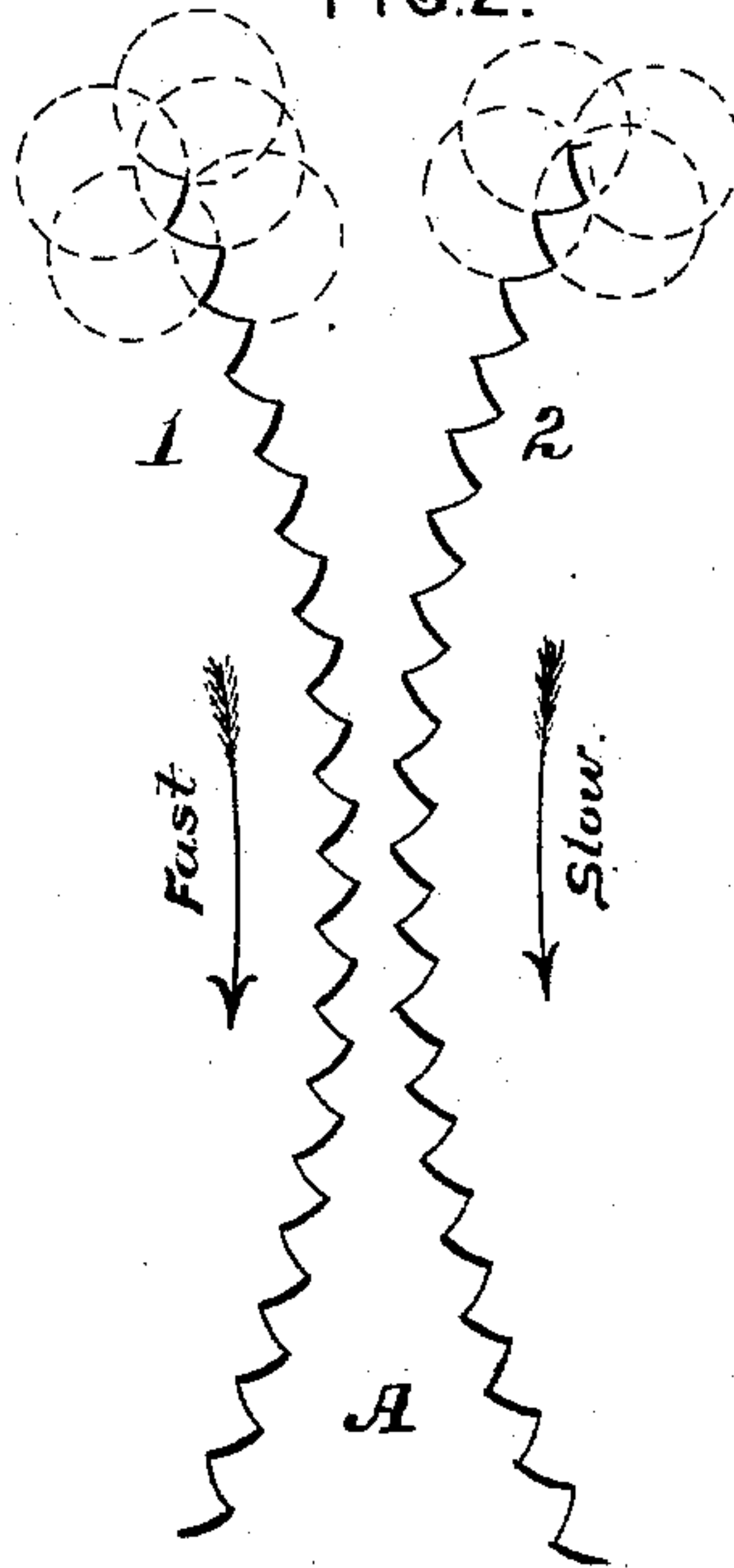


FIG. 3.

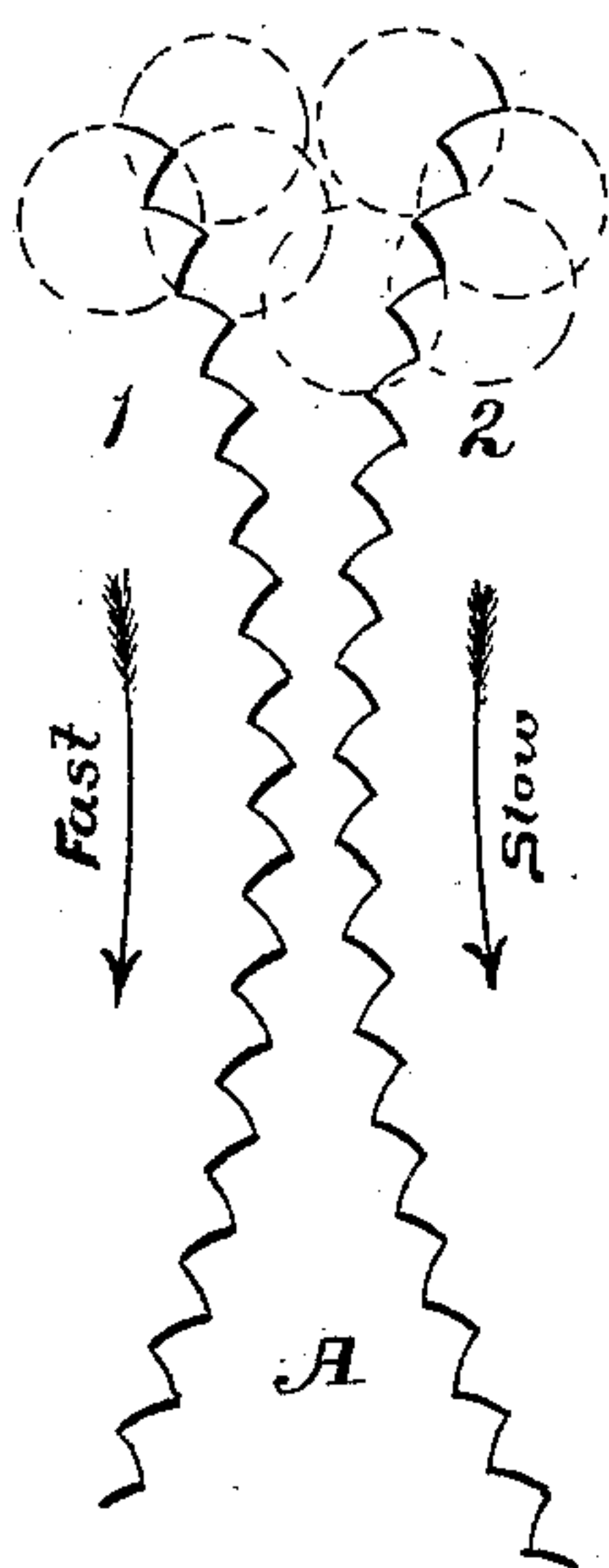
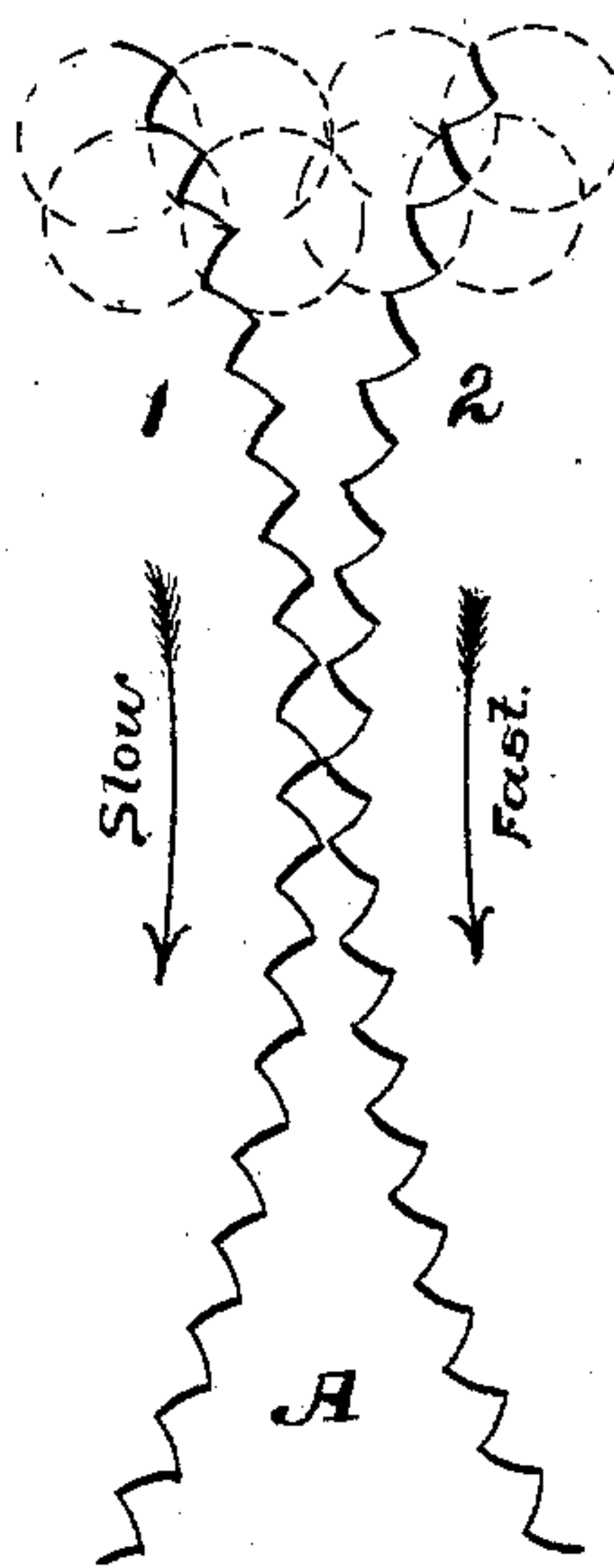


FIG. 4.



ATTEST-

J. Henry Kaiser.
William H. Scott.

INVENTOR-

James B. Allfree.
By atty J. M. C. W. S. S. S.

UNITED STATES PATENT OFFICE.

JAMES B. ALLFREE, OF CUMBERLAND, MARYLAND, ASSIGNOR OF ONE-HALF
TO ROBERT SHRIVER AND HARRISON SWARTZWELDER, BOTH OF SAME
PLACE.

GRINDING-ROLL.

SPECIFICATION forming part of Letters Patent No. 362,196, dated May 3, 1887.

Application filed January 5, 1886. Serial No. 187,680. (No model.)

To all whom it may concern:

Be it known that I, JAMES B. ALLFREE, a citizen of the United States, residing at Cumberland, Maryland, have invented new and
5 useful Improvements in Grinding-Rolls, of which the following is a specification.

This invention relates to rolls employed in roller grinding-mills, and particularly to the form of the corrugations or ribs upon their
10 operative surfaces.

The great desideratum in rolls of this kind is to provide the same with operative surfaces having corrugations of such form that by changing the relative positions of the rolls and
15 changing the speed of each, independent of the other, an action may be produced upon the material varying from a very sharp cutting action to an exceedingly dull non-cutting but crushing action, to suit the various quali-
20 ties of material to be acted upon; and the object of the present invention is to produce rolls possessing these characteristics.

With this object in view the invention consists of a roll for use in roller grinding-mills
25 provided with teeth or corrugations trending lengthwise of the roll, the whole operating-surface of each tooth being of such contour as is formed by the meeting of two simple reversed curves at an obtuse angle, one side
30 thereof being concave and the other convex.

In order that those skilled in the art to which my invention relates may know how to make and use the same, I will now proceed to describe the particular form of corrugations employed and the various effects which may be
35 produced upon the material therewith, in connection with the accompanying drawings, in which—

Figure 1 represents a small portion of the
40 contiguous grinding-surfaces of a pair of rolls so arranged and speeded as to exercise a sharp cutting action upon the material. Fig. 2 is a similar view indicating the arrangement and speed employed to perform a cutting action
45 in a degree less severe than that done by the arrangement shown in Fig. 1. Fig. 3 shows the arrangement and speed used when a less severe action than that performed by the arrangement shown in Fig. 2 is employed, and

Fig. 4 shows the arrangement employed to 50 perform a dull crushing reduction.

In the drawings, A represents the longitudinal teeth or flutes, which are placed upon the rolls and extend from end to end thereof, and are arranged either parallel or slightly spiral 55 to the axis of the rolls. The number of flutes per inch formed upon the rolls varies from twelve to thirty-two, according to the class of work to be performed.

The rolls are mounted in suitable frames, 60 and are so arranged that they may be turned end for end, and may be capable of having their speeds increased or decreased independent of each other. The means for accomplishing this forms no part of the present inven- 65 tion, however, and need not therefore be particularly described here.

The corrugations are, as will be apparent from an inspection of the drawings, of such contour that the whole or entire operative 70 surface of each tooth or corrugation is the same as is formed by the meeting of two reversed curves at an obtuse angle, which curves, if continued or extended, would describe two circles having their centers at opposite equi- 75 distant points from the angles of intersection, and one side of said corrugations is concave, while the other is convex. This form produces upon the convex face a very dull grinding-surface, while the crest of the rib upon the 80 concave side is exceedingly sharp. Thus it will be apparent that when the rolls are arranged as shown in Fig. 1, and the roll 1 run at a higher rate of speed than roll 2, the sharp crests will be brought into action upon the ma- 85 terial and an exceedingly sharp cutting action exercised. When a less severe cutting action than that exercised by the arrangement shown in Fig. 1 is required, the rolls are so arranged that the dull or convex sides of the flutes of 90 the fast roll shall come in contact with the sharp or concave sides of the flutes of the slow roll, as shown in Fig. 2.

In Fig. 3 the rolls are so arranged that the sharp or concave sides of the flutes of the fast 95 roll shall come in contact with the dull or convex surfaces of the slow roll, and this arrangement produces a less severe action than that

produced by the arrangement shown in Fig. 2. When a dull absolutely non-cutting action is required, the parts are arranged in the same way as in Fig. 1, and roll No. 2 is run at a higher rate of speed than roll 1. This brings the dull surfaces of both rolls in contact, as will be seen from an inspection of Fig. 4.

From this description it will be apparent that any action varying from an exceedingly sharp cutting action to an equally dull non-cutting action may be secured, and the rolls therefore adapted to any ordinary class of material.

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

1. A roll for roller grinding-mills provided with ribs or corrugations of such contour as is formed by the meeting of two simple reversed

curves at an obtuse angle, one side of the said ribs being concave and the other convex, substantially as described. 20

2. A dress for the rolls of a roller grinding-mill, consisting of a series of ribs or corrugations trending lengthwise of the roll and of such contour as is formed by the meeting of two simple reversed curves at an obtuse angle, one side of said ribs being concave and the other convex, substantially as described. 25

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses. 30

JAMES B. ALLFREE.

Witnesses:

DAVID H. MEAD,
CURTIS LAMMOND.