

(No Model.)

J. DODD.
FLUTED OR GROOVED DRAWING ROLLER.

No. 497,912.

Patented May 23, 1893.

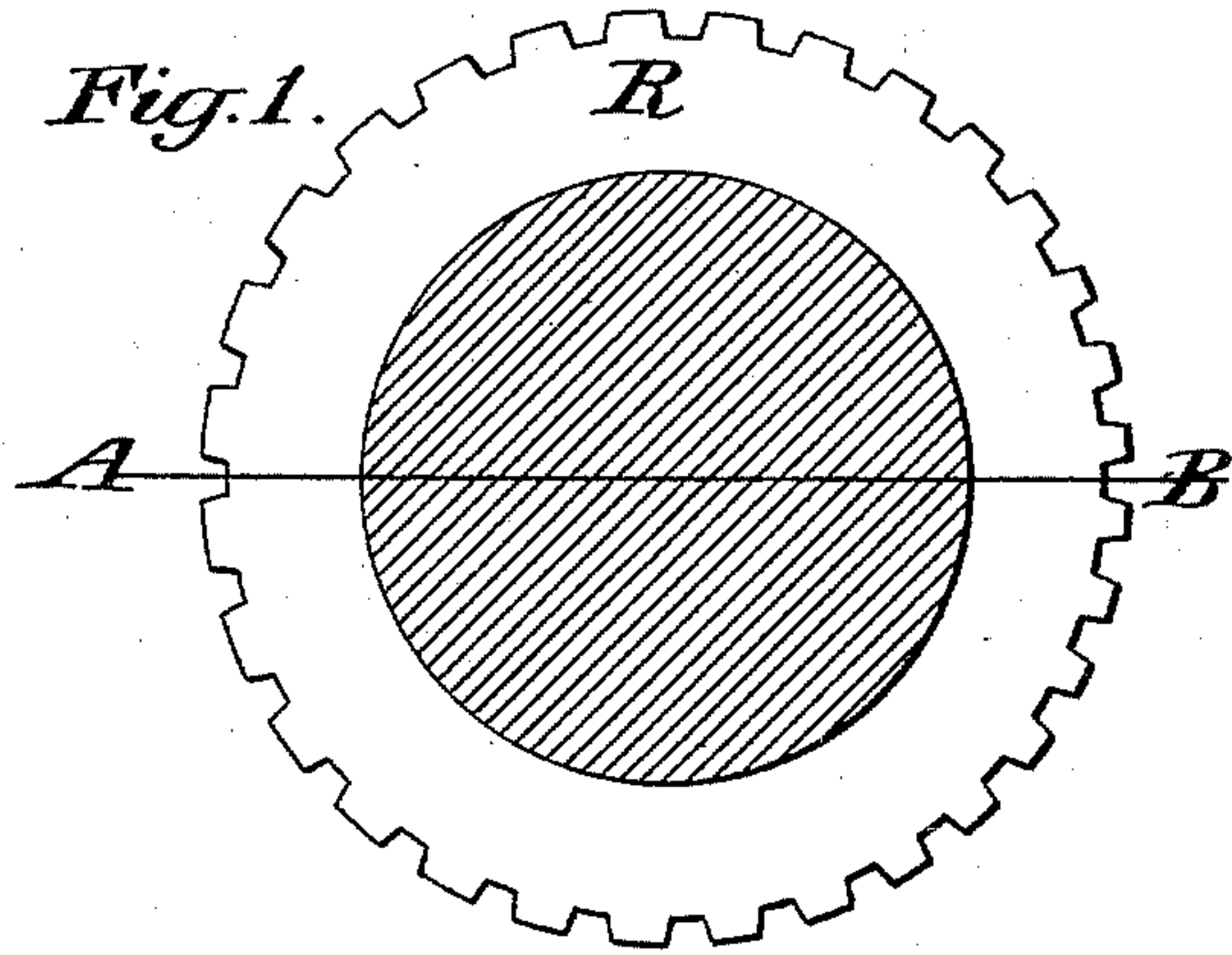


Fig. 2.

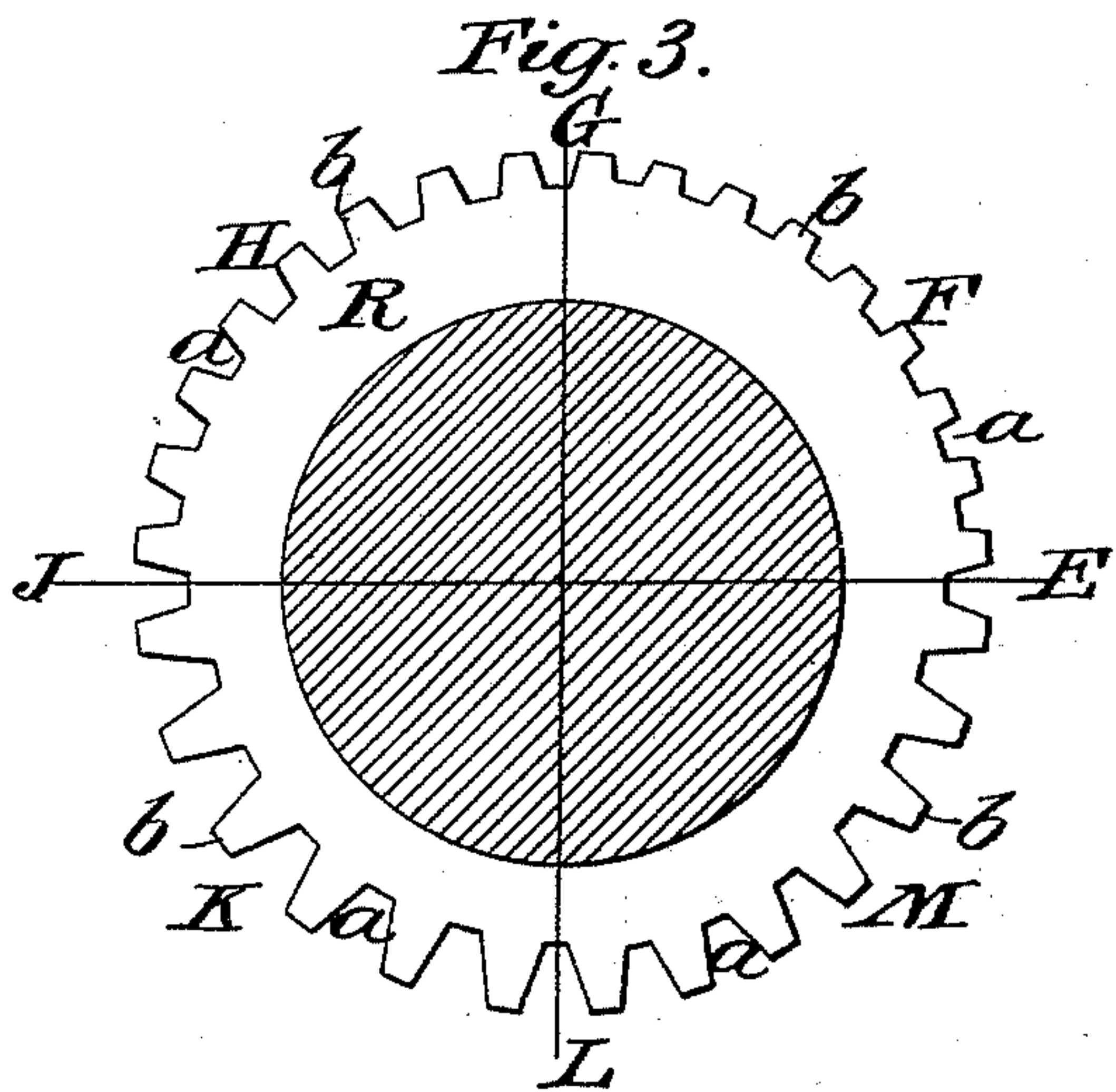
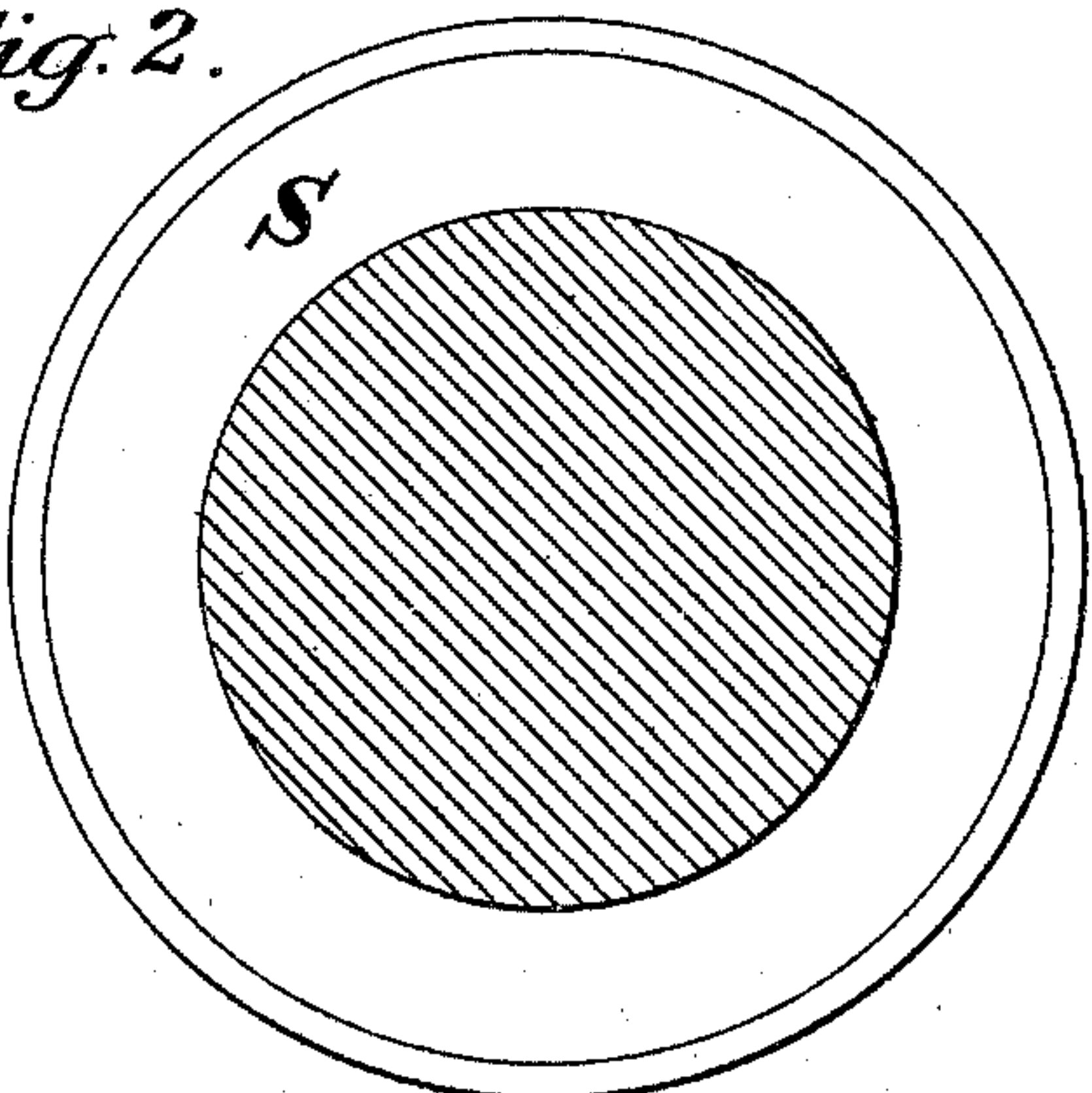
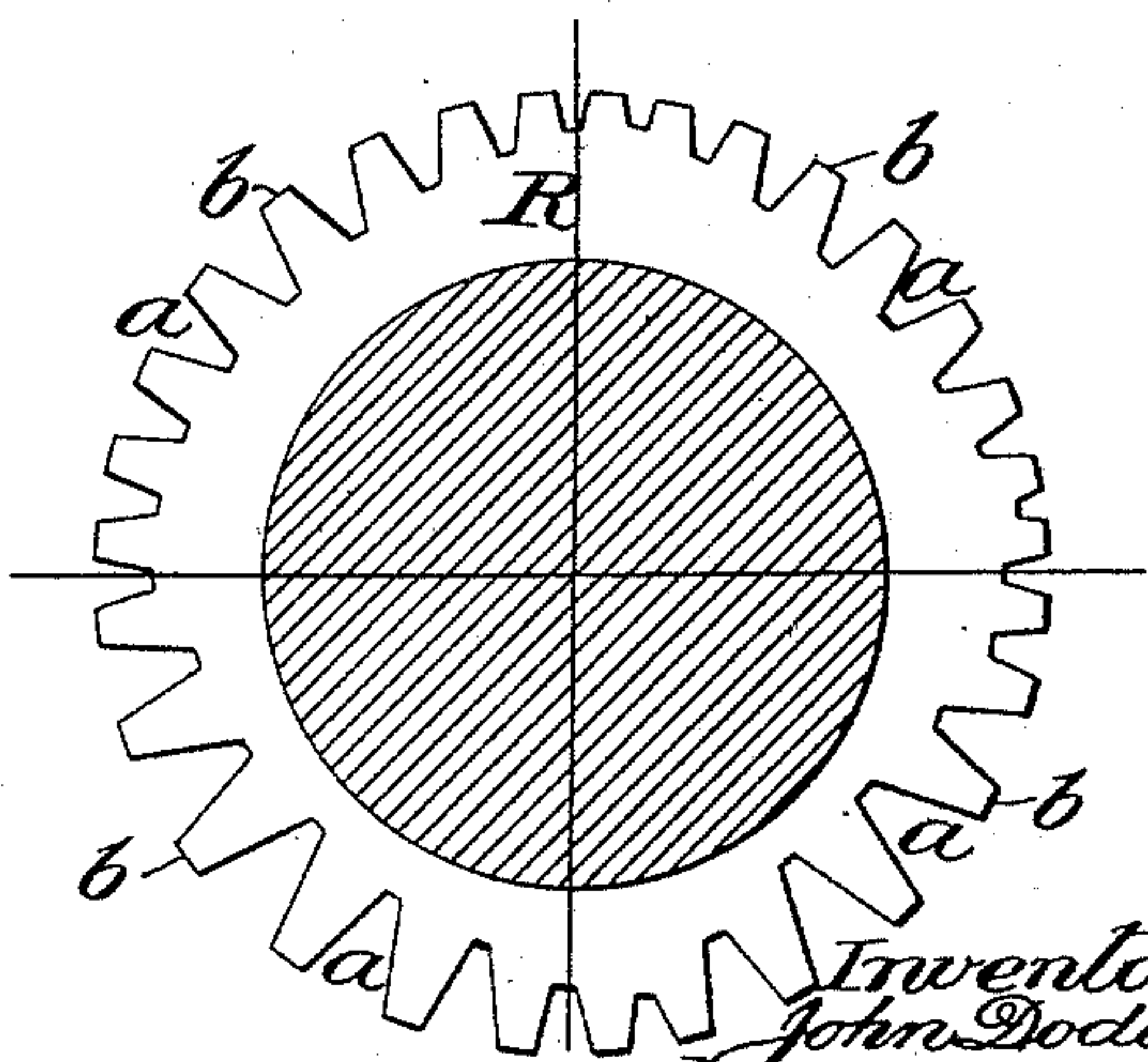


Fig. 4.



Witnesses:

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UNITED STATES PATENT OFFICE.

JOHN DODD, OF OLDHAM, ENGLAND.

FLUTED OR GROOVED DRAWING-ROLLER.

SPECIFICATION forming part of Letters Patent No. 497,912, dated May 23, 1893.

Application filed December 27, 1892. Serial No. 456,304. (No model.) Patented in England September 28, 1889, No. 15,276.

To all whom it may concern:

Be it known that I, JOHN DODD, machinist, of the firm of Platt Brothers & Co., Limited, of Hartford Works, Oldham, in the county of Lancaster, England, have invented certain new and useful Improvements in Fluted or Grooved Drawing-Rollers, (for which I have obtained Letters Patent of the United Kingdom of Great Britain and Ireland, dated September 28, 1889, and numbered 15,276,) of which the following is a specification, reference being had to the accompanying drawings.

This improvement relates to the fluted or grooved metal rollers which are commonly used in machinery or apparatus for preparing and spinning fibrous materials and which are technically known as "drawing" rollers.

Figure 1 in the drawings represents a cross section of a fluted drawing roller of a known kind. Fig. 2 represents a cross section of an end view of one example of a fluted metal drawing roller constructed according to my invention and of a top roller arranged in operative relation thereto. Figs. 3 and 4 represent cross sections of different examples of fluted metal drawing rollers constructed according to my invention.

In the views in which R is the drawing roller and S the top roller for the sake of greater perspecuity the rollers are represented several times larger than the real size and the flutes and grooves of the drawing rollers are represented relatively still larger, the number of flutes and grooves in actual practice being from fifty four to sixty two flutes and grooves. The drawing rollers in ordinary use are of two kinds.

In one kind of drawing roller in ordinary use the flutes or grooves are formed on the surface of the roller with a uniform pitch, that is to say with a pitch in which the distance between the center of one flute and the center of the next flute or the distance from the point of one tooth to the point of the next tooth is equal in every part of the circumference of the roller. In the other kind of drawing roller in ordinary use the flutes are formed on the surface of the roller with a varying pitch which is technically known as "eccentric" fluting. The distance between the flutes is either constantly increasing or de-

creasing, as will be seen on reference to Fig. 1. On one side of the roller R the pitch is greater than on the opposite side of the roller; that is to say, beginning with the least pitch at B, (Fig. 1) the distance between the flutes gradually increases to the part marked A, from which part to the part marked B, the pitch decreases in the same manner and in the same ratio as it increased. Thus in one half of the circumference of the roller the pitch is gradually increasing and in the other half of the circumference of the roller the pitch is gradually decreasing.

The particular mode of action in the operation of "drawing" or elongating fibrous materials both in preparing and spinning machinery, is well known and need not be explained here excepting in so far as to state that it is necessary for the perfect action of the "top" rollers that their surfaces should be cylindrical, smooth and of uniform diameter.

The fluid drawing rollers R produce corresponding impressions or indentations on the surface of the leather or parchment covered top rollers S and when the pitch or distance between the flutes or grooves is uniform, whatever may be the relative diameters of the top and drawing rollers, the teeth of the drawing rollers in rotating continually enter into the same or similar impressions or indentations thereby producing what is technically known as a "fluted top roller" which necessitates the continual renewal of the covering of the top rollers to enable them to do their work effectually. A similar effect is also produced in the rollers heretofore constructed in which the pitch varies in different parts of the circumference whether made in the ordinary manner or according to the invention which is the subject of my application for Letters Patent, Serial No. 418,978, filed January 23, 1892, or even when constructed according to my present invention whenever the top and drawing rollers are of the same diameter because the angular velocity of the two rollers being the same the teeth of the drawing roller in rotating continually enter the same indentations or impressions in the leather or other covering of the top rollers, thus producing fluted top rollers.

It will be obvious that where the flutes of an ordinary drawing roller are of a uniform

pitch the width of the teeth will be also uniform so that if the teeth are thin or sharp in one part of the roller they will be thin or sharp all round the roller and the drawing power of the roller will be the same at every part of its circumference, an advantage greatly to be desired.

Drawing rollers known as "eccentrically" fluted rollers are formed with all the flutes of a uniform width and as the distance or pitch from one flute to another continually changes from the smallest pitch to the largest pitch or vice versa it follows that the width of the tops of the teeth will be increased or diminished to the same extent as the pitch of the flutes is increased or diminished. The width of the tops of the teeth varies in a similar manner in all rollers in which the pitch of the flutes or grooves is not uniform and the flutes or grooves are of uniform size.

In the case of an ordinarily eccentrically fluted roller such as is shown in Fig. 1 the broad teeth of the coarsest pitched part (A) of the roller have less power of drawing than the fine teeth of the finer pitched part B, of the roller; and for this reason in some cases it is found necessary in order to get rid of the blunt teeth of the coarse pitched part of the roller and to obtain the greatest possible drawing power, to employ rollers fluted with a uniform pitch in which there is no variation in the drawing power notwithstanding the objection that with such rollers the top rollers soon become "fluted."

The object of my present invention is to enable the advantage which arises from the use of a varying pitch of the flutes in drawing rollers in avoiding the fluting of the leather or parchment coverings of the top rollers used therewith to be obtained without the loss of uniformity in the drawing power which is present with all rollers of variable pitch other than those made according to my present invention.

The roller shown in Fig. 1 is as has been said above a cross section of an ordinary drawing roller known as an eccentrically fluted roller. This arrangement of roller forms no part of my invention and it is only intended to illustrate the disadvantages my invention is intended to overcome.

According to my invention I so form the flutes or grooves of rollers in which flutes or grooves of varying pitches are formed that while such flutes or grooves vary in "pitch" the breadth or thickness of the tops or extremities of the teeth between the flutes or grooves shall be uniform. In accomplishing this I form the flutes or grooves of varying width which I may accomplish by causing the tool employed to form the flutes to cut or penetrate more or less deeply so that a wider or narrower part of the tool will be caused to operate on the roller. The drawing roller so fluted in order to be effective must be used with a top roller of a different diameter.

In Fig. 2 of the accompanying drawings

my invention is shown as applied to a roller in which the pitch of the flutes or grooves which is least at C, increases in both directions round the roller to D where the pitch is largest as in the ordinary eccentrically fluted roller illustrated in Fig. 1. The width of the grooves (a) in Fig. 2 is made variable in the same proportion as the pitch of such grooves so that the teeth (b) between the grooves (a) are of uniform width at the top. As is indicated in Fig. 2 the variation in the width of the flutes or grooves (a) which results in the uniformity of the width of the tops or extremities of the teeth (b) is very readily obtained by the flutes or grooves (a) being formed deeper in proportion to the increase in the pitch.

In Fig. 3 of the accompanying drawings my invention is shown as applied to a roller in which the flutes are of different pitches in different sections while the flutes in each section are of a uniform pitch. In the section E, F, G, there are nine teeth, in the section G, H, J, there are eight teeth, in the section E, M, L there are seven teeth and in the section J, K, L, there are six teeth. The pitch of the flutes or grooves (a) is smallest in the section E, F, G, greater in the section G, H, J, greater still in the section E, M, L, and greatest in the section J, K, L. By the grooves (a) being formed deeper and wider when and in the same proportion as they are formed of greater pitch the tops or extremities of the teeth are made to be uniform in width around the whole circumference of the roller.

In Fig. 4 of the accompanying drawings my invention is shown as applied to a roller in which the flutes or grooves are formed so that in each of the several sections of the circumference of the roller the flutes or grooves are of variable pitch while the flutes or grooves in each section are different in pitch and in variation of pitch from those in every other section. The grooves or flutes (a) being according to my invention formed of greater width and depth in proportion as they are formed farther apart the teeth (b) between such flutes or grooves are formed so that their tops or extremities are of the same width all round the circumference of the roller.

By varying the width and depth of the flutes or grooves (a) in proportion to the variation of the pitch of the flutes and grooves as above described I am enabled to form a roller which operating with a top roller of different diameter shall retain the advantages which result from the variation of the pitch of the flutes or grooves in the avoidance of fluted top rollers and also to obtain the uniformity of drawing power hitherto only obtained when drawing rollers of uniform pitch have been employed.

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

1. A fluted drawing roller in which the flutes or grooves (a) of different pitch in dif-

ferent parts of the roller are made wider or narrower in proportion as they are made of greater or less pitch in order that the teeth between such grooves or flutes may be of uniform width at their tops or extremities throughout the circumference of the roller substantially as and for the purpose herein described.

2. In a pair of drawing rollers, the combination of a roller covered with soft material and a fluted or grooved roller of metal in which the flutes or grooves of different pitch in different parts of the roller are made so

much wider or narrower in proportion as they are made of greater or lesser pitch that the teeth between such grooves or flutes may be of uniform width at their tops or extremities throughout the circumference of the roller, substantially as herein set forth.

JOHN DODD.

Witnesses:

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It is hereby certified that in Letters Patent, No. 497,912, granted May 23, 1893, upon the application of John Dodd, of Oldham, England, for an improvement in "Fluted or Grooved Drawing Rollers," an error appears in the printed specification requiring the following correction, viz.: In line 74, page 1, the word "fluid" should read *fluted*; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 30th day of May, A. D. 1893.

[SEAL.]

JNO. M. REYNOLDS,
Assistant Secretary of the Interior.

Countersigned:

S. T. FISHER,
Acting Commissioner of Patents.