(No Model.) 2 Sheets—Sheet 1.

N. W. HOLT.

BELT DRIVE,

No. 455,283. Patented June 30, 1891.

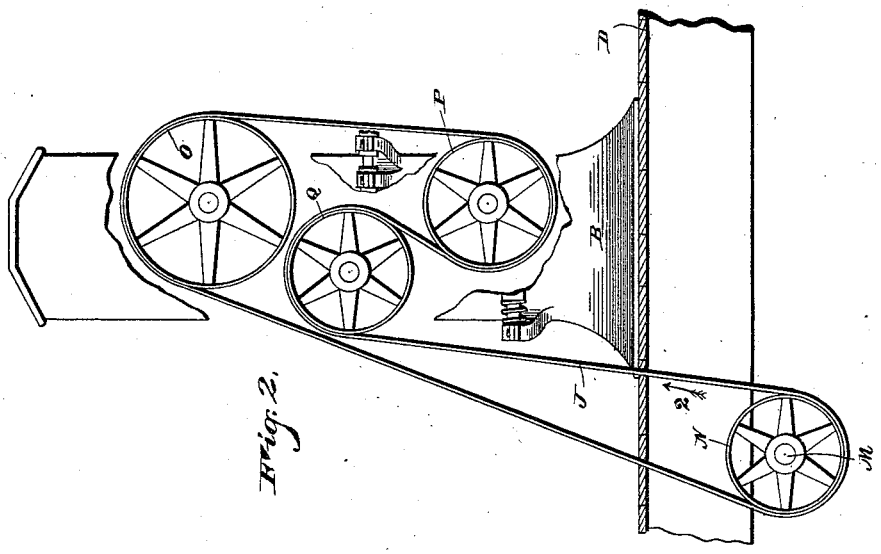

Fig. 2.

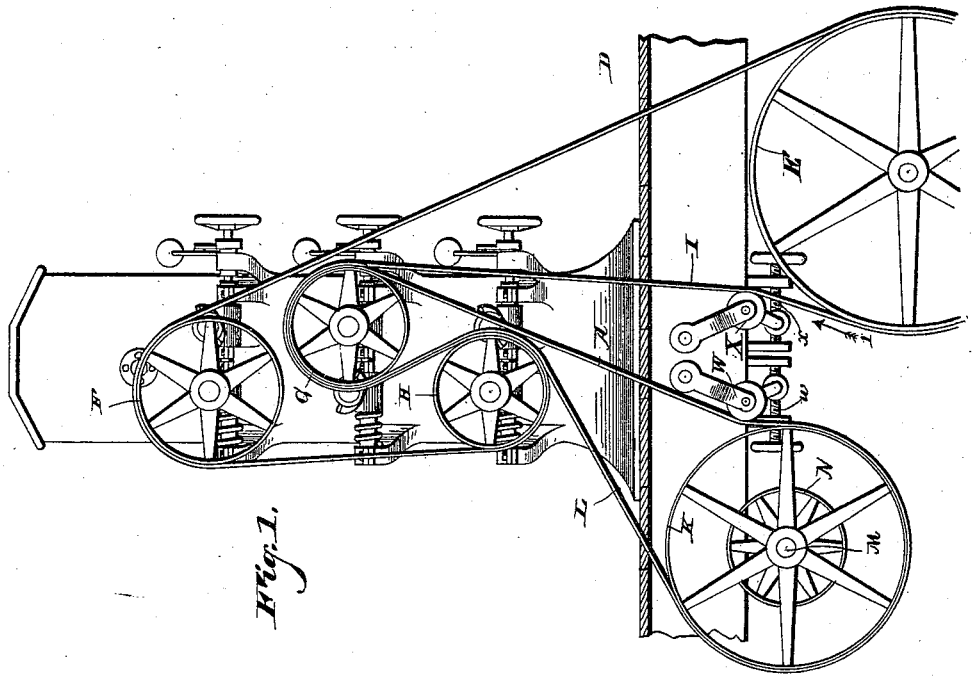

Fig. 1.

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(No Model.) 2 Sheets—Sheet 2.

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BELT DRIVE.

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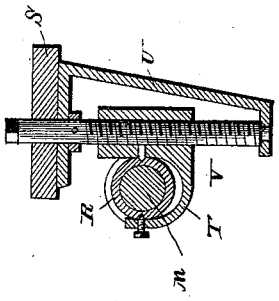

Fig. 4.

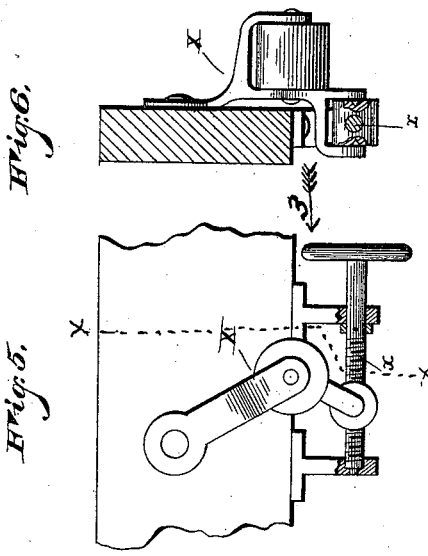

Fig. 6.

Fig. 5.

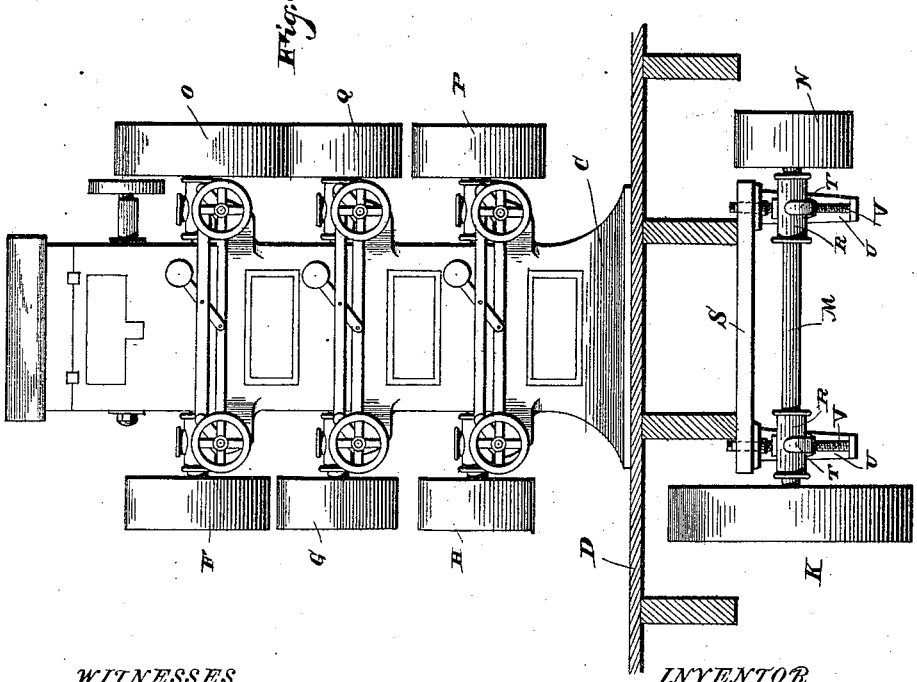

Fig. 3.

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UNITED STATES PATENT OFFICE.

NOAH WILLIAM HOLT, OF MANCHESTER, ASSIGNOR TO RUFUS H. EMERSON, AND ZENAS C. ELDRED, RECEIVERS, BOTH OF JACKSON, MICHIGAN.

BELT-DRIVE.

SPECIFICATION forming part of Letters Patent No. 455,283, dated June 30, 1891.

Application filed March 14, 1891. Serial No. 385,099. (No model.)

To all whom it may concern:

Be it known that I, NOAH WILLIAM HOLT, a citizen of the United States, residing at Manchester, in the county of Washtenaw and State of Michigan, have invented certain new and useful Improvements in Belt-Drives, of which the following is a specification, reference being had therein to the accompanying drawings.

Figure 1 is an end elevation of a roller-mill having my invention applied thereto. Fig. 2 is a view of the drive of the opposite end of the mill, looking in the same direction as that of Fig. 1, parts being broken away to facilitate clearness of illustration. Fig. 3 is a front view of the same, the main drive-shafts and belts being omitted. Figs. 4 and 5 are detached views showing the hangers for the belt-tighteners. Fig. 6 is an edge view of Fig. 5.

In the illustration shown I have represented my invention as being applied to a mill having three reductions, substantially such as is frequently used for grinding feed and similar material, and in which the upper pair of rolls is driven at a slower speed than are those below.

Like letters of reference indicate like parts in all the drawings.

A B are the ends and C the front of the frame-work or casing upon which the rolls are mounted. As I prefer to construct the mill as far as is practicable in accordance with my Patent No. 440,157, no detailed description need be here given, because this patent relates more specifically to the belt-drive.

D is the flooring or other support upon which the mill rests.

E is the main driving-pulley, the shaft of which is carried by suitable hangers or other bearings which are not shown.

F G H are the belt-pulleys of the fast rolls.

I is a belt running in the direction of the arrow 1, Fig. 1, from the main driving-pulley up over the outer or front face of pulley G, thence down around pulley H, up over pulley F, and back to pulley E.

K is the pulley of the counter-shaft.

L is a belt extending from pulley K up over and around roller-pulley G and between that pulley and the adjacent belt I. This belt L also follows the belt I part way around the roller-pulley H but in contact with the outer face of belt I and thence back to pulley K. Owing to the greater diameter of pulley K the counter-shaft M will have a relatively slower rotation than the roller of pulley G.

N is a pulley on the opposite end of the counter-shaft and drives a belt J, which, running in the direction of arrow 2, Fig. 2, passes over roller-pulley O, thence down around roller-pulley P, thence up over roller-pulley Q and back to pulley N. Owing to the fact that pulley N is smaller in diameter than pulley K the belt J travels at a lower speed than does belt L, and as roller-pulley Q is larger than roller-pulley I there is a greater difference between the speeds of the upper pair of rolls than there is between the speeds of the lower pairs, although in practice I prefer to make the pulleys O and P of greater diameter than the pulleys G H. The bearings R R of the counter-shaft M are in this instance supported from a beam or bar S below the floor by means of stirrups or forks T T, which are by preference adjustably supported in hangers U U by means of screw-rods or threaded spindles V V. By means of these adjustable bearings the pulleys K N may be adjusted vertically and the belts L J thereby tightened. It is evident that when thus tightening the belts the counter-shaft should be adjusted by moving it the same distance at both its ends to guard against the belts running off, and owing to the difference in the lengths of the belts it is many times desirable to use an independent tightener for each of them. Therefore I prefer to employ two tighteners W X, as is indicated in Fig. 1, although the precise location of such tighteners is not material. As shown in that figure and in detail in Fig. 5, the tighteners are adjustably mounted in hangers which depend from the flooring and are, by means of screw-rods *w x*, thrust toward the adjacent pulleys, so that when the belts become a little slackened they are wrapped around the pulleys a little farther than when they are first applied.

The frictional contact-surface between belt L and its driving-pulley G is of course of much less extent than exists at the counter-pulley K; but this is compensated for in part by the binding action of belt I and in part by the engagement of a part of the belt I which lies between pulley H and belt I. In order to pro-

mote the driving efficiency of these frictional contacts, I prefer to make the pulley H of somewhat less diameter than pulley G, such difference being about the thickness of belt I in the radius of the pulley, so that both belts shall travel at the same speed and thus avoid creeping.

Of course a tightener may be employed at Z in connection with belt I.

What I claim is—

1. In a roller-mill, the combination of a series of pairs of rollers, one roll of each pair having a drive-pulley at one end, a driving-pulley, a belt connecting the driving-pulley with the pulleys on one end of the mill, a belt connecting one of those driven pulleys with the counter-shaft, and a belt connecting the counter-shaft with pulleys on the rolls at the opposite end of the mill, substantially as set forth.

2. In a roller-mill, the combination of a series of relatively fast-moving rolls, each having a pulley at one end of the mill, a series of relatively slow-moving rolls, each having a pulley at the opposite end of the mill, a driving-pulley, a belt connecting the driving-pulley with the roll-pulleys at one end of the mill, a belt connecting one of those driven pulleys with a counter-shaft provided with two pulleys of different sizes, and a belt connecting the counter-shaft with the roll-pulleys at the other end of the mill, substantially as set forth.

3. In a roller-mill, the combination of a series of rolls arranged in pairs, one roll of each pair having a pulley at one end of the mill, the other roll of each pair having a pulley at the opposite end of the mill, a counter-shaft having two pulleys, a belt connecting one of the pulleys with the roll-pulleys at one end of the mill, a belt connecting the other counter-shaft pulley to one of the rolls at the opposite end of the mill, a drive-pulley, and a belt connecting the drive-pulley with roller-pulleys at the other end of the mill and engaging with the outer surface of the belt from the counter-shaft pulley at that end of the mill and forcing it against one of the roller-pulleys, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

NOAH WILLIAM HOLT.

Witnesses:

C. H. BENNETT,

SAM H. CAMP.