

(No Model.)

2 Sheets—Sheet 1.

L. E. KRUGER.
ROLLER MILL.

No. 440,480.

Patented Nov. 11, 1890.

Fig. 2.

Fig. 1.

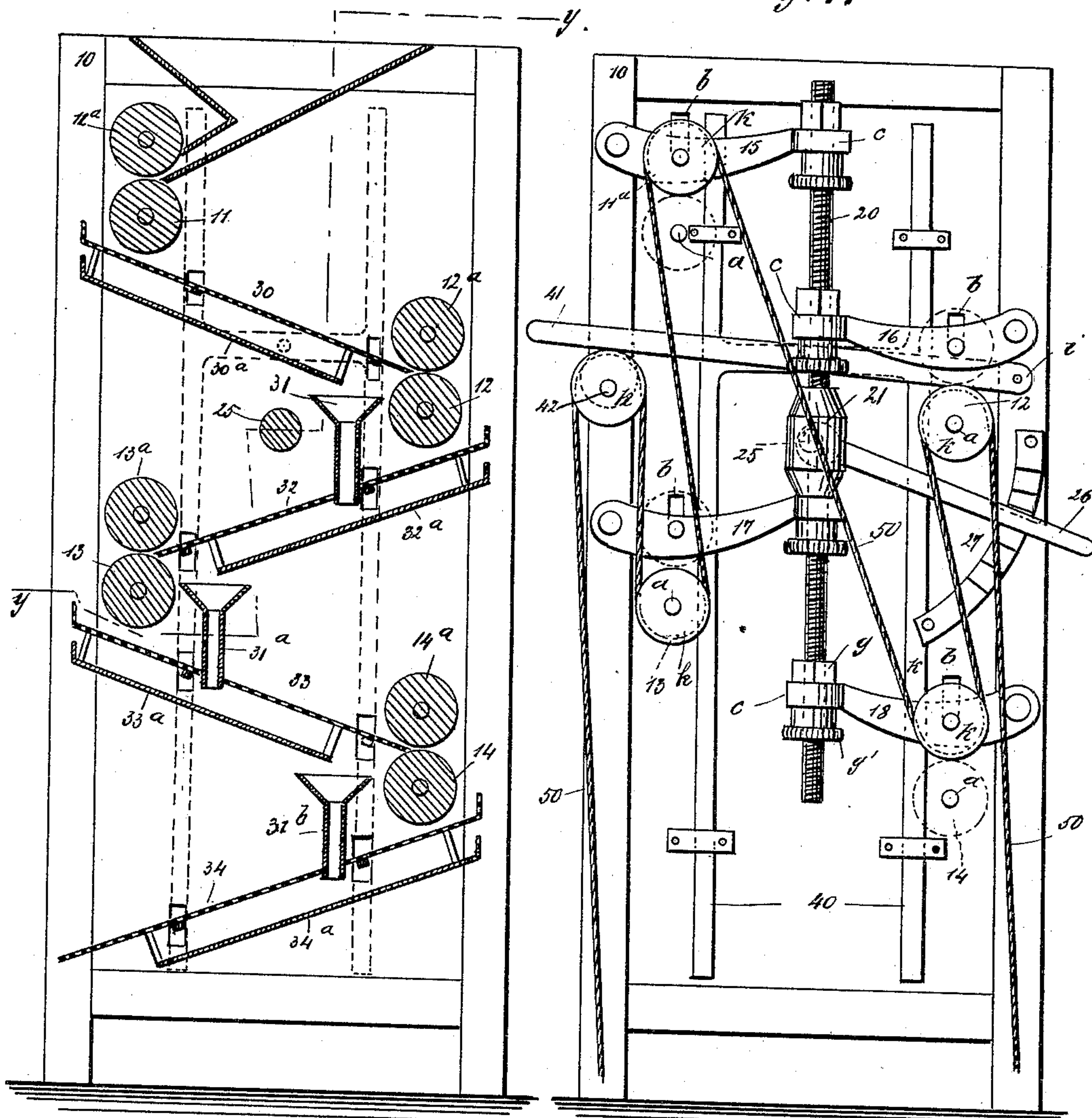
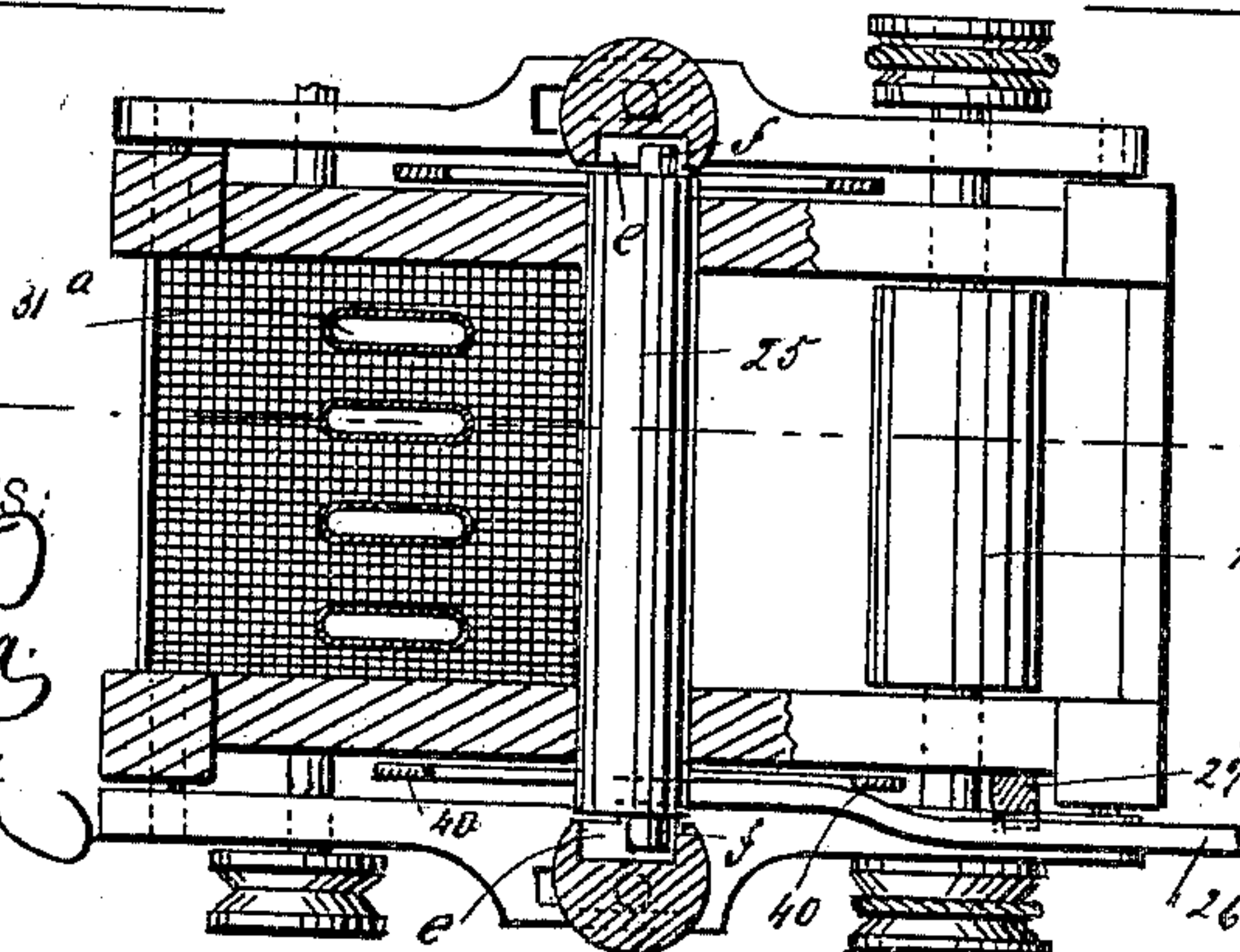


Fig. 3.



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C. Sedgwick

INVENTOR:

L. E. Kruger

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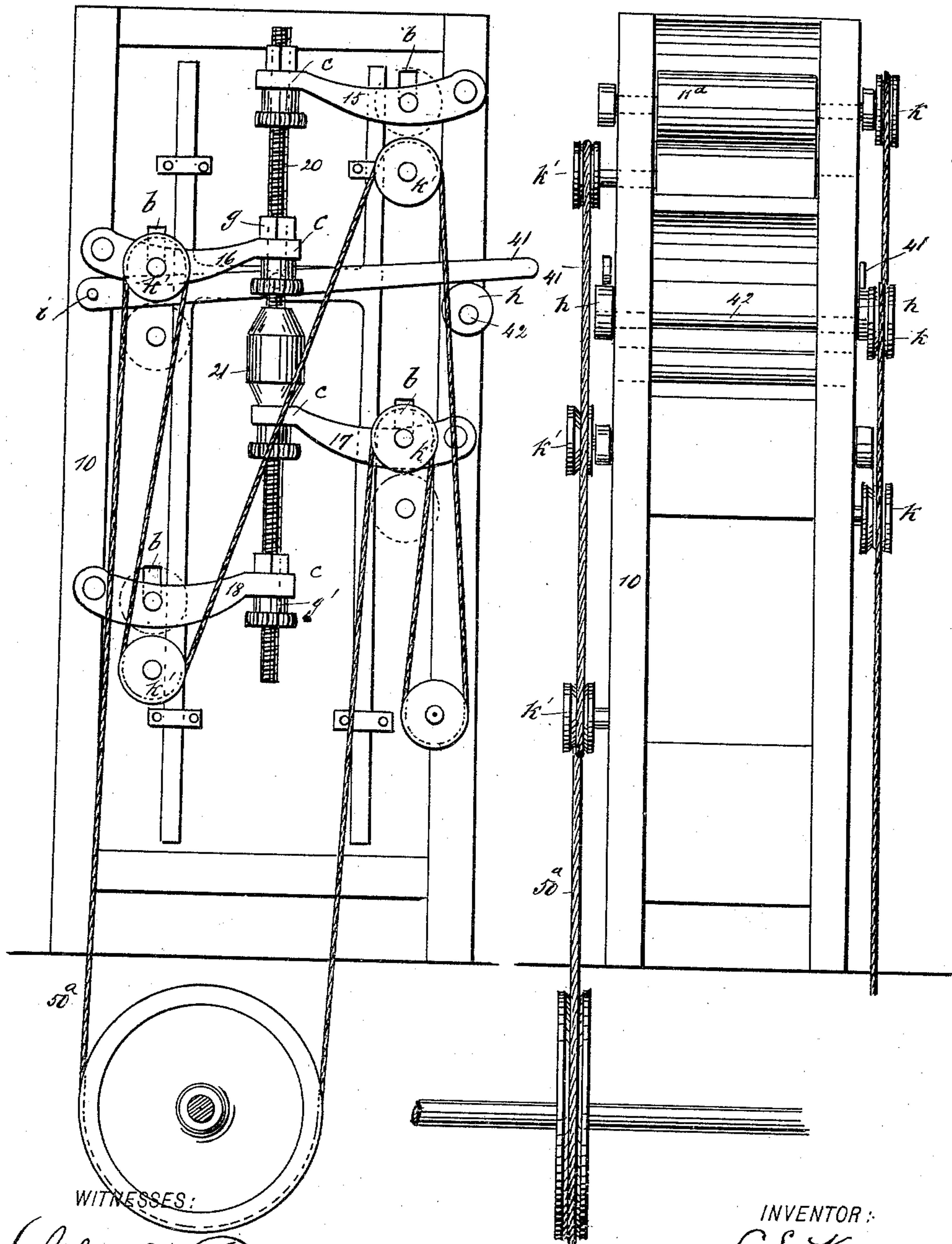
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Fig: 4.

Fig: 5.



WITNESSES:

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UNITED STATES PATENT OFFICE.

LOUIE EDWARD KRUGER, OF CANTON, SOUTH DAKOTA.

ROLLER-MILL.

SPECIFICATION forming part of Letters Patent No. 440,480, dated November 11, 1890.

Application filed January 23, 1890. Serial No. 337,839. (No model.)

To all whom it may concern:

Be it known that I, LOUIE EDWARD KRUGER, of Canton, in the county of Lincoln and State of South Dakota, have invented a new and Improved Roller-Mill, of which the following is a full, clear and exact description.

This invention relates to roller-mills, the object of the invention being to provide for the continuous treatment of stock in a manner such that after the first reduction all particles that are of a sufficient degree of fineness will be sifted out, and will gradually pass downward, being joined on the way by other particles of the required fineness that are produced by other sets of rolls with which the machine is provided, the final result being the delivery of the bran and of the flour and middlings in separate streams.

To the ends above named the invention consists of certain novel constructions, arrangements, and combinations of elements, which will be hereinafter fully described, and specifically pointed out in the claims.

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

Figure 1 is a side view of my improved roller-mill. Fig. 2 is a vertical central sectional elevation of the mill transversely through its rolls and screens on the line $x x$, Fig. 3. Fig. 3 is a sectional plan view on the broken line $y y$ of Fig. 2. Fig. 4 is a view of that side of the mill that is opposite the one illustrated in Fig. 1, and Fig. 5 is an end view of the mill.

In the drawings, 10 represents the main frame of the mill, which said frame is provided with bearings adapted to receive the journals a of the lower rolls 11, 12, 13, and 14, as many of these rolls being provided as may be deemed desirable. Above the rolls 11, 12, 13, and 14 there are mounted upper rolls 11^a, 12^a, 13^a, and 14^a, said rolls being journaled in arms 15, 16, 17, and 18, that are pivotally attached to the frame 10, the roll-shafts extending outward through slots b , that are formed in the frame or casing 10. Upon the inner ends of the arms 15 to 18 there are formed eyes c , through which eyes there are passed threaded

shafts 20, one of said shafts being arranged at each side of the machine, and each shaft being provided with a central enlargement 21, formed with a recess e , adapted to receive an eccentrically-arranged pin f , such pins extending outward from the ends of the shaft 25. This shaft 25 is provided with a lever-arm or handle 26, in connection with which there is arranged a segmental rack 27.

Upon the shaft 20 there are mounted adjusting-nuts g and g' , a pair of these nuts being arranged in connection with each of the arms 15, 16, 17, and 18, whereby any arm may be so adjusted as to bring its roll to the required position should the adjustment of the roll alter, owing to the wearing of the bearings or from any other cause, and whereby all of the upper rolls may be simultaneously adjusted by simply throwing the lever 26, this latter adjustment being desirable in order that the several pairs of rolls may be operated properly upon different styles or classes of grain.

Within the casing or frame 10, I arrange an upper sieve 30, so located as to receive the stock after it passes between the rolls 11 and 11^a and to deliver a portion of the stock to the rolls 12 and 12^a, all the material that has been sufficiently reduced passing through the sieve 30 and onto a plate 30^a, to pass thence to funnels 31, which lead downward through a sieve 32, that is arranged to receive the material after it has been acted upon by the rolls 12 and 12^a. The funnels 31 deliver to a plate 32^a, which in turn delivers to funnels 31^a, that pass through a third sieve 33, the material passing through the funnels 31^a being caught by a plate 33^a, which delivers to funnels 31^b, which pass through sieves 34 and deliver to a plate 34^a.

The sieves and plates above referred to are connected to external frames 40, that are in turn supported by levers 41, such levers being fulcrumed at the points marked i , and the connection between the frames 40 and the levers being a pivotal connection. The free ends of the levers 40 rest upon eccentrics h , that are carried by a shaft 42, so that if the shaft 42 be revolved a vertical reciprocating motion will be imparted to the frames 40, and consequently to the sieves and plates

that are supported by such frames, connections between the sieves and frames being established by rods that extend outward through slots formed in the walls of the casing 10.

Referring now to Fig. 1 it will be seen that the rolls 11^a, 12, 13, and 14^a carry pulleys *k*, about which pulleys there is passed a driving-belt 50, such belt extending upward from a driving-pulley and tightener-pulleys not shown in the drawings, and following the course indicated in the figure last above referred to, passing upward from the pulley *k*, which is carried by the roller 13, to and about a pulley which is carried by the shaft 42, and thence downward to the driving-pulley.

Upon the opposite side of the machine, as shown in Fig. 4, the rolls 11, 12^a, 13^a, and 14 are provided with pulleys *k'*, about which there is passed a driving-belt 50^a, which runs as indicated. The belt 50^a (see Fig. 4) passes directly from the drive-pulley to the roll-pulleys *k'*; but between the right-hand pulleys it is looped around a tightener-pulley near the lower end of the frame.

Among the advantages arising from the use of such a mill as above described is what follows: The wheat to be ground can be heated before entering between the first pair of rolls, and as all particles are gradually reduced in quick succession the reheating of the wheat will not be necessary. The vertical reciprocating motion imparted to the sieves and plates prevents all clogging of the sieves and provides for a proper clear separation. The driving-belts 50 and 50^a are adjusted so that their action will tend to draw the rolls together, and the belts are so arranged as to overcome any tendency to shift the rolls from their normal parallel position. It will be understood that the tightener-pulleys, around which the belts 50 50^a pass, are in practice to be adjustable, so that the tension of the belts may be adjusted to take up slack or relieve them from undue strain from the movements of the rollers. The said tighteners or idlers are so located as to pull the rolls to their work.

By providing for the discharge of the fine material from plate to plate I secure a single discharge-stream of such material and overcome the necessity of removing the material after it has passed between each pair of rolls. By providing an adjusting attachment which is common to all of the rolls, and one by means of which any particular roll may be adjusted, I overcome many of the objections heretofore found with the existing types of roller-mills.

Having thus described my invention, I

claim as new and desire to secure by Letters Patent—

1. A roller-mill comprising the frame, vertically-aligned pairs of rolls 11 11^a and 13 13^a at one side of the frame, vertically-aligned pairs of rolls 12 12^a 14 14^a at the opposite side of the frame, the pairs of levers 15 16 17 18, pivoted at their outer ends to the frame, extending inwardly, the inner ends of the opposite pairs of levers overlapping each other and having vertically-aligned apertures at their said overlapped inner ends, the upper roll of each pair being mounted on one pair of said levers, vertical screw-threaded adjusting-shafts extending down through the apertured overlapped ends of the said levers and provided with nuts between which the ends of said levers are held, a recess *e*, provided between the ends of each shaft, a transverse shaft extending through the frame and provided with eccentrics at its ends entering said recesses *e*, and an operating-lever, means for locking the lever at various points to simultaneously adjust the working-space between the rolls and regulate the fineness of the grind, and inclined screens and plates between the several pairs of rolls, substantially as set forth.

2. In a roller-mill, the combination, with the frame and the rolls, of the inclined vertically-reciprocating upper and lower screens, the opposite vertically-reciprocating frames 40, mounted in bearings on the frame and having rods projecting inwardly through slots in the frame into connection with said screens, horizontally-extending levers 41, pivoted at one end to the frame at opposite sides thereof and engaging the frames 40 between their ends, and rotary cams or eccentrics on which the free ends of said levers rest, substantially as set forth.

3. The combination of the frame, the pairs of rolls 11 11^a 12 12^a 13 13^a 14 14^a, pulleys *k* on rolls 11^a, 12, 13, and 14^a at the side of the frame, pulleys *k'* on the ends of rolls 11, 12^a, 13^a, and 14 at the opposite side of the frame, the rolls of each pair being one above the other, inwardly-projecting levers on which the upper rolls of each pair of rolls are journaled, said levers being connected for simultaneous movement, a driving-belt 50, passing around the several pulleys *k*, and a pulley 42, and the belt 50^a, passing over the pulleys *k'*, and an idler for each belt located to pull the rolls to their work, substantially as set forth.

LOUIE EDWARD KRUGER.

Witnesses:

DETLEF H. SMITH,
AMOS SEVERTSON.