

(No Model.)

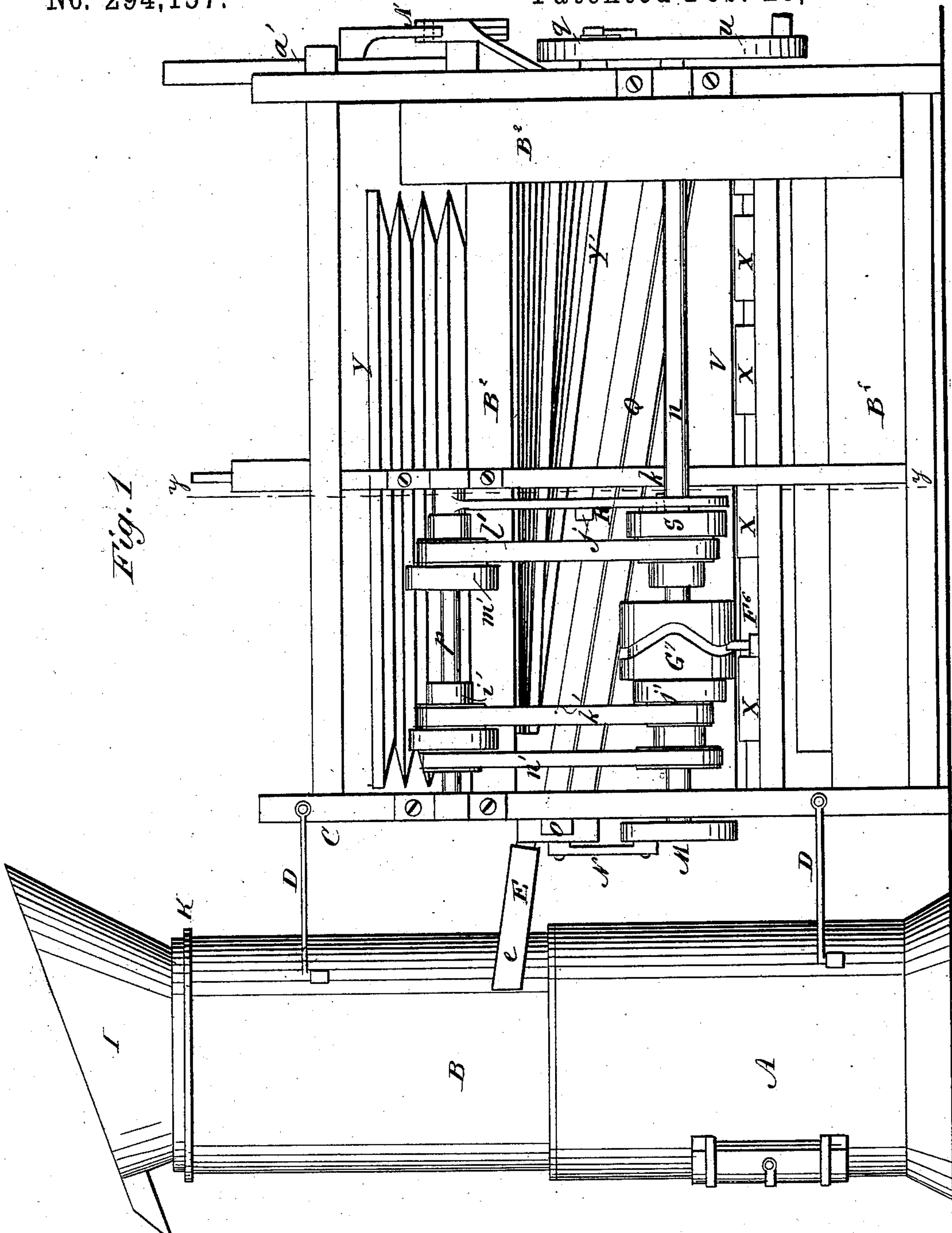
3 Sheets—Sheet 1.

A. SENEFF.

ORE DRIER AND SEPARATOR.

No. 294,157.

Patented Feb. 26, 1884.



WITNESSES:

*C. Neveux*  
*L. Sedgwick*

INVENTOR:

*A. Seneff*  
BY *Munn & Co*  
ATTORNEYS.

(No Model.)

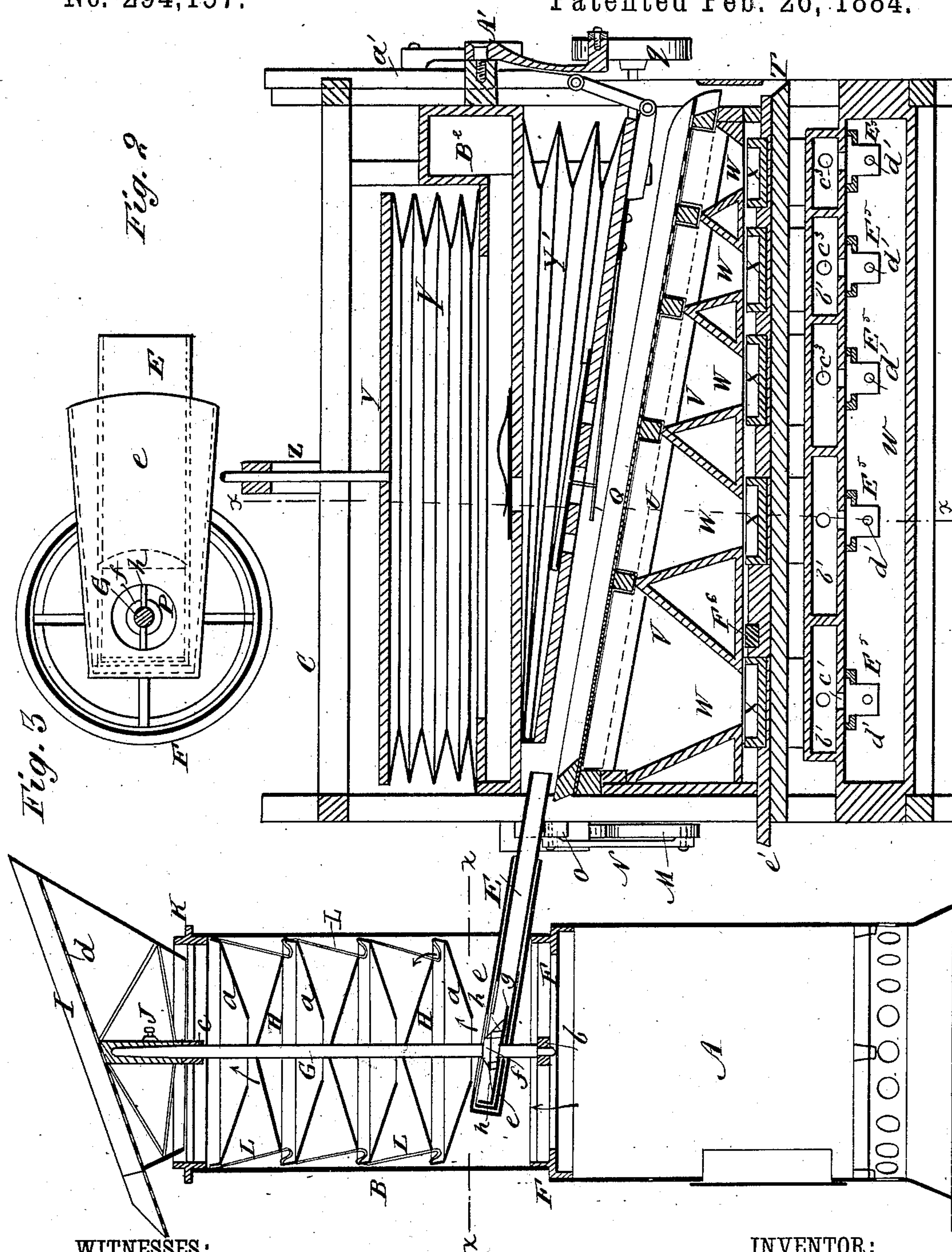
3 Sheets—Sheet 2.

A. SENEFF.

## ORE DRIER AND SEPARATOR.

No. 294,157.

Patented Feb. 26, 1884.



**WITNESSES:**

C. Neveu  
C. Sedgwick

INVENTOR:

BY *A. Beneff*  
*Munn & Co*  
ATTORNEYS.



(No Model.)

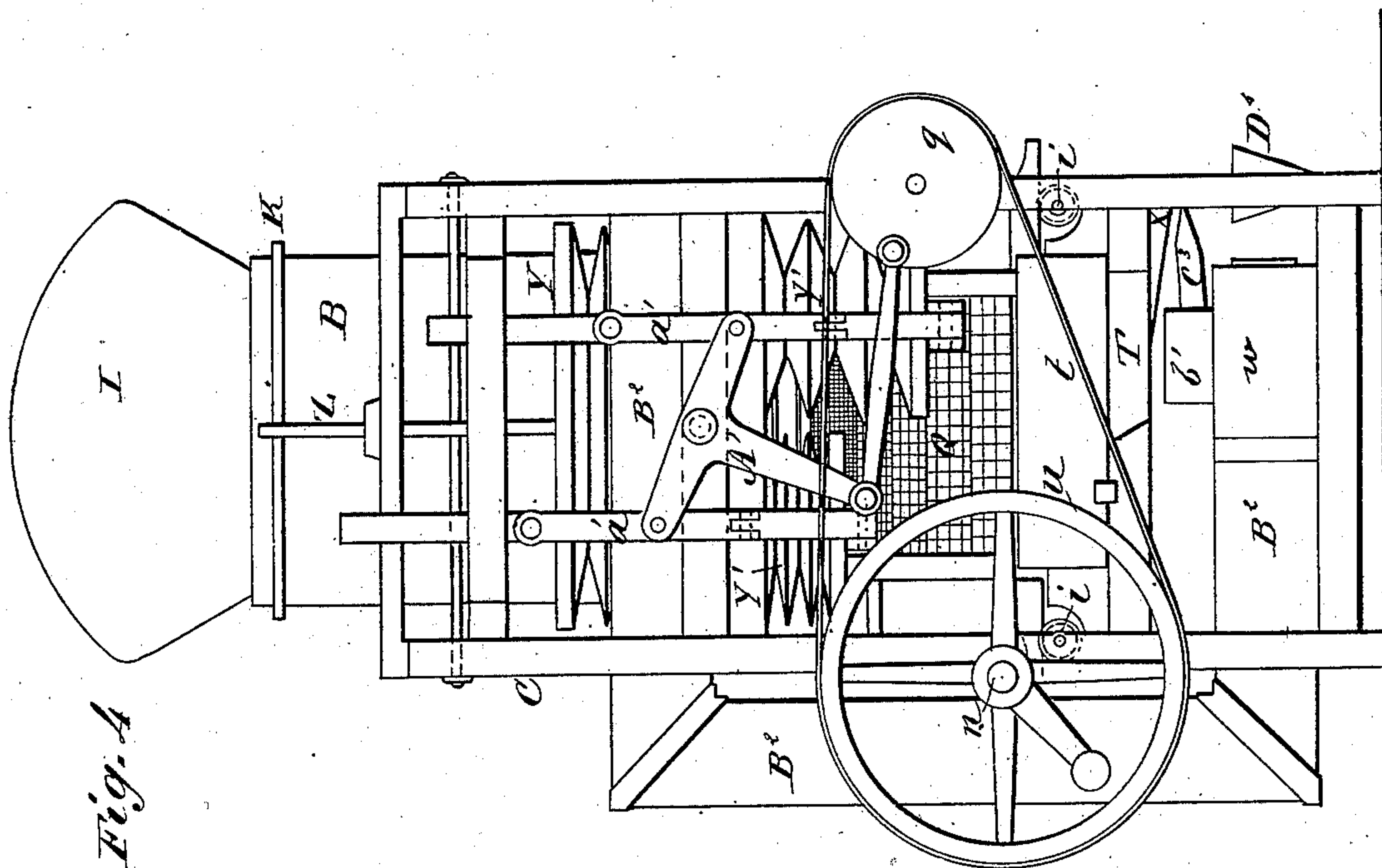
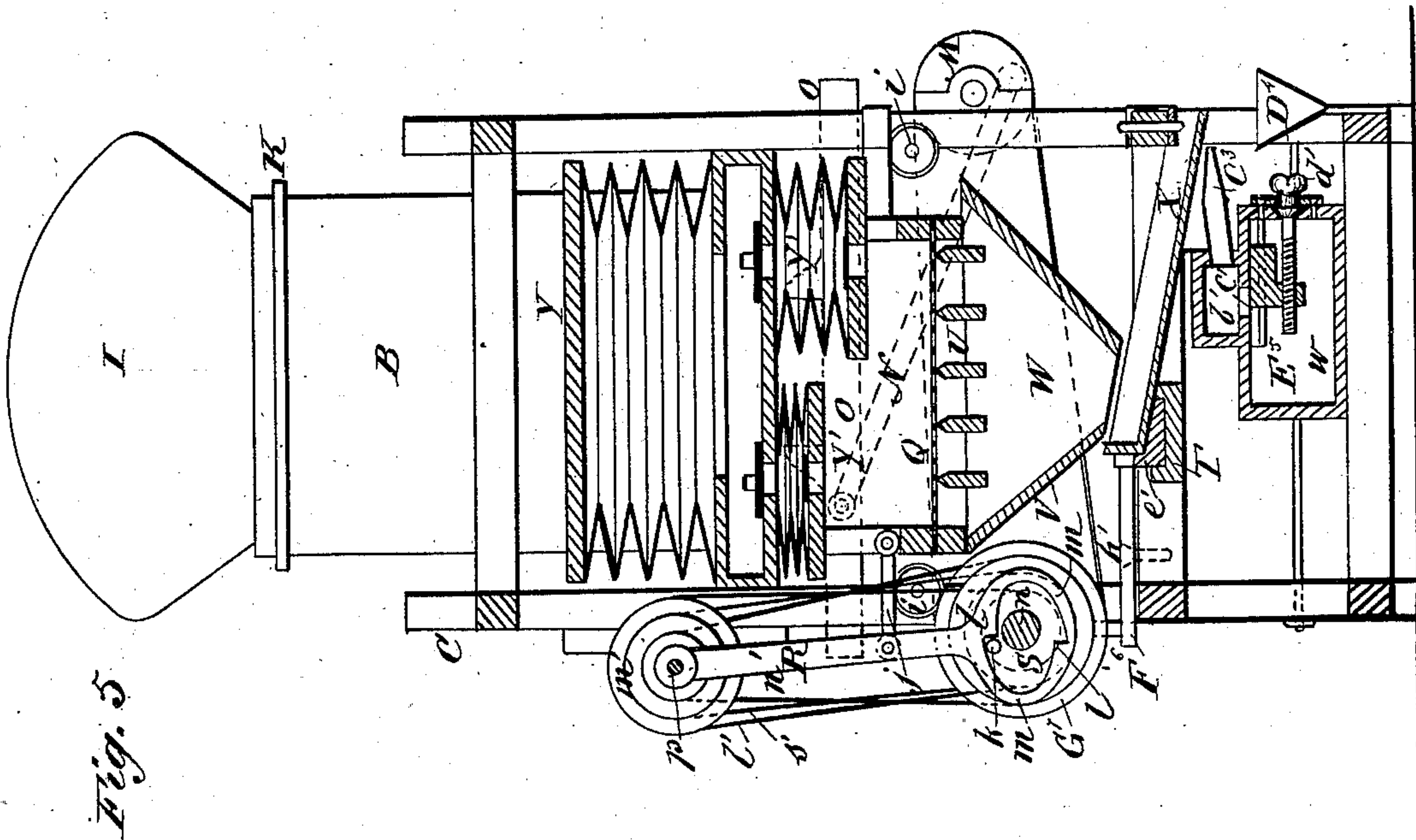
3 Sheets—Sheet 3.

A. SENEFF.

ORE DRIER AND SEPARATOR.

No. 294,157.

Patented Feb. 26, 1884.



WITNESSES:

*C. Seneff*  
*L. Sedgwick*

INVENTOR:

*A. Seneff*

BY

*Mum & Co*

ATTORNEYS.



# UNITED STATES PATENT OFFICE.

ALBERT SENEFF, OF LARAMIE CITY, WYOMING TERRITORY, ASSIGNOR TO HIMSELF AND FRANCIS MULHERN, OF SAME PLACE.

## ORE DRIER AND SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 294,157, dated February 26, 1884.

Application filed June 30, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, ALBERT SENEFF, of Laramie City, in the county of Albany and Territory of Wyoming, have invented a new and Improved Ore Drier and Separator, of which the following is a full, clear, and exact description.

My invention consists of improved apparatus for slowly passing the ore down a heated shaft or flue of a furnace by devious courses on pans or disks that have a slight shaking motion for distributing, agitating, and urging the ore forward, from which the ore is discharged upon a long sloping and graduated screen, to be graded and discharged into different hoppers, from which each grade is passed separately through a conductor and falls past or through a blast of air from a blow-pipe supplied by a bellows, by which the earth and other matters are blown away, while the ore falls into receptacles provided for the different grades, all as hereinafter fully described, and particularly pointed out in the claims.

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

Figure 1 is a side elevation of my improved drier and separator. Fig. 2 is a longitudinal sectional elevation. Fig. 3 is a sectional plan view of the drier on line *x x*, Fig. 2. Fig. 4 is an end elevation, and Fig. 5 is a transverse sectional elevation on line *y y* of Fig. 1.

A represents a furnace of cylindrical form, on the top of which is a cylindrical case or tube, B, resting on a ring, F, and forming a heat-flue, through which the products of combustion escape upward from the furnace. Within this case B, I have arranged a series of sheet-iron hoppers, *a*, with intermediate conical disks, H, on a vertical shaft, G, the hoppers discharging at the center onto the disks, and the disks discharging from their outer edges into the hoppers, for causing the ores to traverse to and from the center and circumference of the heat-flues, for producing the best effects of the heat within the smallest space for drying purposes. The disks are attached to the shaft, and the hoppers are connected to the disks for support by the rods or bars L. The shaft G has a step in a cross-bar,

*b*, at the top of the furnace, and it passes through a cross-bar, *c*, of a ring, K, at the top of case B, for its upper support. A hopper, I, with a sloping screen, *d*, for a bottom, is located on the top of shaft G by a metal socket having a set-screw, J, to secure the hopper in any desired radial direction. Below the lowest hopper *a* the shaft G passes through a spout, E, into which said hopper discharges the ore to be conducted from the drier into the separator, said spout being inclosed in a jacket, *e*, which is employed to lessen the loss of heat through the spout E, and particularly to inclose a space wider than said spout E, in which the spout vibrates to impart a slight forward and backward motion to the hoppers and disks of the drier, to prevent the ores from lodging on them and to cause them to feed properly. The shaft has a collar, *f*, in spout E, that is connected to the bottom plate of said spout E by the plate *g* and lugs or bars *h*, projecting from said collar and attached to said plate *g*, the spout E extending out of the drier and into the separator, and through a notch in the upper edge of a sliding bar, O, suitably arranged in cleats attached to the end of separator-frame C, for being shifted forward and backward by connecting-rod N and the cranked disk M to vibrate said spout, and thus cause it to shake the hopper and disks. The screen *d* in hopper I is to separate any coarse matters too large to pass through the drier and separator and discharge them onto the ground. In practice it will be detachably connected to hopper I, in order that interchangeable screens of different mesh may be applied as may be required. The spout E discharges onto the long sloping grading-screen Q, of five different sections and discharging into five different hoppers, W. This screen is arranged over a series of knife-edged scrapers, V, arranged lengthwise of it, and placed about as far apart as the screen shifts in shaking, and with their upper edges touching the screen, to force up any lumps or other matters lodging in the screen, to prevent it from being choked and clogged. This screen rests on the friction-rollers *i*, fitted on stud-pivots attached to the frame, and is connected to the vibrating lever R by the rod *j* to be operated, said lever R being worked by the stud-pin *k* in the side of cone-pulley S, acting on



the shoulders *l* of the yoke *m* of said lever, embracing the main driving-shaft *n* of the machine. The lever *R* is pivoted on the counter-shaft *p* for its fulcrum. From the series of  
 5   hoppers *W* the different grades of ore fall into a corresponding series of shaking-spouts, *X*, to be discharged at the ends of said shakers, so as to fall into the receptacles *D*<sup>4</sup>, the falling streams passing a series of blow-pipes, *c*<sup>3</sup>,  
 10   from which they are treated to air-blasts which strike them directly under the bottoms of the shakers and free them of all light dirt and other matters of less specific gravity than the  
 15   ores by the same being carried beyond the receptacles *D*<sup>4</sup>, while the ores fall into them. The air for this purpose is supplied to the trunk *w* by a pair of bellows, *Y*<sup>1</sup>, located above the screen *Q*, and operated by the sliding bars  
 20   *a*<sup>1</sup>, rock-lever *A*<sup>1</sup>, pitman, cranked disk *q*, belt *t*, and the pulley *u* on the driving-shaft *n*. These bellows discharge the air into a pressure-regulator, *Y*, for steadying the blast, from which the air passes by the conductors *B*<sup>2</sup> to the trunk  
 25   *w*. From the trunk *w* the air passes into a chamber, *U*<sup>1</sup>, for each blast-tube through an orifice, *c*<sup>1</sup>, regulated by a valve, *E*<sup>5</sup>, and a thumb-screw, *d*<sup>1</sup>, to vary the force of the blast, the thumb-screws extending out through the  
 30   case of the trunk *w*, where they can be manipulated by the attendant at will. The shakers *X* are attached to a bar, *e*<sup>1</sup>, arranged for sliding in a way, *T*, and having a lever, *F*<sup>6</sup>, connected to it, said lever being pivoted at *h*<sup>1</sup> for a fulcrum, and being worked by the grooved  
 35   cam *G*<sup>7</sup>, and a stud-pin of said lever extending into the groove of said cam. This cam is fit-

ted loosely on the main shaft *n*, and is driven by counter-shaft *p*, cone-pulleys *i*<sup>1</sup> and *j*<sup>1</sup>, and belt *k*<sup>1</sup>, the cone-pulleys being employed to vary the speed of the shakers as may be re-  
 40   quired. The cone-pulleys *S*, by which the screen *Q* is operated, are also driven by shaft *p*, belt *l*<sup>1</sup>, and cone-pulley *m*<sup>1</sup>, to vary its speed also. This counter-shaft *p* is driven from the  
 45   main shaft *n* by a belt, *n*<sup>1</sup>, and pulleys, for the purpose of driving the shakers and screen as above.

The drier is designed to stand at one end of the separator, and is connected to it by hooks *D*, for steadying one by the other.

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

1. The combination of the hopper *I*, screen *d*, hoppers *a*, conical disks *H*, shaft *G*, heat-flue *B*, and vibrating spout *E*, as and for the  
 55   purpose described.

2. The combination of the spout *E*, jacket *e*, sliding bar *O*, shaft *G*, the hopper, and the disks, as and for the purpose set forth.

3. The combination, in an ore-separator, of  
 60   the sloping graded and shaking screen *Q*, series of hoppers *W*, shakers *X*, blow-pipes *c*<sup>3</sup>, and receptacles *D*<sup>4</sup>, substantially as described.

4. The bellows *Y*<sup>1</sup>, regulator *Y*, conductors *B*<sup>2</sup>, and the air-trunk *w*, in combination with  
 65   the blow-pipes *c*<sup>3</sup>, shaking-spouts *X*, and the receptacles *D*<sup>4</sup>, substantially as described.

ALBERT SENEFF.

Witnesses:

J. W. BLAKE,  
 RICHARD BUTLER.