

(No Model.)

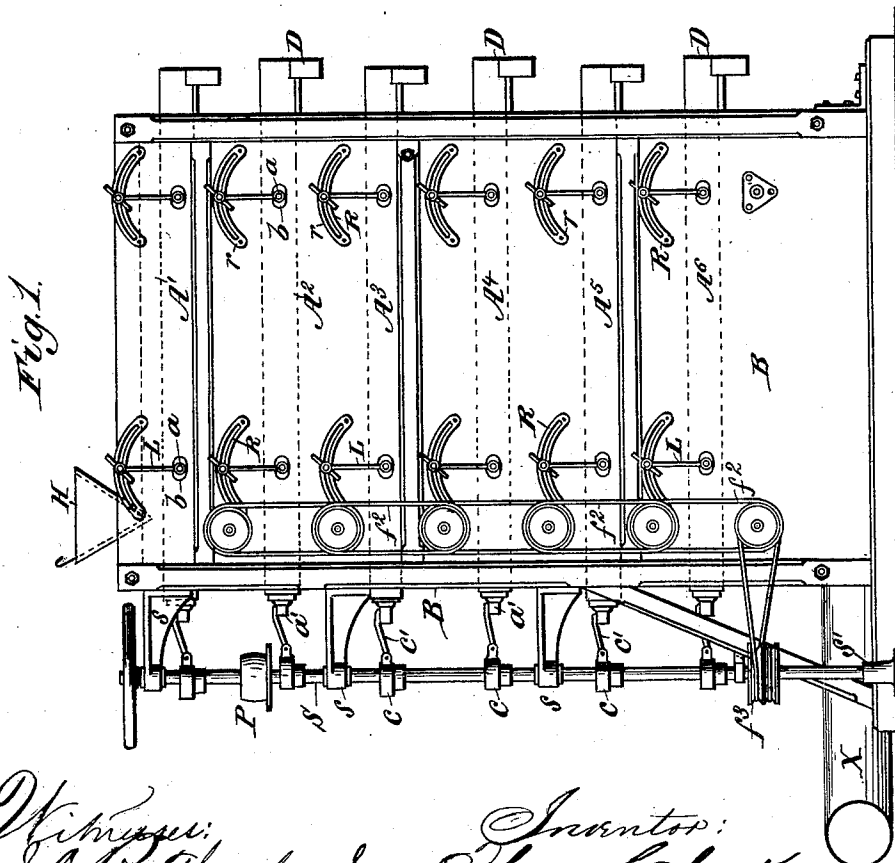
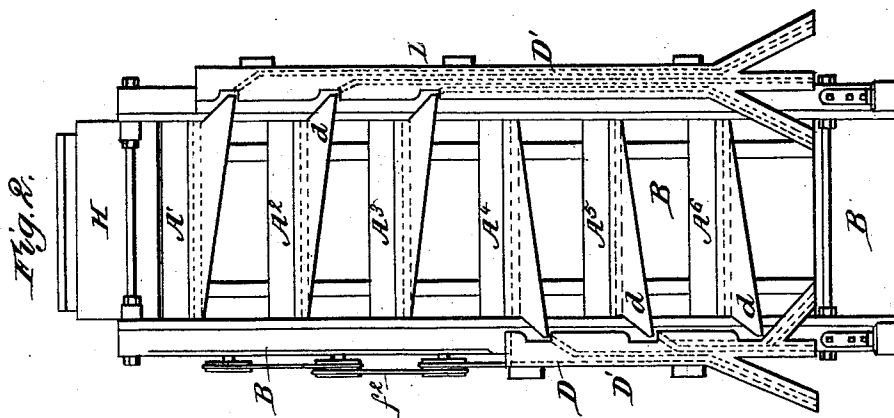
3 Sheets—Sheet 1.

T. CLARKSON.

MACHINE FOR CLASSIFYING OR SIZING ORES AND LIKE MATERIALS.

No. 472,433.

Patented Apr. 5, 1892.



Witness:
J. M. Rutherford
Robert Emmett

Inventor:
Thomas Clarkson
By James L. Norris.
Attorney

(No Model.)

3 Sheets—Sheet 3.

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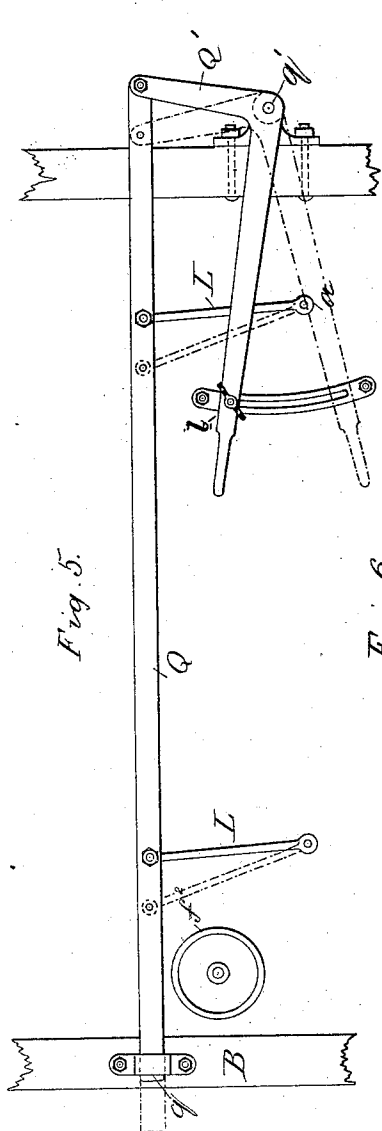


Fig. 5.

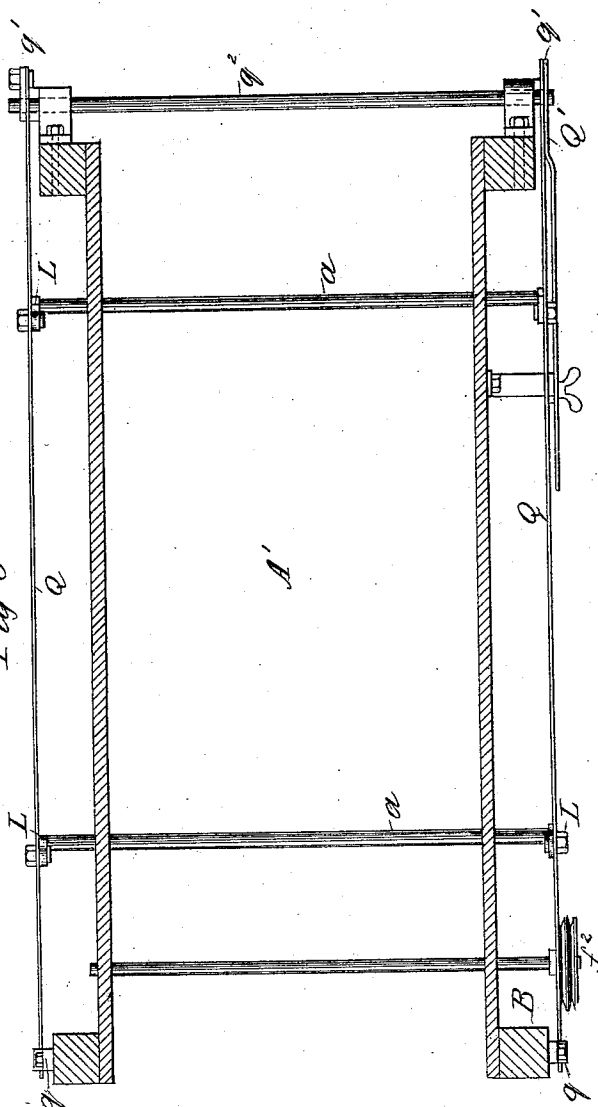


Fig. 6.

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UNITED STATES PATENT OFFICE.

THOMAS CLARKSON, OF LONDON, ENGLAND.

MACHINE FOR CLASSIFYING OR SIZING ORES AND LIKE MATERIALS.

SPECIFICATION forming part of Letters Patent No. 472,433, dated April 5, 1892.

Application filed June 18, 1891. Serial No. 396,786. (No model.)

To all whom it may concern:

Be it known that I, THOMAS CLARKSON, engineer, a subject of the Queen of Great Britain, residing at Fairholme, Egmont Road, Sutton, in the county of Surrey, England, have invented an Improved Machine for Classifying or Sizing Ores and Like Materials, of which the following is a specification.

This invention has for its object to provide a simple and efficient machine for classifying or sizing materials; and it consists in the construction, arrangement, and combination of parts, as hereinafter described and claimed, whereby the machine can be readily disconnected and put together again for facility of transport and inspection.

I will describe my invention with reference to the annexed drawings, in which like letters refer to like parts.

Figure 1 a side elevation, Fig. 2 is an end elevation, and Fig. 3 is a plan, of the machine. Fig. 3^a is a section on line A B of Fig. 3. Fig. 4 is an enlarged longitudinal section on line Y Z of Fig. 2. Fig. 4^a is a plan of a connecting-block for eccentric-book. Fig. 4^b is a part plan at end of catch-apron. Fig. 5 is a skeleton elevation of a modified manner of suspending the screens. Fig. 6 is a skeleton plan of same, and Fig. 7 is an enlarged sectional elevation of valve for chutes.

According to my invention I arrange horizontally, one above another, a number of frames A' A² A³ A⁴ A⁵ A⁶, each having perforated screens of varying mesh, the coarsest in the top frame A' and the finest in the bottom frame A⁶. The meshes may, for example, be as follows per lineal inch: A', forty; A², fifty; A³, sixty-four; A⁴, eighty; A⁵, one hundred; A⁶, one hundred and twenty. These screen-frames are mounted horizontally in a main frame B on transverse rods *a a*, passing through and supported in slots *b b* in its sides, so as to be capable of vibratory motion.

In order to provide for adjustment of the rate of travel and the motion of the material along the screens to the discharge-orifices D, as hereinafter explained, the screens may be suspended from links L, arranged in pairs at each side of the frame and adapted for adjustment, as aforesaid, by means of segmental slots R in carrying-plates *r*, fixed to the frame B. The lower ends of each pair of links L L

are attached to the vibrating screen-rods *a a*, extended through slots (which in this case are clearance-slots) *b b* in the frame, and a set-screw and nut *l* are provided to fix the position of the points of suspension of the links in their slots R.

A modified method of suspending and adjusting the motion of the screens is illustrated in Figs. 5 and 6, where instead of segmental slots R the suspending-links L are slung from side bars Q Q, sliding in guides *q q*, fixed to the frame B and connected together by rod *q*². To one of said bars Q is pivoted a bell-crank lever Q', fulcrumed on the frame at *q'* and provided with a segmental guide and set-screw *l*, as illustrated in Fig. 5, near the handle, by operating which the parts will take the positions shown in dotted lines, and the angularity of the links L, and thereby the direction of motion of the screen, can be regulated and fixed at will. To further explain, if the links L are fixed truly vertical the direction of motion of the screen will be a practically true horizontal longitudinal reciprocation; but if the links L are fixed obliquely in the least degree the direction of motion becomes compound, being partly longitudinal and partly vertical. Hence a forward throw is imparted at each vibration to the screen and the material upon it, and thus by adjusting the angularity or obliquity of the links L the rate of travel of the material upon and along the screen can be regulated exactly as required. The vibratory motion may be a steady shake effected by small eccentrics *c c*, mounted opposite one end of each screen-frame upon a single vertical spindle S, mounted in bearings *s s* and rotated in a step *s'* by power applied to a pulley P in any suitable manner. The eccentrics are connected by detachable hooks *c' c'* to rubber blocks or eyes *c*², Fig. 4^a, mounted in the blocks *a' a'*, bolted to the frame ends, as illustrated in Fig. 4; or instead of the rubber eyes a spring may be applied to take up the shocks, in order to effect a noiseless and flexible connection, or a percussive shake may be effected by springs alternately compressed or extended and then suddenly liberated by cams or equivalent devices similarly mounted upon and operated by the spindle S, as will be readily understood.

Discharge-orifices D D are provided across the full breadth of an end of the main frame opposite each screen end, and each one has an inclined chute *d*, arranged as illustrated and leading to a separate vertical discharge-channel, and these may be conveniently grouped on casings D' D', disposed at either side of one end of the machine, with diverging extremities, and leading to separate receivers. (Not shown, but being simple removable boxes.)

Between each and every pair of screens a removable catch-apron E, Fig. 4, is fitted, which joins or approaches, as shown, to the frame at the discharge end, but not at the back end, a suitable opening O being left thereat, and the adjacent end part of each apron E may be perforated, as illustrated in Fig. 4^b, and slightly turned down, as shown by dotted lines in Fig. 4, if desired, to facilitate the descent of the materials to the next lower screen.

Above the catch-apron is mounted a pair of endless bands or chains F F, rotating in the direction of the arrows and carrying brushes *ff*, supported at each end and directed by guides *f° f°*, fixed on the main frame B and adapted to sweep and clear both the lower surface of every screen and the upper surface of each catch-apron, upon which latter also the brush acts as a conveyer. The chains F are actuated by the chain-wheels *f' f'*, mounted on axes projecting outside the main frame and driven through double pulleys and bands *f² f²*, Figs. 1 and 2, at the same speed and in the same direction by the prime motor as shown at *f³*, Figs. 1 and 3, or other suitable equivalent driving mechanism may be substituted.

The end spaces of the main frame between the screens are filled in by air-tight doors *ee*, provided with india-rubber air-excluders, as at *e' e'*.

H is the feed-hopper, provided with an adjustable slide *h* and arranged at the top of the frame above the uppermost screen A', as shown.

In combination with the machine above described an exhaust-fan Z is or may be provided, acting through the exhaust-pipe X below the lowest screen A⁶, as illustrated in

Figs. 1 and 3. This serves to facilitate the downward tendency of the particles, and when the fan is used the rubber air-excluders *e' e'* are kept tight, and special provision is made to exclude air at the screen discharge-orifices and other parts, except the top. This is effected by fitting in the chutes *d* flap-valves *v*, normally held closed by a light spring *v'*, but adapted to open outward by the weight of accumulated materials, as shown in Fig. 7, or the discharge-orifices of the chutes *d* may be made of just sufficient size to deliver the material, and thus the admission of air is practically avoided.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a classifying-machine, the combination, with horizontally-superposed vibratory screens and their transverse carrying-rods *a*, of the adjustable suspending-links L, the sliding side bars Q, the bell-crank lever Q', and means for regulating the angularity of said links L and the direction of motion of the screens, substantially as and for the purposes set forth.

2. The combination, with a pair of horizontally-superposed screens, of an intervening catch-apron E, having a perforated end and an aperture O, and the endless bands or chains F F, carrying brushes *ff*, all substantially as shown, for the purposes specified.

3. In a classifying-machine, the combination of the upright frame B, having the horizontal slots *b*, the transverse rods *a*, extending at their ends through the slots and adapted to reciprocate horizontally therein, the suspension-links L, having their lower ends attached directly to the projecting ends of the transverse rods and adjustable at their upper ends in the arcs of circles, and adjusting devices connected with the upper ends of the links, substantially as and for the purpose described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

THOMAS CLARKSON.

Witnesses:

JOSEPH LAKE,

T. F. BARNES,

Both of 17 Gracechurch Street, London, E. C.