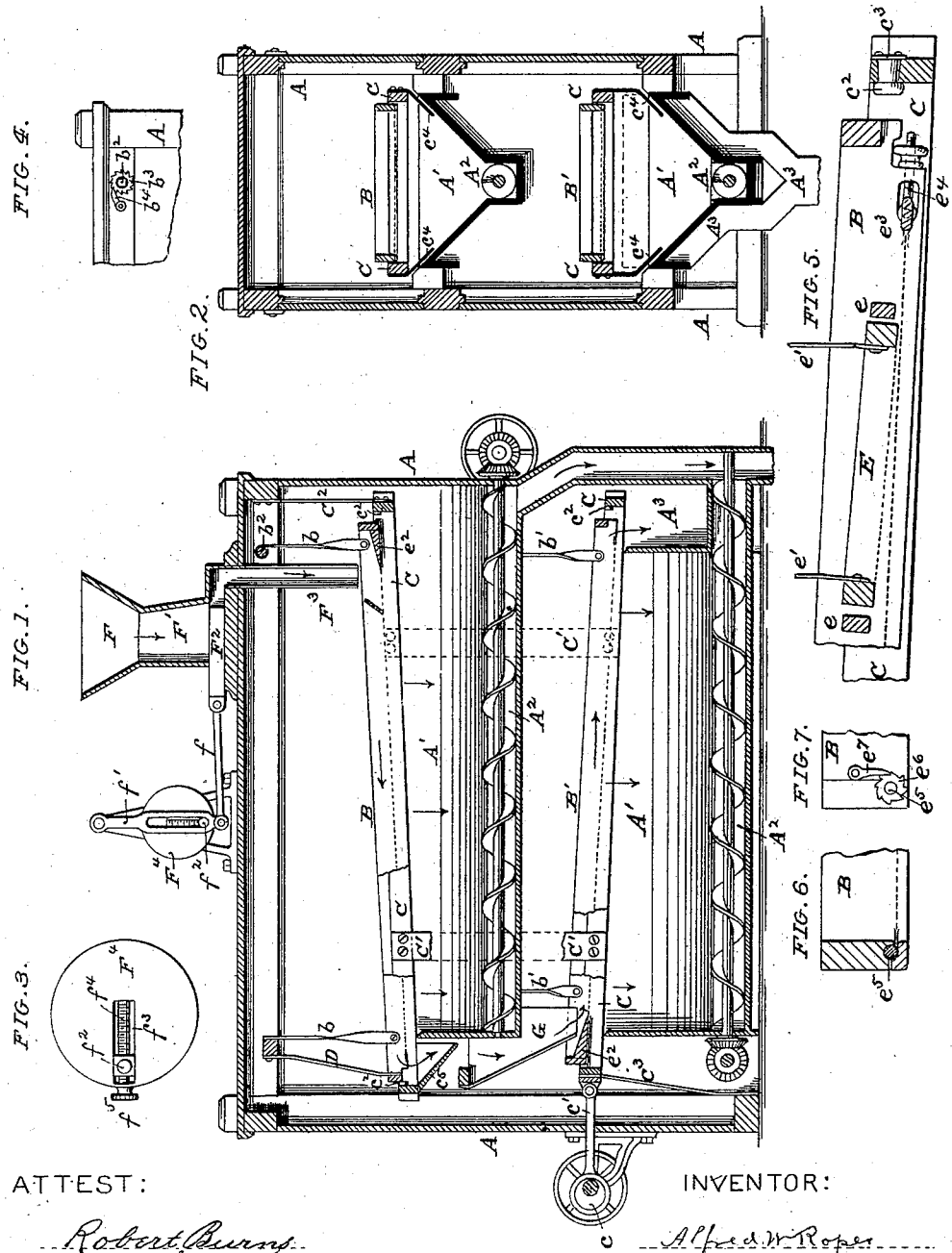
(No Model.)

A. W. ROPER.

SEPARATOR.

No. 293,983. Patented Feb. 19, 1884.



ATTEST:

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UNITED STATES PATENT OFFICE.

ALFRED W. ROPER, OF ST. LOUIS, MISSOURI.

SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 293,983, dated February 19, 1884.

Application filed June 5, 1882. (No model.)

To all whom it may concern:

Be it known that I, ALFRED W. ROPER, a citizen of the United States, and a resident of the city of St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Separators, of which the following is a specification.

This invention relates to certain improvements in sieves or separators used for separating or grading in a quick and effective manner all kinds of granular or pulverulent material and to this end my invention consists in the construction hereinafter claimed.

In the drawings, Figure 1 is a longitudinal section, illustrating my invention as applied to that class of machines known in flouring-mills as "dusters" or "separators." Fig. 2 is a transverse section of same. Fig. 3 is a detail view of the crank-disk for operating the feeding mechanism. Fig. 4 is a detail view, illustrating the ratchet mechanism for adjusting the inclination of the screens. Fig. 5 is an enlarged detail section of the lower end of the screen, showing the globule-breaker and means for longitudinally tightening the screening-cloth. Fig. 6 is a detail section of the means employed to tighten the screening-cloth transversely. Fig. 7 is a detail end view of same.

The same letters of reference indicate the same or corresponding parts in the various views.

Referring to the drawings, A represents the main supporting-frame, rectangular in form, with the sides provided with removable panels, to form a closed casing for the operating parts of the machine.

B B′ are the screens or sieves (of which any desired number may be used) inclined in opposite directions to each other, and independently hung by means of straps or hangers *b b′* from the main frame A. The inclination of these sieves is made adjustable, so as to regulate the speed with which the material undergoing treatment passes over the sieve by the following means: The hanger-straps at one end of the machine are attached to a winding drum or shaft, b^2, by the rotation of which the sieve end can be raised or lowered and its inclination varied during the operation of the machine. b^3 is a ratchet-wheel fixed on said shaft outside the main casing—that is engaged by a pawl, b^4, to lock the parts in any required position.

In use the adjusting device above mentioned can be applied to the hangers at either end of the sieve-frame, as may be found desirable or convenient. The screens B B′ are surrounded by a vibrating yoke-frame of any suitable form and construction, preferably consisting of a rectangular frame, C, surrounding each sieve or screen, the said frame C being united together firmly and rigidly by vertical strips C′, as shown. A quick vibratory motion is imparted to this yoke by a suitable eccentric, *c*, or its equivalent device, and pitman *c′*. The yoke-frame C is preferably supported at one end by a hanger, C^2, and at the other end upon a spring-support, C^3, as indicated in Fig. 1; yet any other mode of support may be used without departing from the spirit of my invention. As shown in Fig. 1, the yoke-frame C is made somewhat longer than the frames of the sieves B, so as to enable the latter to have a limited swing or vibration therein, bumpers c^2 being interposed at each end to receive the impact of the blow between the two frames and assist in deadening the noise caused by the same. The bumpers are secured in place by being arranged in holes in the end bars of the yoke-frame and held in place by plates c^3, as clearly indicated in Fig. 5.

Although I have shown as my preferred construction a rubber bumper, any other form of bumper may be employed.

The purpose of my improved mode of hanging and operating the sieve or screen is to achieve a perfect cleaning of the meshes of the same and keep them clean and open, and at the same time impart a proper rolling movement to the particles of material undergoing treatment, so as to insure a proper separation or grading of the material, such action being accomplished by the impact of the sieve against the ends of its yoke-frame.

I have found by practical experiment that with such construction I am enabled to more perfectly separate and clean flour, middlings, &c., than has heretofore been accomplished by the use of an air-blast, which has been con-

sidered an indispensable feature in all middlings-purifiers and other machines used in kindred processes.

By the improved mode of hanging the sieves, as herein described, it will be observed that all friction between the sieve-frame and its surrounding and operating yoke is entirely avoided, and thus a lighter running of the parts is attained, the wear caused by friction overcome, and the "loading up" of the sieve entirely prevented.

In order to impart to the material undergoing treatment a rolling motion in a direction toward the tail of the sieve, I employ a spring, D, the tendency of which is to force the tail or discharge end of said sieve against its bumper, and thus cause a greater jar to that end of the sieve during the operation of the machine.

In order to prevent the "balling" of the fine material upon the sieve and the escape of the same with the tailings, which is a serious difficulty met with in all screening operations, either in bolts or flat screens, I have provided a device as follows to crush and break said globules, so that they will be in a condition to sift or screen through and be separated.

The device consists of a frame, E, preferably covered with cloth, and supported in an inclined position over the screen or sieve B′, over the cloth of which it has a limited vibration between the stops *e e* on the screen-frame, its inclined position being such that its forward end will be some distance from the sieve-cloth, while its rear end nearly touches the same, the action being to allow the balls or globules of material to pass under said frame and be crushed before they can pass out under the rear end of said frame E. It is preferable to hang the frame E by means of straps *e′;* but it may be supported on inclined pins or cleats on the sides of the sieve-frame without departing from the spirit of my invention. The cloth upon the sieves or screens is stretched and tightened by the following means: The cloth at the head of the screen is secured fixedly under the inclined faced board or block e^2, placed at the upper end of the sieve-frame, while at its lower end the sieve-cloth is secured to an adjustable rod, e^3, extending across the sieve, which rod is provided at each end with eyebolts e^4, arranged in cut-out portions of the sieve-frame, as shown, and by means of which the longitudinal adjustment of the cloth is effected. (See Fig. 5.) The side adjustment of the cloth is effected by attaching one side of the same to a rotary rod or shaft, e^5, arranged or housed in a recess in the side bar of the sieve-frame, and having a squared end, by which it is rotated, a ratchet-wheel, e^6, and pawl e^7 being provided to lock said shaft in its required adjustment. By the use of the inclined block or board e^2 at the head of the sieve the "banking up" of the material at such point is prevented, the cloth protected from wear, and the end of the machine strengthened.

The material is fed into the machine evenly across the whole width of the top screen in the following manner: F is the feed-hopper, having a leg, F′, the side or sides of which flare downward, as shown. On the floor of this leg slides a feeding-plunger, F^2, of a width equal to or nearly approaching the width of the screen. A forward motion of the plunger F^2 will carry before it the material upon the floor of the leg and drop it down the vertical discharge-spout F^3 onto the screen B.

The amount of "feed" depends upon the amount of movement imparted to the feeding-plunger F^2, which movement is adjusted in the following manner: *f* is a pitman, connecting the plunger F^2 with a slotted pendulous lever, *f′*, in the slot of which the pin f^2 of the operating-crank F^4 operates to impart movement to the feed-plunger. The crank-pin f^2 is adjustable to and from the center, so as to regulate the throw of the parts by being arranged in a radial groove, f^3, in which its position is adjusted by an operating-screw, f^4, provided with an operating hand nut or head at the rim of the crank-disk. By this construction an adjustment can be effected while the machine is in operation, owing to the fact that the rotation of the crank-disk is comparatively slow. By making the hopper-leg F′ to flare downward, as shown, the descent of the material is not retarded, but falls freely, and thus an even feed is assured, as with this construction there will be no clogging up of the leg.

In the drawings I have shown two screens, arranged one above the other; but any required number may be employed, depending entirely upon the nature of the material that is being treated.

As shown, the screenings from each sieve fall into receiving-hoppers A′, having at bottom screw-conveyers A^2, to remove the same from the machine; and in order to prevent an escape of the screenings at the sides of the machine, between the top edges of said hoppers and the sides of the yoke-frames C, I provide the latter with inclined horizontal cant-boards c^4 at each side, and extending some distance down into said hoppers, as clearly indicated in Fig. 2. The tailings from the top sieve, B, are directed by an inclined return-board, c^5, on the yoke-frame C into a fixed return-spout, G, which in turn discharges said tailings into the head of the screen B′ next below, and so on, where a number of sieves or screens are employed, the tailings from the last screen or sieve being received into a hopper, A^3, to be carried away from the machine for any further treatment required.

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

1. A screen-frame having a recess on its under side for the reception of the cloth, in combination with the cloth, a winding-rod, e^5, the ratchet e^6, and pawl e^7, as described, and for the purpose set forth.

2. The combination of a screen-frame having stops *e*, and the disintegrating-frame E, suspended by links *e'*, the stops limiting the vibration of the disintegrating-frame, as set forth.

3. The combination of a vibrating screen, B, and an actuating frame, C, loosely surrounding it, as set forth.

4. The combination of a vibrating screen, B, an actuating-frame, C, loosely surrounding it, and a spring, D, at the discharge end of the screen, as set forth.

5. The combination of the feeding-plunger F^2, the feed-hopper F, pitman *f*, pendulous lever *f'*, crank-disk F^4, and adjustable crank-pin f^2, as set forth.

In testimony whereof witness my hand this 1st day of June, 1882, at St. Louis, State of Missouri.

ALFRED W. ROPER.

In presence of—
ROBERT BURNS,
J. D. KUBAUGH.