

J. R. FOGG.

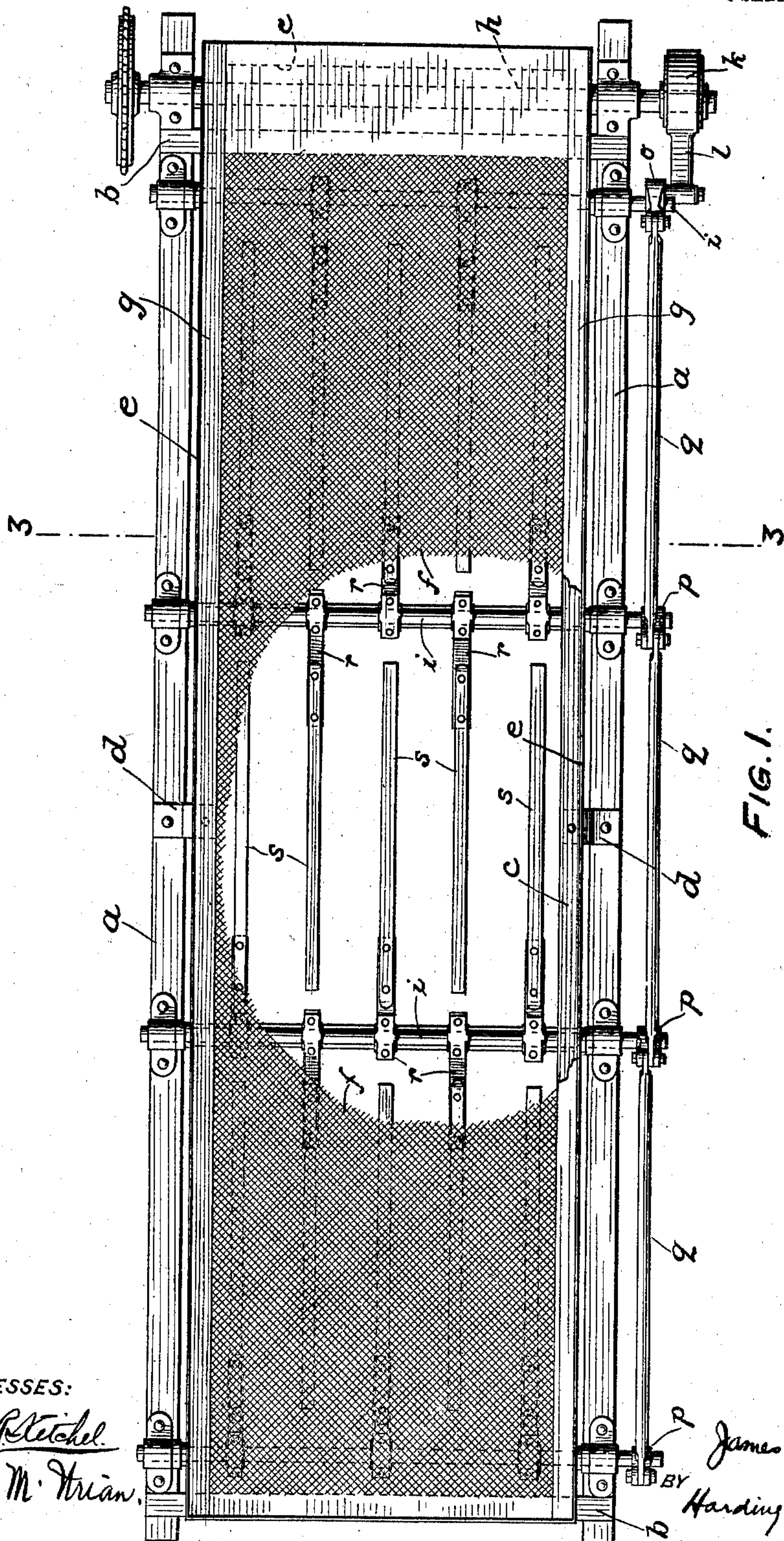
SCREEN.

APPLICATION FILED OCT. 2, 1909.

967,358.

Patented Aug. 16, 1910.

3 SHEETS—SHEET 1.



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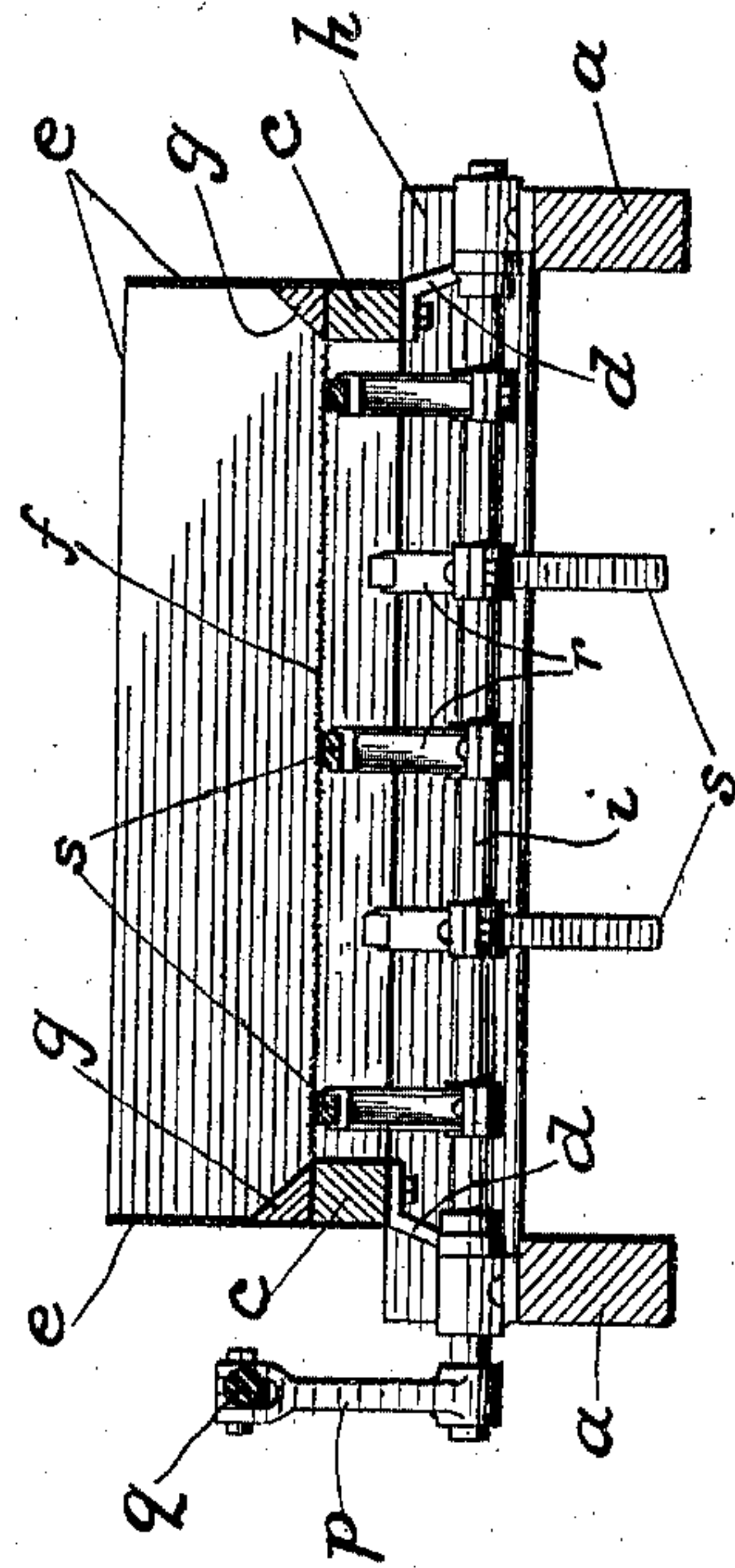
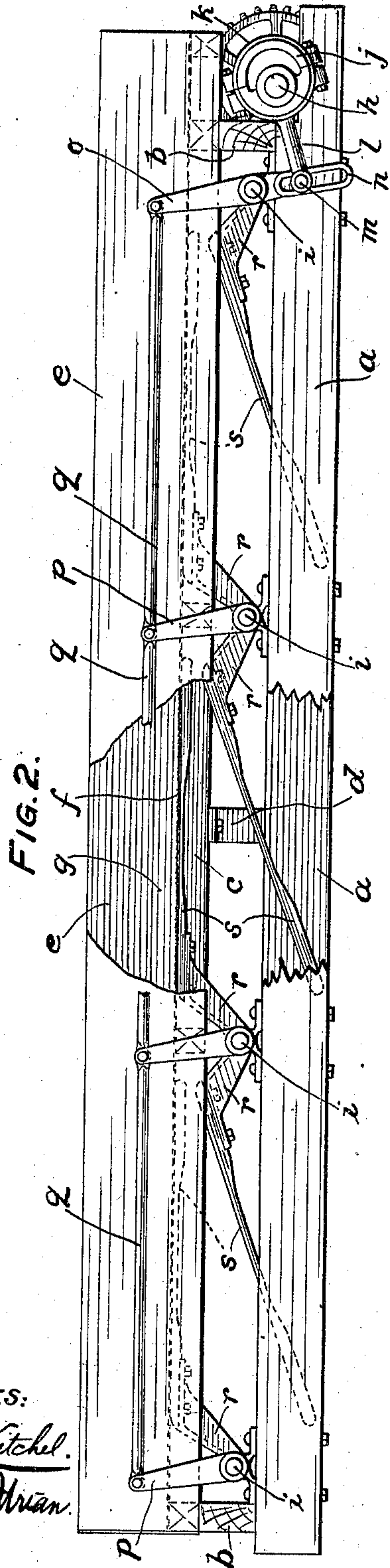
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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

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FIG. 4.

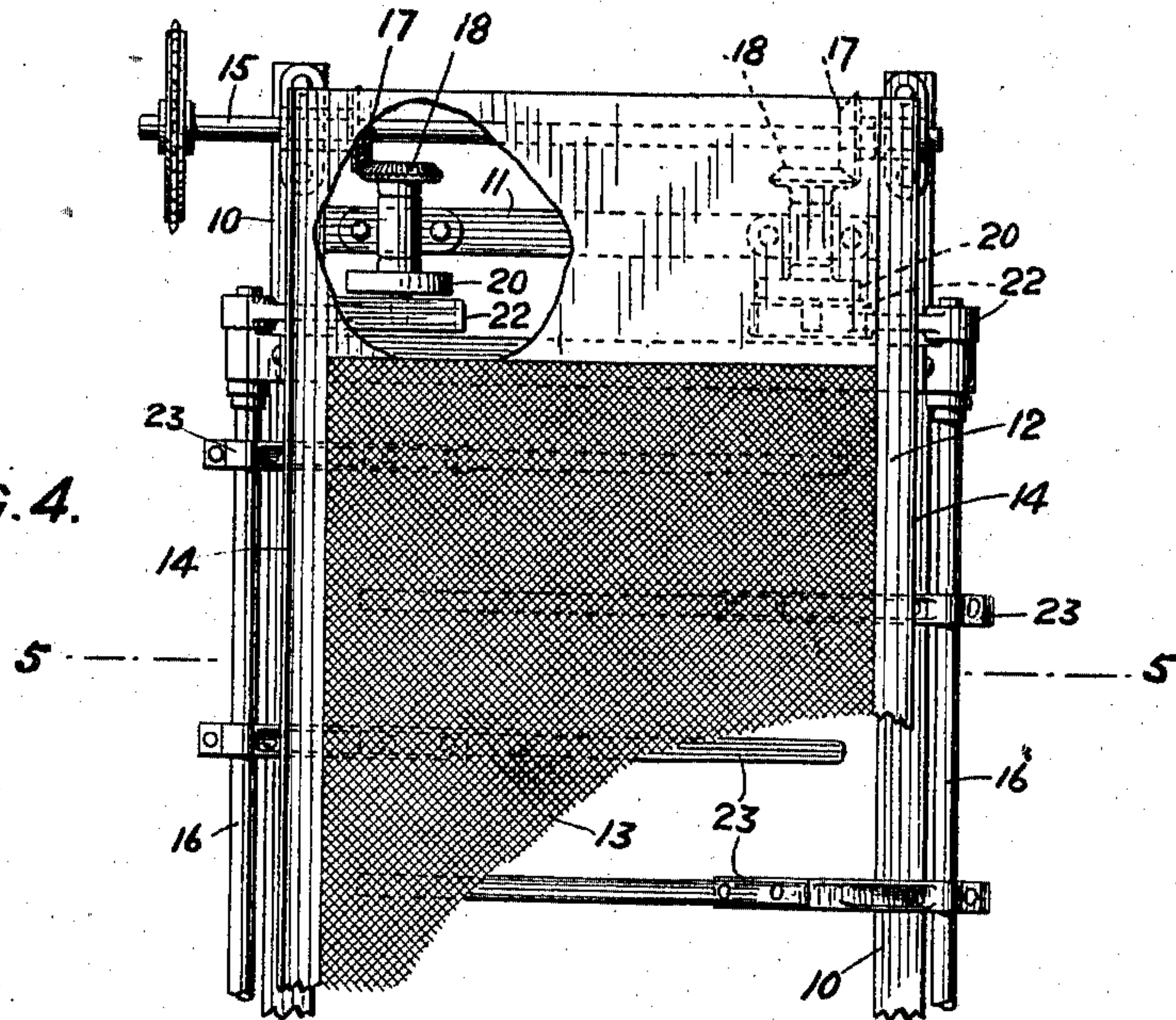


FIG. 5.

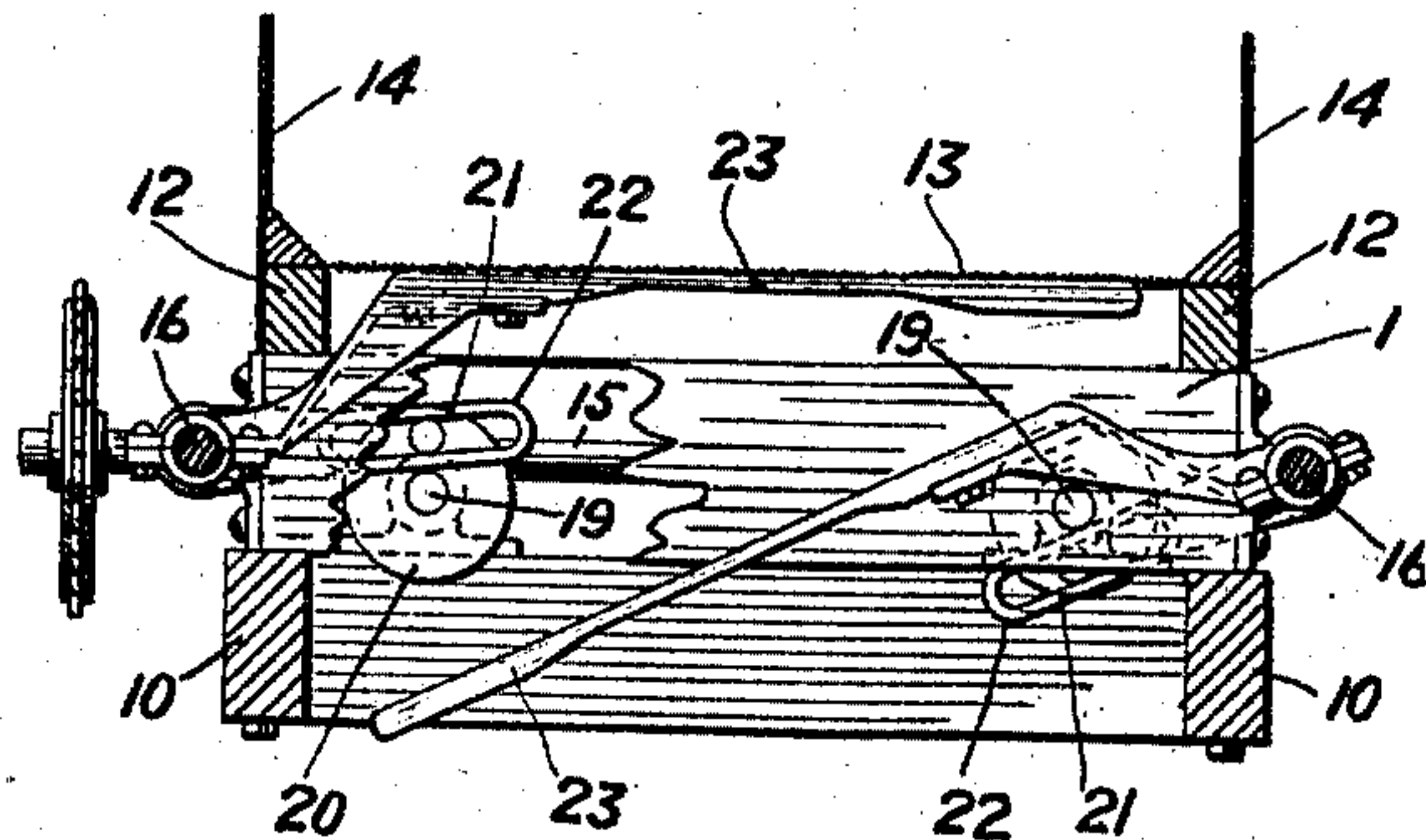
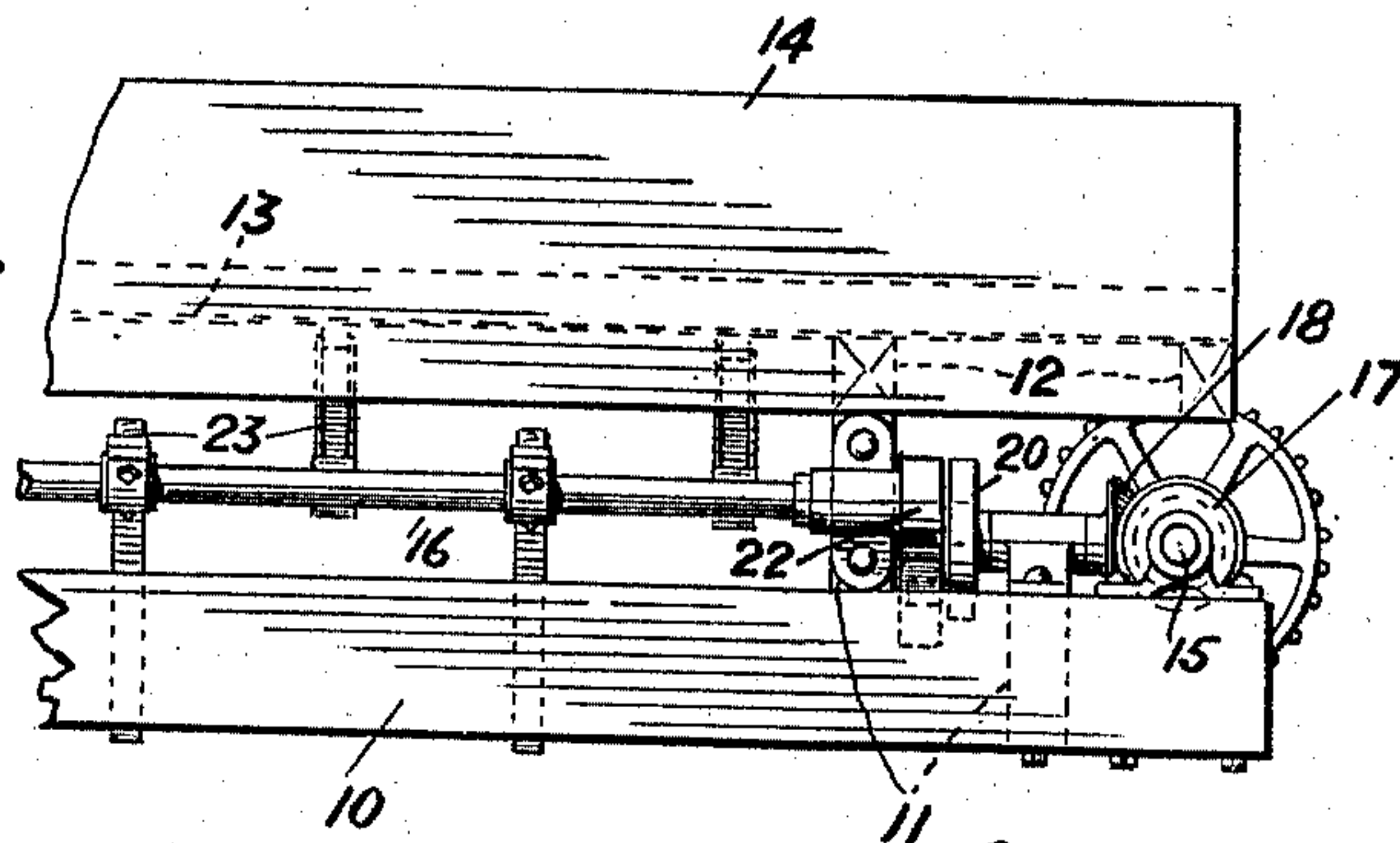


FIG. 6.



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UNITED STATES PATENT OFFICE.

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SCREEN.

967,358.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JAMES R. FOGG, a citizen of the United States, residing at Kennett Square, county of Chester and State of Pennsylvania, have invented a new and useful Improvement in Screens, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention has for its object to provide a screen adapted for screening, on a large scale, materials, such as sand, coal, ore, rock, etc., that are in a moist or wet condition, such materials tending to clog up the interstices of the screen and make the screening operation both slow and imperfect.

In the drawings: Figure 1 is a plan view of the machine partly broken away; Fig. 2 is a side elevation of the same partly broken away; Fig. 3 is a cross-section on the line 3—3 of Fig. 1; Fig. 4 is a partial plan view of another embodiment of the invention; Fig. 5 is a cross-section on the line 5—5 of Fig. 4; Fig. 6 is a side elevation of the part of the machine shown in Fig. 4.

The preferred embodiment of my invention shown in Figs. 1, 2 and 3 will first be described. *a, a*, are two longitudinal beams on which the screen frame and appurtenances are supported. *b, b*, are cross-beams supported between the beams *a, a*. A rectangular screen frame *c* composed of side-beams joined by cross beams is supported on the cross-beams *b*. The side beams of the screen frame *c* are, intermediate of their length, bolted to angle irons *d*, which in turn are bolted to the supporting beams *a*. *e, e, e*, are upright plates which are secured to the screen frame and extend along the sides and one end of the screen frame. *f* is the screen, which is secured to the upper face of the screen frame *c*. The plates *e* extend a substantial distance above the level of the screen and screen frame and form, with the screen, a receptacle for the reception of the material to be screened. *g, g*, are strips, triangular in cross-section, extending along the side edges of the screen *f* and the lower edges of the side plates *e, e*, and are nailed to the side beams of the screen-frame *c*. *h* is a driving shaft extending across the machine and rotatable in bearings secured to the supporting beams *a*. *i, i, i, i*, are rock

shafts extending across the machine and turnable in bearings secured to the supporting beams *a*. Secured to the driving shaft *h* is an eccentric *j*, which is surrounded by a strap *k* having an arm *l* provided with a pin *m* adjustably fastened in a slot *n* in the lower end of an arm *o* secured between its ends to one of the rock-shafts *i*. Secured to the other rock-shafts are arms *p*. The upper ends of the arms *p* and the upper end of arm *o* are connected together by means of a rod *q*. Secured to each of the rock shafts are whips or beaters, each consisting of a metal arm *r* and a wooden stick *s*, the latter being of reduced thickness between its ends so as to render the same somewhat flexible. The rock-shaft *i* at each end of the screen is provided with a single series of beaters extending toward the other end of the screen. The intermediate rock-shafts are each provided with two series of beaters extending in opposite directions. The beaters are preferably of a length slightly less than the distance between adjacent rock-shafts and the beaters of each series are arranged alternately with the oppositely-extending beaters on the adjacent rock-shaft.

The machine, constructed as above described, operates as follows: A continuous rotary movement is imparted to the driving shaft *h*, which through the medium of the eccentric *j*, strap *k*, arm *l* and arm *o*, and the rod *q* and arms *p*, rocks all the shafts *i*, causing the beaters *r, s*, to strike repeated blows upon the lower surface of the screen. The above described operation loosens and disintegrates any materials that settle in the meshes of the screen and thus tends to keep the screen open and in condition to perform its screening function as thoroughly as if the material were relatively dry.

Another embodiment of the invention is shown in Figs. 4, 5 and 6, wherein 10 represents the longitudinal supporting beams, 11 the cross beams, 12 the screen frame, 13 the screen, 14 the plates forming the walls of the receptacle, and 15 the driving shaft. 16, 16, are two rock shafts extending longitudinally of the machine on each side thereof and turning in bearings secured to the cross beams 11. On each side of the machine the driving shaft carries a bevel gear wheel 17, which drives a similar gear 18 on a counter-shaft 19 turning in a bearing on one of the

cross beams 11. On each shaft 19 is a crank disk 20, the crank-pin of which is slidable in the slot 21 of an arm 22 secured to the corresponding rock-shaft 16. Secured to
 5 each rock-shaft 16 is a series of whips or beaters 23 similar in construction to the beaters *r*, *s*, hereinbefore described. The beaters extend transversely of the screen, and those secured to one rock-shaft are arranged
 10 alternately with relation to the other series of beaters.

In each machine, the construction and arrangement is such that the beaters, in moving upwardly, have their motion accelerated
 15 until at or about the time they strike the screen, thereby causing the beaters to strike the screen with a considerable degree of force. This acceleration is effected, in the specific constructions herein disclosed, by
 20 reason of their actuation by crank mechanism properly adjusted and connected as shown. In the first embodiment the crank mechanism comprises an eccentric and in the second embodiment a disk and crank-pin,
 25 each of said mechanisms being adapted to impart to its actuated devices the movement of alternate acceleration and retardation characteristic of a crank motion. At or
 30 about the time the beaters strike the screen, their movement commences to be retarded, so that the beaters do not tend to move far above the level of the screen, such tendency as there is to further movement of the beaters being taken care of by their capacity to
 35 bend under stress. The advantage of the accelerated motion of the beaters is that, with a limited range of movement, they are caused to strike the screen with the desired maximum force. The limited range of move-
 40 ment is highly desirable in that it permits a number of screens to be superposed one upon the other and yet maintain them relatively close together. It is also preferred, as shown in both embodiments of the invention,
 45 that different series of beaters should strike the screen at different times, this being the necessary result, in the preferred embodiment, of arranging two series of beaters on opposite sides of the same rock-shaft and
 50 rocking all the shafts in unison in the same direction; while the same result is attained, in the other embodiment, by arranging the crank-pins of the two crank-disks diametrically opposite to each other.

55 It will be understood that in operation screens embodying my invention will be arranged, as is usual, in a more or less inclined position.

60 The construction of both screens is such that the beaters, in their movement, describe a very short arc, which permits a plurality of screens to be superposed one upon another without the beaters of one screen interfering with the screening operation in the next
 65 lower screen. It will also be observed that

all the beaters strike flat, or nearly so, against the screen, thereby subjecting practically the entire surface of the screen to the beating or whipping operation. This operation of the beaters is effected, when the rock-
 70 shafts are substantially below the level of the screen, by securing the flexible arms to the rigid arms at an angle to the latter's direction of extension. By adjusting the arm *l* in the slot *n* of the arm *o* (see Fig. 2) the
 75 length of the stroke of the beaters may be varied, thus varying the force with which they strike the screen.

Having now fully described my invention, what I claim and desire to protect by Let-
 80 ters Patent is:—

1. The combination with a screen, of two series of beaters, in proximity to the screen, extending in opposite directions toward each other, the beaters of one series overlapping
 85 the beaters of the other series, and means to actuate both series of beaters.

2. The combination with a screen, of a plurality of shafts arranged in proximity to the screen, a series of beaters secured to each
 90 shaft extending toward and overlapping the beaters secured to, an adjacent shaft, and means to rock said shafts.

3. The combination with a screen, of two series of beaters, in proximity to the screen,
 95 extending in opposite directions and overlapping each other, the beaters of one series being arranged alternately relatively to the beaters of the other series, and means to actuate both series of beaters.
 100

4. The combination with a screen, of a plurality of shafts arranged in proximity to the screen, a series of beaters secured to each shaft extending toward an adjacent
 105 shaft, the beaters of one shaft being arranged alternately with the beaters on the adjacent shaft extending toward the first shaft, and means to rock said shafts.

5. The combination with a screen, of two series of beaters, in proximity to the screen,
 110 extending in opposite directions and overlapping each other, the beaters of one series being arranged alternately relatively to the beaters of the other series, and means to reciprocate the two series of beaters in opposite
 115 directions, thereby causing the two series of beaters to strike the screen alternately.

6. The combination with a screen, of flexible beaters arranged in proximity thereto,
 120 and positively actuated means to move said beaters toward said screen and impart thereto in said movement an accelerated motion.

7. The combination with a screen, of a
 125 shaft arranged in proximity thereto, rigid arms secured to said shaft, flexible arms secured to said rigid arms, and means to rock said shaft.

8. The combination with a screen, of a
 130

shaft arranged in proximity thereto, rigid arms secured to said shaft, arms of yielding material secured to said rigid arms, said yielding arms being of reduced section between their ends to increase their flexibility, and means to rock said shaft.

9. The combination with a screen, of a shaft arranged in proximity thereto, rigid arms secured to said shaft, flexible arms secured to the rigid arms and extending at an angle to the latter's direction of extension, and means to rock said shaft.

10. The combination with a screen and its supporting frame work, of a shaft arranged in proximity to the screen and turning in stationary bearings on the supporting frame-work, beaters secured to the shaft, a rotatable driving shaft, and mechanism, positively actuated by the driving shaft and positively actuating the beater shaft, adapted to convert the rotary movement of the driving shaft into an oscillating movement of the beater shaft, whereby the beaters are positively moved toward and from the screen.

11. The combination with a screen, of a number of shafts extending cross-wise of, and in proximity to, the screen, one or more of said shafts having two series of beaters extending respectively in opposite directions lengthwise of the screen, and means to rock the shafts.

12. The combination with a screen, of a number of shafts extending cross-wise of, and in proximity to, the screen, a plurality of said shafts having two series of beaters extending respectively in opposite directions lengthwise of the screen, the beaters of each of said series being arranged alternately

with respect to the oppositely extending beaters of the next adjacent shaft, and means to rock said shafts.

13. The combination with a screen, of a number of shafts extending cross-wise of, and in proximity to, the screen, each shaft except the end shafts having two series of beaters extending respectively in opposite directions lengthwise of the screen, and the end shafts having each a series of beaters extending lengthwise of the screen toward the other shafts, and means to rock the shafts.

14. The combination with a screen, of a plurality of rock-shafts extending cross-wise of, and in proximity to, the screen, beaters secured to said shafts extending lengthwise of the screen, a driving shaft, an eccentric thereon, means to oscillate one of said rock-shafts from said eccentric, arms on each rock-shaft, a rod connecting said arms, and beaters secured to the several rock-shafts.

15. The combination with a screen, of a shaft arranged in proximity to the screen, beaters secured to the shaft, a rotatable driving shaft, mechanism between said driving shaft and beater shaft adapted to convert the rotary movement of the former into an oscillatory movement of the latter, said mechanism including an adjustable device adapted to vary the extent of said oscillation.

In testimony of which invention, I have hereunto set my hand, at Philadelphia, on this 25th day of September, 1909.

JAMES ROBINSON FOGG.

Witnesses:

EDWIN S. PHILIPS,
W. D. MUSSON.