

No. 710,983.

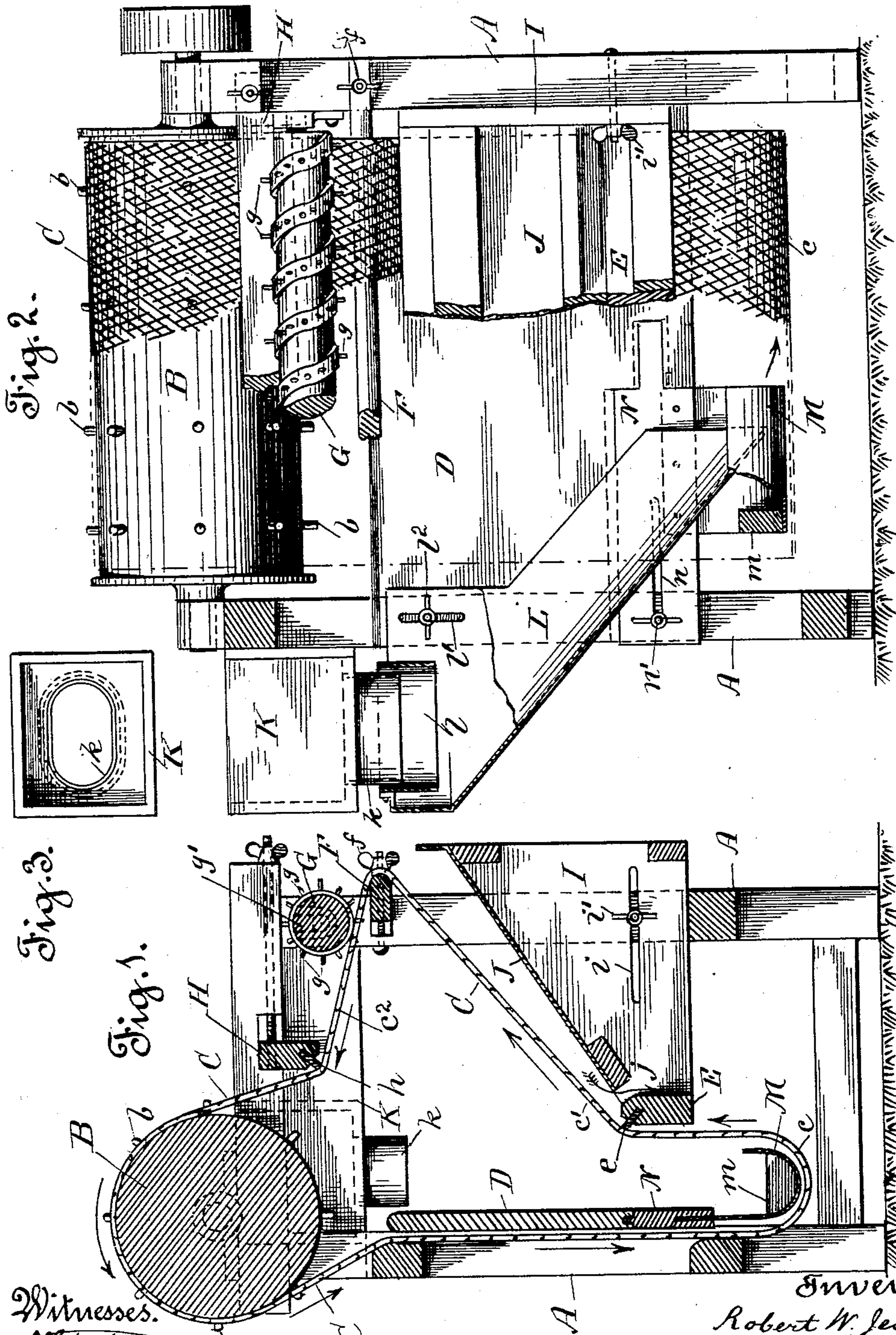
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R. W. JESSUP.

SEPARATOR.

(Application filed Jan. 8, 1902.)

(No Model.)



Witnesses.  
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# UNITED STATES PATENT OFFICE.

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## SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 710,983, dated October 14, 1902.

Application filed January 6, 1902. Serial No. 88,581. (No model.)

*To all whom it may concern:*

Be it known that I, ROBERT W. JESSUP, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented certain new and useful Improvements in Separators; and I do hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to that class of separators for grains and other small seeds in which an endless traveling screen is employed.

In a pending application, Serial No. 77,382, filed October 3, 1901, I show a separator in which the flexible screen is mounted to form a hanging loop or bight, and a feeder is arranged to deliver the material to said loop or bight. My present invention involves improvements in this machine; and the object of these improvements is to adapt the machine to suit the varying conditions of the different materials operated upon and the different degrees of separation to suit circumstances, as I shall hereinafter explain.

My invention consists in means for varying the width of the loop or bight of the screen, means for varying its depth, means for varying the inclination of the uprising side of the screen, means for regulating the feed of the material, and generally in the novel disposition of the screen and of the several parts of the separator, all as I shall now fully describe by reference to the accompanying drawings, in which—

Figure 1 is a vertical section of my separator. Fig. 2 is a side view of same, partly broken. Fig. 3 is a top view of hopper K.

A is the frame of the machine. In the upper portion of the frame is mounted the driver-roller B, which is provided with pins *b*, engaging the screen-mesh and insuring the travel of the screen.

C is an endless flexible screen. It may be of any suitable character; but the form of the screen which I deem the best is a screen made of freely-interlaced spiral wires, forming what is commonly known as "spiral fabric." This screen is a flexible one, and as I have fully illustrated it in my previous application above referred to it is unnecessary to further describe it or to illustrate it in de-

tail, as its construction forms no part of my invention, the only essential of the screen being that it be flexible, which qualification is sufficiently herein shown by its course. The course of this screen, as here shown, is downward to its lower portion, where it forms a hanging loop or bight *c*, thence upwardly, forming an inclined portion *c'*, thence a return portion *c''* to the driver-roller, from which it is suspended and which causes it to travel in the direction indicated by the arrows. On the down-moving side the screen is guided and prevented from swaying by the guide-strip D, carried by frame A. On the opposite or uprising side of the bight or loop a guide strip or bar E defines the width of said loop or bight and changes the course of the screen to the inclined portion *c'*. At the head of this inclined portion a guide-strip F again changes the course of the screen on its return to the driver-roller B.

Mounted in the upper portion of the frame A is a roller G, provided with pins *g*, which, entering the screen-meshes, clear them of any clogging particles. This roller is mounted in boxes *g'* in such a manner that the roller rests by gravity upon the screen, thereby constantly engaging it and clearing its meshes.

In frame A is mounted a tightener-bar H, which is adapted to slide toward or from the driver-roller and though pressing on the screen all the time is adapted by its movement and adjustment to vary the depth of the loop or bight *c*.

The guide strip or bar E, which defines the width of the loop or bight of the screen, is made adjustable in a direction toward or from the fixed guide D on the other side, thereby varying the width of said loop or bight. For example, if the bar E be moved closer to the guide D the width of the loop or bight will be diminished. If it be moved back, the loop or bight will be widened. Though the bar E may be made adjustable in any suitable manner, I have here shown a practical construction as consisting of a triangular frame I, in the front of which said bar E is carried. This frame I is provided with slots *i* in its ends, which receive thumb-screws *i'*, whereby the frame may be set when adjusted. This frame I also carries at its top an inclined table J,



which lies under the inclined portion *c'* of the screen, said table terminating at its foot just short of the bar E, whereby an opening at *j* is left for the discharge of such particles as  
5 may fall through the inclined portion of the screen upon said table.

The guide-strip F, which terminates the inclined portion *c'* of the screen, is mounted adjustably in frame A and is adapted to be  
10 moved out or in by thumb-screws *f* or other means, and this adjustment of said strip F provides for varying the inclination of said inclined portion *c'* of the screen.

Though for the mere purpose of directing  
15 the course of the endless traveling screen the guide E and the tightener H might come in direct contact with the screen, I find it best to provide each of said bars with strips or pieces which make contact with the screen  
20 and in addition to guiding it agitate it as well. These agitators are shown at *e* on guide-bar E and at *h* on tightener-bar H, and they may be of any suitable character which by contact with the traveling screen will shake or agi-  
25 tate said screen. Vulcanized fiber or vulcanized rubber serve as proper materials for these agitator-strips *e* and *h*. Hard-wood will also serve, the idea being to employ some material capable of standing the frictional wear  
30 and hard enough to resist the blows or impacts of the raised surfaces or ridges of the spiral-fabric screen as they successively drag past in contact with the strips. The travel past these strips in contact therewith of the  
35 uneven-surfaced spiral-fabric screen and the resistance of said strips thereto cause the necessary agitation of the screen.

Secured to frame A is a fixed feed-hopper K, the throat of which is provided with a  
40 flange *k*.

L is a feed-chute, the upper end of which has a flange *l*, which forms with the hopper-flange a loose connection or joint of a telescopic nature, which will permit the inclination of the chute to be varied, while preserving its communication with the hopper. The  
45 chute L extends down at an inclination, and its discharge end terminates within the loop or bight *c* of the screen C, entering the open side thereof. The chute L is made adjustable in order to vary its inclination. For this purpose it may be mounted in any suitable manner. The way here shown is by means of a slot *l'* in the chute and a thumb-screw *l''*,  
50 entering said slot and the frame A. Though in some cases the chute L may discharge directly into the loop or bight, I find it better to interpose an adjustable delivery or regulator spout M. This spout consists of a piece of  
60 flexible material—rubber, leather, or other material—which, lying in the loop or bight, is adapted to conform itself to said loop or bight and to the various changes in its contour due to the several adjustments heretofore described. This delivery-spout lies upon  
65 the screen within its loop or bight and directly under the discharge end of the feed-chute L,

the rear or outer end of said spout having a wall *m* to prevent the material from getting out at said end. Now by making this spout  
70 adjustable—that is, adapted to move transversely of the loop or bight farther in or farther out—the feed of the material can be regulated to suit circumstances, as I shall presently explain. It may be rendered adjust-  
75 able in any suitable manner. A good construction is that here shown—namely, a bar N, to which said spout is secured, said bar being tongued and grooved into the base of guide D and provided with slots *n*, through  
80 which pass set-screws *n'* into frame A.

The operation of the machine is as follows: The screen, as before stated, travels in the direction indicated by the arrows. The material being led to the hopper K passes the  
85 flanges *k* and *l* and flows down the chute L to the regulator-spout M. When the chute L is at a given pitch, the material retarded by the flanges *k* and *l* is led by its natural flow to the edge of the spout M; but if a small feed  
90 be desired the sliding bar N is drawn back, thus drawing the regulator-spout M back until the feed is satisfactory. On the other hand, an increase of feed is obtained by moving or adjusting the spout M farther into the screen  
95 loop or bight. If the material fed be wheat and a change to coarser material is desired, the chute L is raised at its upper end to change its inclination and the regulator-spout M is adjusted back toward the screen  
100 edge. The separation takes place in the loop or bight of the screen by the continual rolling action of the mass, the movement of which over and over is insured by the flexible loop clinging to the mass on three sides and con-  
105 tinually lifting it on the uprising side and turning it over, whereby the smaller particles drop through the screen-meshes, while the larger particles work along to the edge of the screen and are discharged, as I have described  
110 in my prior application above referred to. Now if the guide strip or bar E which defines the width of the loop or bight be adjusted inwardly—that is, toward the screen—by sliding  
115 inwardly the triangular frame I it will narrow said loop or bight, and this adjustment has the effect of causing more of the long particles of the material to end up and pass through the screen. On the other hand, if  
120 by adjusting the frame I and the bar E back in the other direction the loop or bight be increased in width less of these long particles will pass through. This will be readily understood if the principle of separation carried out herein be regarded. The particles  
125 to be separated differ in length and thickness. The thicker particles will not pass through the screen; but the thinner particles are thin enough to pass through if their length will permit. These thin particles are  
130 generally too long for the mesh, and if they lie flat they will bridge the spaces and will not pass through. By continually lifting the mass and turning it over and over, as is done



very positively and effectively by the flexible loop or bight, these long slim particles are upended by the uprising side of the loop, and in this position they will pass through. Now if the loop be a wide one its change from its bottom to its uprising side will not be very sharp. In the bottom the long slim particles lie flat, and with a wide loop the mass will be gently carried around the curve to the uprising side and will slip back again without much turning or rolling over. Consequently the particles will retain their relative positions and the least number of the long particles will be upended. On the other hand, if the loop be a narrow one the change from the bottom to the uprising side is abrupt. The effect of this sharp abrupt turn is to cause the loop to cling more closely to the mass, and its uprising side will more forcibly carry up the mass and to the greatest height and will turn it more completely. In this turning and change of the relative positions of the particles the greatest number of long particles will be upended. Between these limits the adjustment of the loop may be various to suit the particular material to be separated. Thus the degree or character of the separation may be varied to suit conditions, and a further variation may be had by varying the depth of the loop or bight. This regulation is effected by the adjustment of the tightener-bar H above. Any particles which drop through the inclined portion *c'* of the screen are caught upon the table J and are directed thereby to the opening *j* at the foot and are discharged through said opening. By setting in or out the guide-strip F the inclination of the inclined portion *c'* of the screen may be varied as may be desired for the particular separation required. The pins of the roller G clear the screen-meshes of clogging particles, the roller adjusting itself by gravity to the screen. The agitators *e* and *h* serve to keep the screen in constant agitation to assist the separation.

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

1. A separator consisting of an endless traveling flexible screen, means for supporting the screen to form a hanging loop or bight, a feeder arranged to deliver material to said hanging loop or bight, and means for varying the width of said loop or bight, substantially as described.

2. A separator consisting of an endless traveling flexible screen, means for supporting the screen to form a hanging loop or bight, a feeder arranged to deliver material to said hanging loop or bight, and adjustable means for varying the width of said loop or bight, substantially as described.

3. A separator consisting of an endless traveling flexible screen, means for supporting the same to form a hanging loop or bight, oppositely-disposed guides for defining said loop or bight, means for relatively adjusting said

guides, and a feeder adapted to deliver material to the loop or bight, substantially as described.

4. A separator consisting of an endless, traveling, flexible screen, mounted to form a hanging loop or bight, a feeder arranged to deliver material to said hanging loop or bight, and an adjustable bar with agitators in contact with said loop or bight, and adapted to define and adjust its width and to shake the screen.

5. A separator consisting of an endless, traveling, flexible screen, mounted to form a hanging loop or bight, and thence guided at an incline on its uprising side, an adjustable frame having a guide adapted to define and vary the width of said loop or bight, and having also a table lying under the incline of said screen, and a feeder arranged to deliver material to said hanging loop or bight.

6. A separator consisting of an endless traveling flexible screen, means for supporting the same to form a hanging loop or bight, guiding devices above said loop or bight adapted to cause the screen to travel at an inclination on its uprising side, and a feeder adapted to deliver material to the hanging loop or bight, substantially as described.

7. A separator consisting of an endless, traveling, flexible screen, mounted to form a hanging loop or bight, and thence guided at an incline on its uprising side, an adjustable guide to vary the inclination of the screen on said side, an adjustable guide defining and adapted to vary the width of said loop or bight, and a feeder arranged to deliver material to said loop or bight.

8. A separator consisting of an endless, traveling, flexible screen, mounted to form a hanging loop or bight, and thence guided at an incline on its uprising side, an adjustable guide to vary the inclination of the screen on said side, an adjustable guide defining and adapted to vary the width of said loop or bight, an adjustable table or chute under the inclined side of the screen, and a feeder arranged to deliver material to said hanging loop or bight.

9. A separator consisting of an endless traveling flexible screen, means for supporting the same to form a hanging loop or bight, a guide for the screen arranged above the loop or bight, means for adjusting said guide to vary the depth of the loop or bight, and a feeder adapted to deliver material to the hanging loop or bight, substantially as described.

10. A separator consisting of an endless, traveling flexible screen, mounted to form a hanging loop or bight, an adjustable guide defining and adapted to vary the width of said loop or bight, a second adjustable guide for said screen, and adapted, by its adjustment, to vary the depth of said loop or bight, and a feeder arranged to deliver the material to said hanging loop or bight.

11. A separator consisting of an endless, traveling, flexible screen, mounted to form a



hanging loop or bight, a feeder-chute adapted to deliver the material to said loop or bight, said chute being adjustable to vary its inclination.

5 12. A separator consisting of an endless, traveling, flexible screen, mounted to form a hanging loop or bight, a feed-hopper, a feeder-chute, adjustably mounted to vary its inclination, and adapted to deliver the material  
10 to the hanging loop or bight, and a yielding connection between the chute and hopper adapted to permit the change in inclination of the chute while preserving the communication of said chute with the hopper.

15 13. A separator consisting of an endless, traveling, flexible screen mounted to form a hanging loop or bight, a feed-hopper, a feeder-chute, adjustably mounted to vary its inclination, and adapted to deliver the material  
20 to the hanging loop or bight, and the yielding connection between the chute and hopper consisting of the freely-interengaging or telescopic flanges.

25 14. A separator, consisting of an endless, traveling, flexible screen, mounted to form a hanging loop or bight, a feeder-chute entering said loop or bight, and an adjustable, delivery or regulator spout, lying in the loop or bight, and adapted to receive the material  
30 from the feeder-chute, and to discharge it into the loop or bight, at desired points.

15. A separator, consisting of an endless, traveling, flexible screen, mounted to form a hanging loop or bight, a feeder-chute entering said loop or bight, and an adjustable, delivery or regulator spout, lying in the loop or bight and adapted to receive the material from the feeder-chute, and to discharge it into the loop or bight, at desired points, said  
35 regulator-spout being of a flexible nature, adapted to conform its contour, to that of said loop or bight.

16. A separator, consisting of an endless, traveling, flexible screen, mounted to form a hanging loop or bight, means for guiding such hanging loop or bight, means adjacent said guiding means for varying the width of said loop or bight, a feeder-chute entering said loop or bight, and an adjustable, delivery or  
45 regulator spout, lying in the loop or bight and adapted to receive the material from the feeder-chute, and to discharge it into the loop or bight, at desired points, said regulator-spout being of a flexible nature, adapted to conform its contour, to that of said loop or bight.  
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17. A separator, consisting of an endless, traveling, flexible screen, mounted to form a hanging loop or bight, a fixed guide for the  
60 down-moving side of the screen, an adjust-

able frame carried by said guide, and having a flexible piece, forming a delivery or regulator spout, lying in and conforming to the bight or loop, and adjustable transversely therein, and a feeder-chute adapted to deliver  
65 the material to said spout.

18. A separator, consisting of an endless, traveling, flexible screen, mounted to form a hanging loop or bight, a fixed guide for the down-moving side of the screen, an adjustable frame carried by said guide, and having a flexible piece, forming a delivery or regulator spout, lying in and conforming to the bight or loop, and adjustable transversely therein, and a feeder-chute adapted to deliver  
70 the material to said spout, said chute being adjustable to vary its inclination.

19. A separator, consisting of an endless, traveling, flexible screen, mounted to form a hanging loop or bight, a driving-roller suspending said screen, a fixed guide for the down-moving side of the screen, an adjustable guide, with agitators, defining and varying the width of said loop or bight, an adjustable guide to vary the inclination of the  
80 uprising side of the screen, an adjustable table, under said inclined side, a gravity-roller with mesh-clearing pins, engaging the screen above said guide, an adjustable guide, with agitators, bearing on the screen, to vary the  
85 depth of the loop or bight, and a feeder arranged to deliver the material to said loop or bight.

20. A separator, consisting of an endless, traveling, flexible screen, mounted to form a hanging loop or bight, a driving-roller suspending said screen, a fixed guide for the down-moving side of the screen, an adjustable guide, with agitators, defining and varying the width of said loop or bight, an adjustable guide to vary the inclination of the uprising side of the screen, an adjustable table under said inclined side, a gravity-roller with mesh-clearing pins engaging the screen above said guide, an adjustable guide, with  
90 agitators, bearing on the screen, to vary the depth of the loop or bight, a fixed hopper, an adjustable feeder-chute communicating with said hopper and adapted to have its inclination varied, and a flexible delivery or regulator spout, adjustable transversely in the loop or bight of the screen, and adapted to receive the material from the chute, and to deliver it to the loop or bight.  
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In witness whereof I have hereunto set my  
hand.

ROBERT W. JESSUP.

Witnesses:

C. W. GRASHO,  
L. H. BRAND.