T. L. & T. J. STURTEVANT.

SCREEN OR SEPARATOR.

APPLICATION FILED NOV. 17, 1910.

1,114,064.

Patented Oct. 20, 1914.

4 SHEETS—SHEET 1.

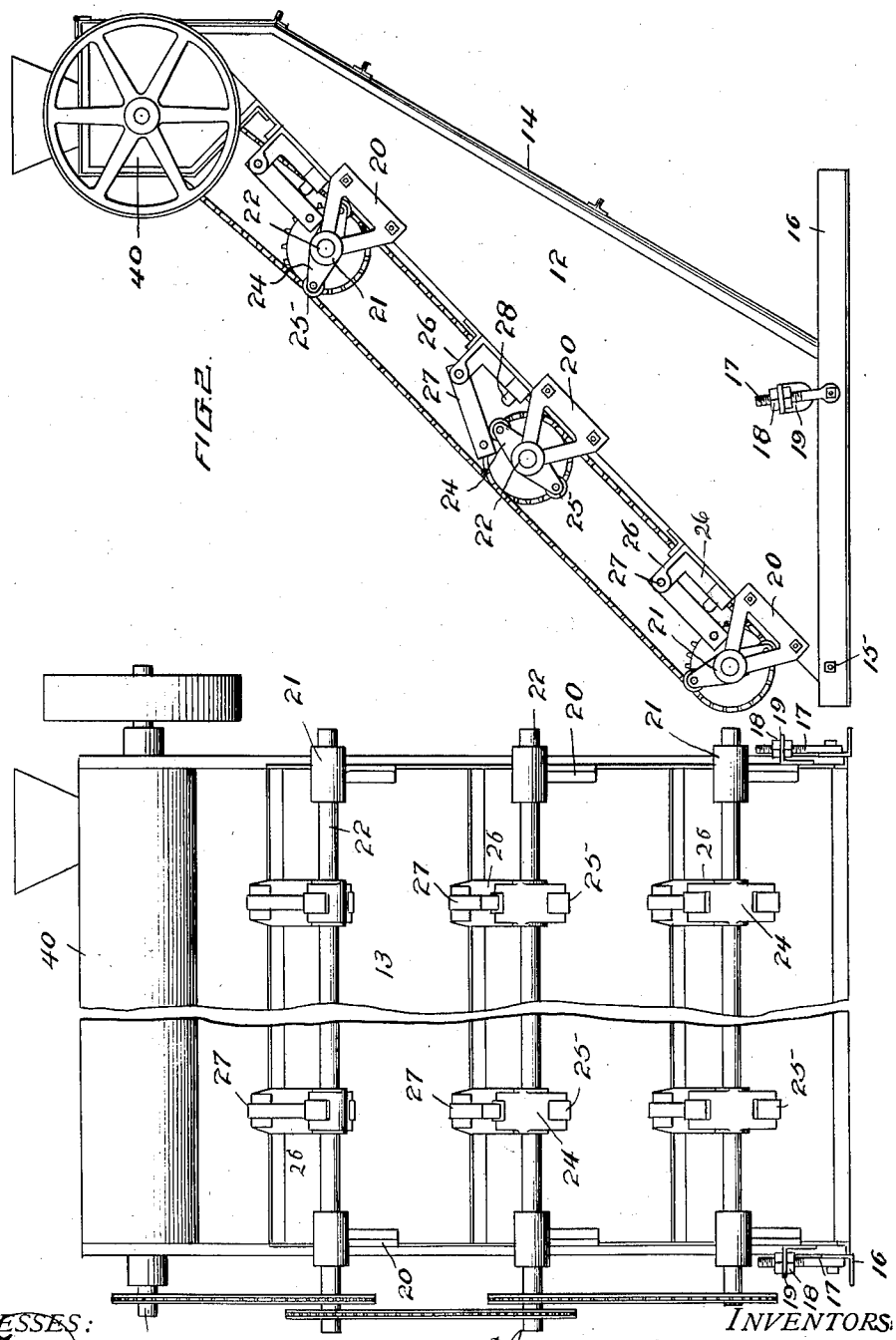


FIG. 2.

FIG. 1.

WITNESSES:

W. F. Boyle.

C. M. Sweeney.

INVENTORS.

Thomas L. Sturtevant,

BY Thomas J. Sturtevant

Calvert Clarke,

Attorneys

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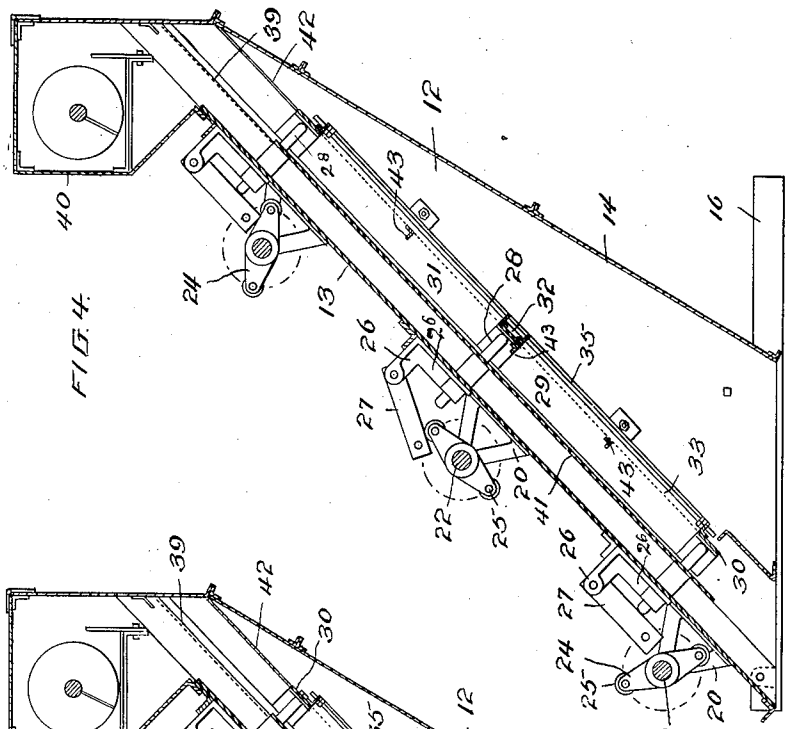


FIG. 4.

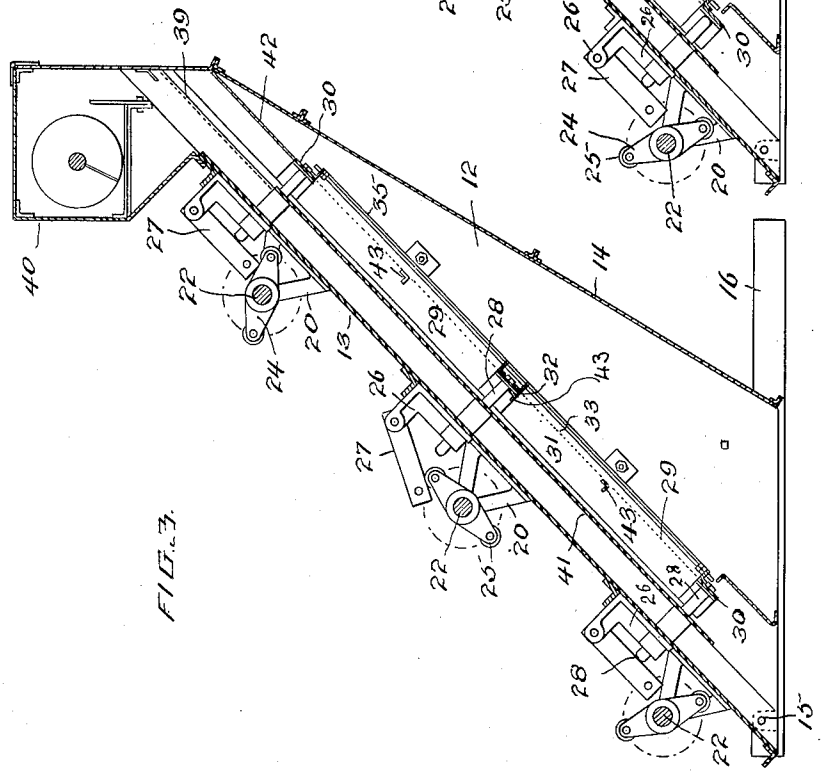


FIG. 3.

WITNESSES:

W. F. Coyle.

L. M. Sweeney.

INVENTORS:

Thomas L. Sturtevant

Thomas J. Sturtevant

BY

Albert G. Davis

Attorneys.

T. L. & T. J. STURTEVANT.

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4 SHEETS—SHEET 3.

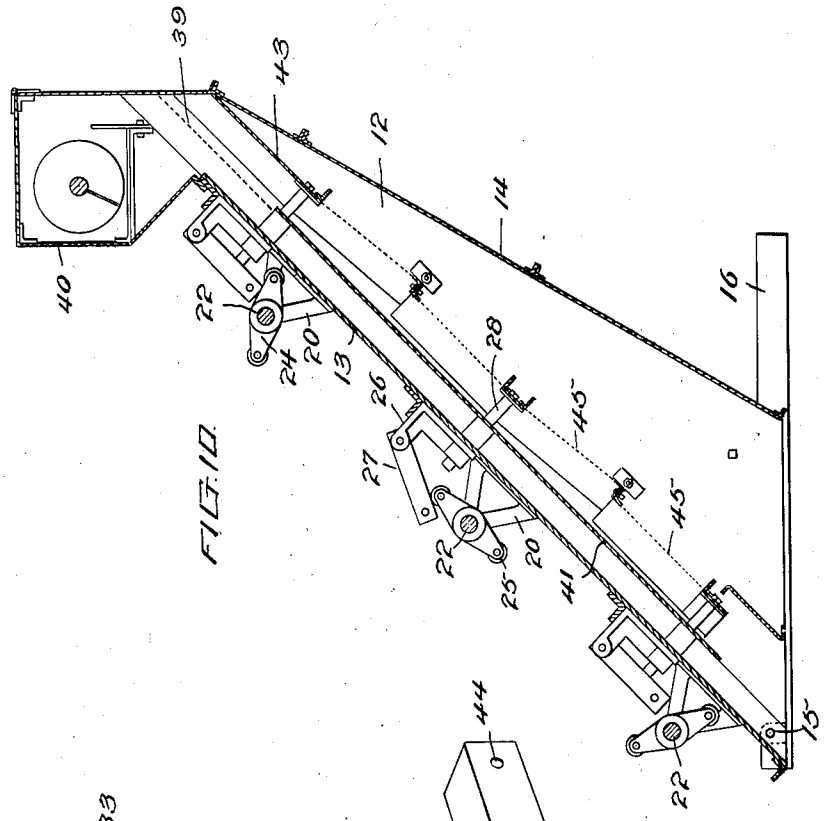


FIG. 10.

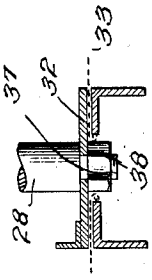


FIG. 5.

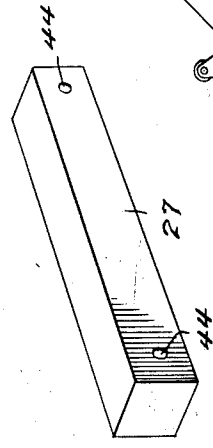


FIG. 6.

WITNESSES:

H. F. Kayle.

L. M. Sweeney.

INVENTORS:

Thomas L. Sturtevant,

Thomas J. Sturtevant,

BY Calver & Calver,

Attorneys.

T. L. & T. J. STURTEVANT.

SCREEN OR SEPARATOR.

APPLICATION FILED NOV. 17, 1910.

1,114,064. Patented Oct. 20, 1914.

4 SHEETS—SHEET 4.

FIG. 7.

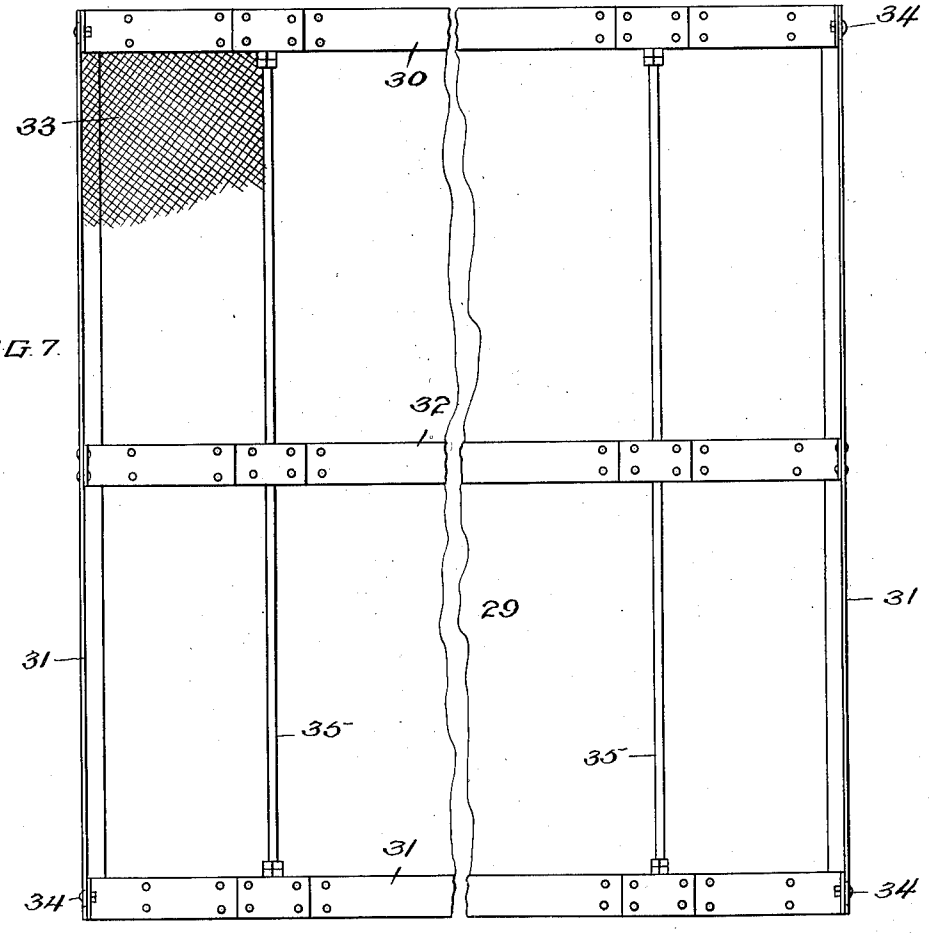


FIG. 8.

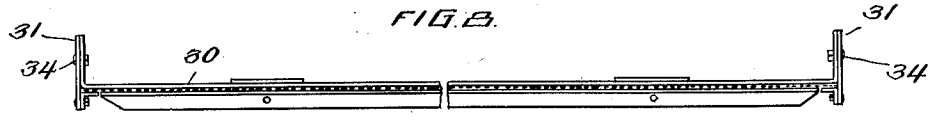
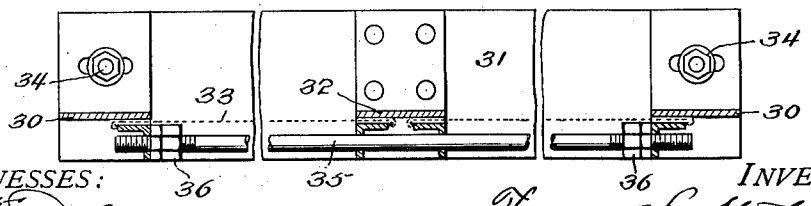


FIG. 9.



WITNESSES:

W. F. Kayle.

C. M. Sweeney.

INVENTORS:

Thomas L. Sturtevant,

Thomas J. Sturtevant,

BY Albert Walker,

Attorneys.

UNITED STATES PATENT OFFICE.

THOMAS LEGGETT STURTEVANT, OF QUINCY, AND THOMAS JOSEPH STURTEVANT, OF WELLESLEY, MASSACHUSETTS, ASSIGNORS TO STURTEVANT MILL COMPANY, A CORPORATION OF MAINE.

SCREEN OR SEPARATOR.

1,114,064. Specification of Letters Patent. Patented Oct. 20, 1914.

Application filed November 17, 1910. Serial No. 592,858.

To all whom it may concern:

Be it known that we, THOMAS L. STURTEVANT and THOMAS J. STURTEVANT, citizens of the United States, residing, respectively, at Quincy and Wellesley, in the county of Norfolk and State of Massachusetts, have invented or discovered certain new and useful Improvements in Screens or Sparators, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to that class of vibrating screening or separating machines in which the screens are jarred by percussive action, and the object of the present improvement is to render machines of this class more durable and more efficient in operation than similar screening or separating machines heretofore constructed, as will hereinafter more fully appear.

In the accompanying drawings Figure 1 is a broken-out front elevation of a separator embodying the present invention, and Fig. 2 is a side view thereof. Fig. 3 is a sectional view of the improved separator, showing impact bars attached to the screen, and Fig. 4 is a sectional view similar to Fig. 3 but showing loose or non-attached impact bars. Fig. 5 is a detail view showing the construction by which the impact bars are attached to the screen frame, and Fig. 6 illustrates one of the hammer bars in detail. Fig. 7 is a plan view, partly broken out, of the form of screen shown in Fig. 3, and Fig. 8 is a broken-out side or edge view of the same. Fig. 9 is a detail view to show the connections of one of the stretching bars with the screen frame. Fig. 10 is a view, similar to Figs. 3 and 4, illustrating a modified form of screen.

The improved separator illustrated in the drawings comprises a suitable inclined screen box which may consist of side pieces or sides 12, a front casing part 13 and a removable rear casing part 14, the latter being preferably removably mounted in place, and the parts of said box or casing being rigidly secured together. The said screen box or casing is preferably pivotally attached or hinged at 15 at its lower part to foot bars 16, so that said box or casing may be adjusted to different angles of inclination. To this end the sides 12 of the casing are adjustably connected with the foot bars 16 by means of eye-bolts 17 attached at their lower ends to said foot bars, and provided at their screw-threaded upper ends with adjustable nuts 18 engaging brackets 19 attached to the sides of the box or casing, so that by screwing said nuts up or down on said eye-bolts, the angle of inclination of the separator and of the screen or screens carried thereby may be varied.

The inclined screen box or casing, constructed as above described, although adjustable to different angles, is normally fixed or stationary, and supports one or more flat screens, consisting of wire mesh or woven wire cloth which comprises transverse as well as longitudinal wires and which is secured to a sutiable frame or frames attached to or supported by the screen box or casing, the said screen or screens being percussively jarred by suitable impact means. From this it results that the fineness of the output may be varied by varying the angle of inclination of the flat wire mesh screen or screens, and this is effected by varying the angle of inclination of the screen box or casing, supporting said screen or screens, through the medium of the adjusting means above described.

Attached to the screen casing are suitable standards or supports 20 which are provided with bearing portions 21 in which are journaled shafts 22 which are operatively connected with a driving shaft 23 by suitable chain and sprocket gearing, as shown in Figs. 1 and 2. On the shafts 22 are mounted carriers 24 provided with rollers 25. Attached to the front 13 of the screen box or casing are brackets 26 in which are pivotally mounted hammers 27 arranged to be engaged and lifted by the rollers 25 on the rotating carriers 24. Beneath the hammers 27 are located impact bars 28 which act on the screen or screens 29, the said impact bars being guided vertically in the brackets 26 through which they loosely pass, and said bars being preferably secured at their lower ends to the frame of the screen 29.

The screen 29, when constructed as shown in Figs. 3, 7 and 8, preferably consists of metal side bars 30, end bars 31, and a central bar 32. The woven wire screen 33 is attached to the side bars 30 in any suitable manner, preferably by being clamped between two parts of each of said side bars, the latter being adjustably connected with the end bars 31 by means of bolts 34 pass-

ing through slotted flanges on the said side bars. The side bars of the frame are connected by tension rods 35 passing through flanges on the said side bars, the end portions of said rods being threaded for the reception of adjusting and set nuts 36. From this construction it will be understood that the woven wire screen 33 may be placed under any suitable desired tension by means of the adjusting nuts on the bars 35 and which adjusting nuts may be locked in any desired position by the set nuts contiguous thereto.

To provide for the attachment of the impact bars 28 to the screen frame the said bars are preferably constructed at their lower ends with threaded shouldered studs 37 for the reception of nuts 38 by which the impact bars may be secured to the central bar 32 and the side bars 30 on the screen frame, and in thus attaching the said impact bars to the screen frame the wire cloth screen 33 is preferably clamped between connected parts of said cross bar and side bars, as denoted in the drawings, and more particularly in detail in Fig. 5.

The improved separator is preferably provided at its upper end with a coarse scalping screen 39 which first receives the material fed to the separator from the feed box 40. The said scalping screen will sift out the coarser part of the material which will be discharged from said screen onto a plate 41 down which it will pass to a suitable discharge opening at the bottom of the separator. The finer material passing through the scalping screen 39 will fall upon a receiving plate 42 from which it will pass to the screen 29. It will be observed that the fine wire cloth or wire mesh screen 29 is arranged practically in the extended plane of the receiving plate 42, so that the material slides from the said receiving plate onto the said screen in such a manner as to have no falling impact thereon; and thus injury to the somewhat fragile wire cloth screen, and which might result from a falling impact of hard sharp material, will be avoided.

When material which is being sifted is fed to an inclined screen a large portion of the sifting operation will be effected at the upper portion of the said screen, for the reason that as the material passes down the inclined screen its travel is so accelerated that when it reaches the lower portion of the screen it will be traveling so fast that the finer portion of the material can hardly pass through a fine mesh screen at all. To obviate this difficulty, and to render the entire screening surface more effective than it otherwise would be, the present invention comprises means or devices for retarding the downward passage of the material being sifted by an inclined screen. To this end the present invention preferably comprises transverse baffle bars 43 which will check the downward passage of the material and practically arrest the movement thereof at intervals, so that each section of the screen below each baffle bar becomes as effective as the upper portion of the screen to which the material being sifted is first fed. It will be understood of course that other means than the baffle bars 43 herein shown may be employed for retarding the downward movement of the material of an inclined screen, although said baffle bars provide a preferred construction for this purpose.

In the operation of the improved separator the rollers 25, mounted on the rotating carriers 24, will lift the hammer bars 27, and as the said hammer bars are released from said rollers they fall and strike the upper ends of the impact bars 28 which impart percussive jarring vibrating movements to the screen 29. The said hammer bars 27 are preferably constructed so that they may be reversed when battered or worn. To this end the said bars, which are preferably square in cross section, are provided near their opposite ends with holes 44 so that they may be pivotally mounted at either end in the brackets 26, by reversing said bars end for end; or by turning said bars over, or upside down, both faces of each of the opposite ends of the said bars may be utilized, thus presenting a new wearing portion or face when one wearing portion or face becomes badly battered or worn in use.

By discharging the entering material from the scalping screen 34 onto the receiving plate 42, instead of discharging such material directly onto the wire cloth screen, much wear of the wire cloth screen is avoided, for the reason that the material will be fed to the wire cloth screen simply by sliding thereon, instead of falling on the screen with more or less impact, as would be the case if the material were discharged downward from the scalping screen onto a fine wire cloth sifting screen beneath it.

Instead of attaching the impact bars 28 to the screen frame, as hereinbefore described, said bars may rest loosely at their lower ends, on said frame, or on protecting plates with which the screen may be provided, as shown in Fig. 4.

Instead of providing the separator with one large sifting screen, as 29, the sifting screen, considered as a whole, may consist of several relatively narrow screens 45, as shown in Fig. 10, so arranged that the material to be sifted may pass from one to another as it travels downward. In this construction of a sectional screen the different parts thereof may be so arranged as to check the downward movement of the material by having the upper ends of the different screen sections raised so as to be out of line with the lower ends of the screen

sections just above, thus providing detaining pockets at the lower ends of the sections to retard or check the downward movement of the material. This arrangement of screens serves a purpose similar to the function performed by the baffle bars 43, and of course it will be understood that said baffle bars might be used with the sectional screens if desired. In thus forming the sifting screen in sections, or providing a sifting screen which consists of a plurality of screens which are relatively narrow, in the direction of travel of the material, it will not be necessary to provide means for stretching the screen clothing taut, as the said screen clothing can be permanently secured to the screen frames under a sufficient tension for effective service. As a matter of fact it may be desirable in some instances to attach the screen clothing to the sections or separate parts of the screen somewhat loosely so as to permit said screen clothing to sag slightly, for the purpose of retarding the downward travel of the material to the screen; and when the material is thus retarded, by providing a succession of screen sections having sagging screen clothing other means for arresting the downward travel of the material, may be dispensed with.

Having thus described our invention we claim and desire to secure by Letters Patent:—

1. In a separator, the combination with an inclined, normally fixed or stationary box or casing and one or more flat screens inclosed therein and supported thereby, of foot bars with which the said box or casing is pivotally connected at its lower end, and adjusting means for varying the angle of inclination of said box or casing on its pivotal connection with said foot bars, said adjusting means comprising threaded eye-bolts provided with adjusting nuts, and brackets engaged by said adjusting nuts.

2. In a separator, the combination with an inclined, normally fixed screen box or casing, and one or more flat metallic screens supported thereby, of adjusting means for varying the angle of inclination of the said box or casing and of the said screen or screens, percussive means for jarring the said screen or screens, and transverse baffle bars on the upper surface or surfaces of said screen or screens, and over which the descending material passes, said baffle bars serving to check the downward movement of the material on said inclined screen or screens at intervals.

3. In a separator, the combination with an inclined, wire mesh screen, comprising longitudinal and transverse wires, and the entire surface of which is disposed in the same plane, of means for retarding or checking the downward movement of the material thereon, said means comprising baffle bars on the upper surface of said screen and arranged transverse to the downward movement of the material on the screen, and over which baffle bars the descending material passes, and means for percussively jarring said screen.

4. In a separator, the combination with an inclined casing provided at its upper end with a coarse or scalping screen, of a receiving plate about equal in length to said scalping screen and on which all of the material passing through said scalping screen will be received, and an inclined wire cloth screen which is practically in the extended plane of said receiving plate and to which screen the material received on said plate will slide or be discharged.

5. In a separator, the combination with an inclined casing provided at its upper end with a relatively short coarse or scalping screen, of a receiving plate of a length about equal to said scalping screen and on which all of the material passing through said scalping screen will be received, and an inclined metallic screen which is practically in the extended plane of said receiving plate and to which screen the material received on said plate will slide or be discharged.

6. In a separator, a pivoted hammer bar which is square, or practically so, in cross section, so that opposite faces of both ends thereof may be used for percussive action, said hammer being provided near its opposite ends with holes to receive the pivot, so that said hammer bar may be reversed endwise for the purpose of bringing its opposite ends into hammer action.

7. A screen for use in separators comprising a frame consisting of end bars and side bars, the latter being slidably mounted on said end bars so that they may be moved toward and from each other, woven wire screen clothing attached to said side bars, tension rods for stretching said screen clothing and varying the tension thereof, said tension rods having screw threaded opposite end portions provided with adjusting nuts by which the tension on the screen clothing may be varied and set nuts for securing said adjusting nuts in place.

In testimony whereof we affix our signatures, in presence of two witnesses.

THOMAS LEGGETT STURTEVANT.
THOMAS JOSEPH STURTEVANT.

Witnesses:
W. F. ELLIS,
L. T. STURTEVANT.