

April 21, 1925.

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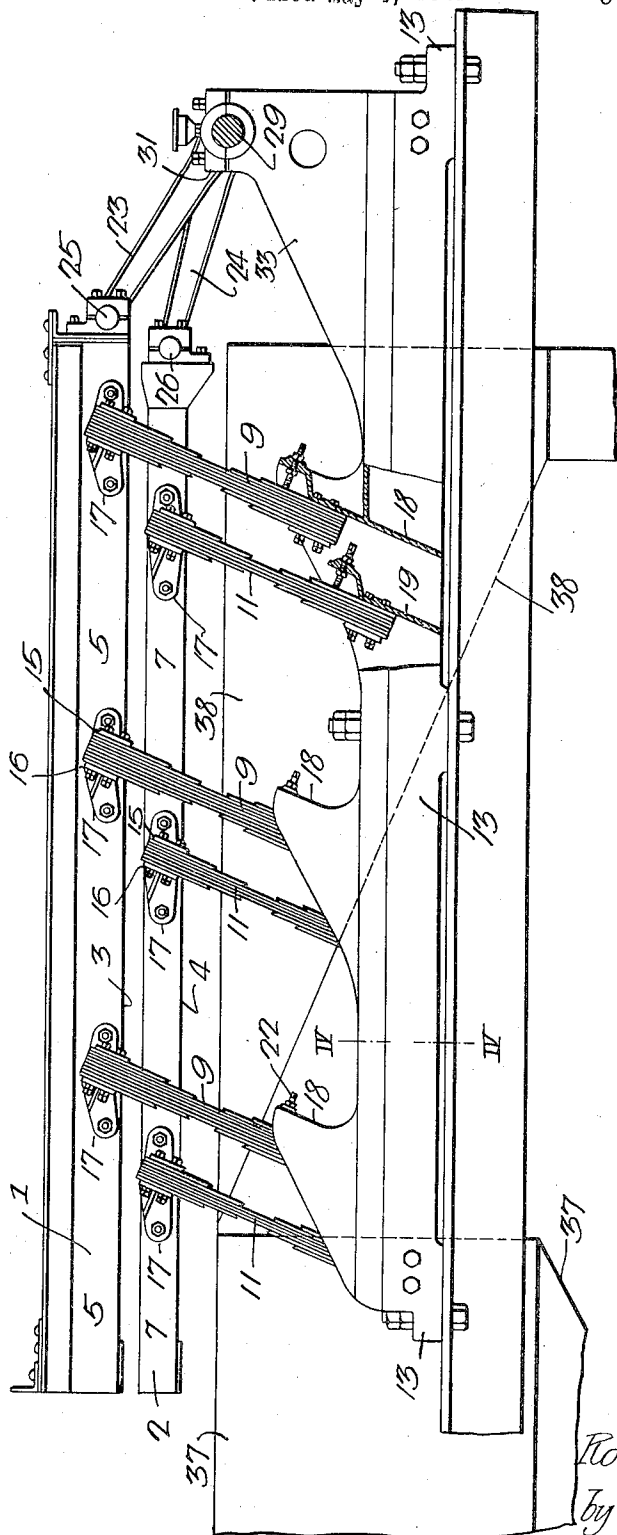
R. H. BEAUMONT

SCREEN

Filed May 1, 1923

3 Sheets-Sheet 1

Fig. 1.



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April 21, 1925.

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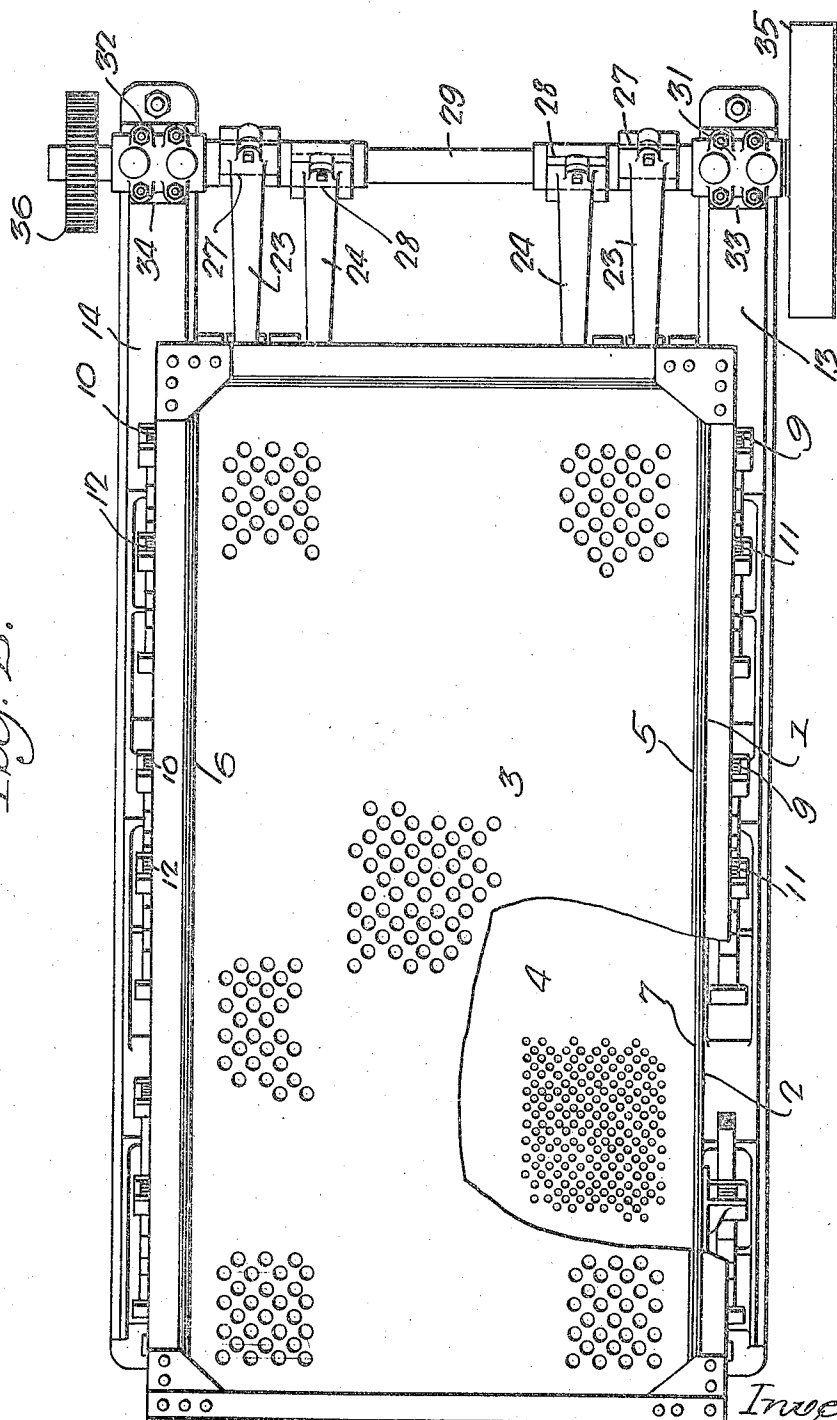
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Filed May 1, 1923

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Fig. 2.



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April 21, 1925.

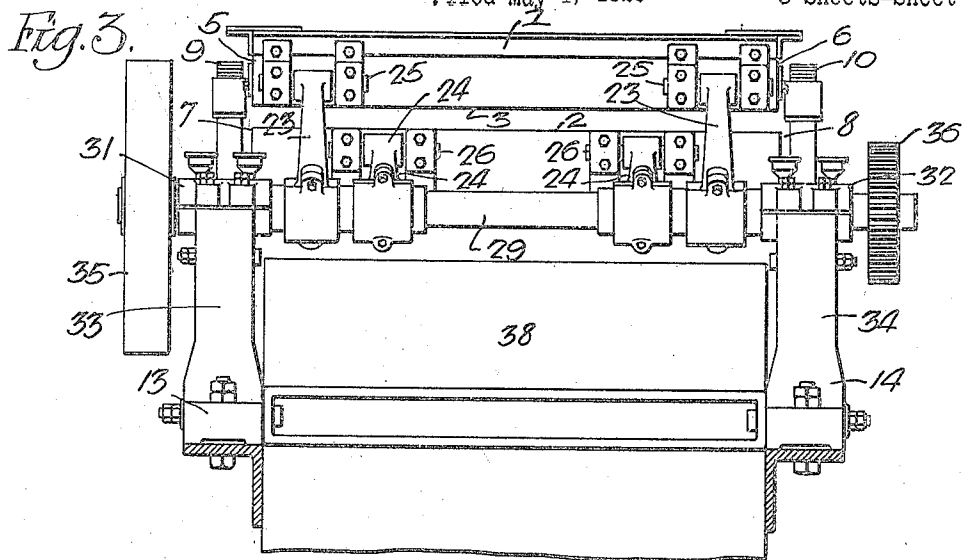
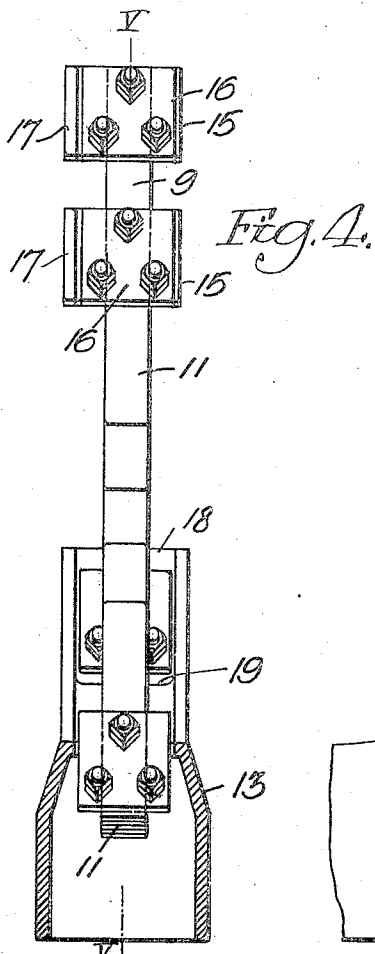
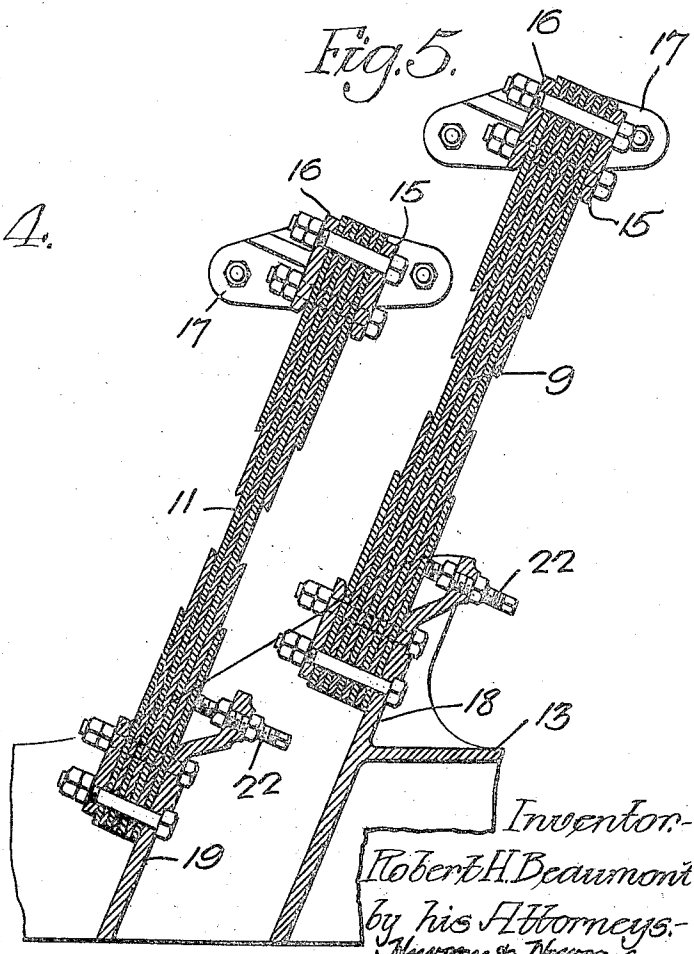
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE.

ROBERT H. BEAUMONT, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO R. H. BEAUMONT COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

SCREEN.

Application filed May 1, 1923. Serial No. 635,953.

To all whom it may concern:

Be it known that I, ROBERT H. BEAUMONT, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented
5 a Screen, of which the following is a specification.

My invention relates to vibrating screens, having particular relation to such screens as are adapted to separate coal.

10 An important object of my invention is to provide a balanced vibrating screen, wherein the usual undesirable mechanical vibration of the supporting structure for the screen, incident to the operation of the
15 screen, is substantially eliminated.

Another object of my invention is to provide an adjustable spring support for resiliently mounting the movable screen members which is characterized by its simplicity
20 of design and construction.

According to my invention, I provide a combination comprising a pair of superposed horizontally extending screens which are mounted on inclined spring supports
25 having adjusting means for varying the force of the springs to correspondingly vary the natural period of vibration of the screens. A crank-shaft mechanism having connecting rods secured to the screens is
30 employed for driving the same, the connecting rods being positioned substantially at right angles to the supporting spring members so that the screen may be given vertical as well as horizontal components of motion.

35 My invention is further characterized by the discovery that the undesirable mechanical vibration, incident to the operation of the foregoing apparatus, may be substantially avoided by establishing a relation between the vibrational frequency of the screen and that of the impulses applied thereto by the driving mechanism, all as will appear more fully hereinafter.

45 With these and other objects and applications in view, my invention further consists in the details of construction and operation hereinafter described and claimed and illustrated in the accompanying drawing, wherein—

50 Fig. 1 is a side elevational view of one

embodiment of my invention, a portion of the spring supporting structure being shown in section;

Fig. 2 is a top plan view of the structure of Fig. 1 with a portion of the upper screen
55 broken away;

Fig. 3 is an end elevational view of the structure of the preceding figures;

Fig. 4 is an enlarged transverse sectional view of the spring supporting structure
60 taken along the line IV—IV of Fig. 1; and

Fig. 5 is an enlarged longitudinal sectional fragmentary view taken on the line V—V of Fig. 4.

In the illustrated form of embodiment of
65 my invention shown in the drawing, a pair of superposed horizontally extending screen members 1 and 2 comprise perforated base portions 3 and 4 and opposite side wall portions 5 and 6, respectively. The screen
70 members 1 and 2 are resiliently supported from the opposite side portions 5, 6 and 7, 8 thereof by inclined spring legs 9, 10 and 11, 12, respectively, which are mounted on a pair of supporting side members 13 and
75 14. The spring legs comprise a plurality of flat strips of flexible steel or other resilient material forming a laminated structure which increases in thickness from the center to the ends thereof. The upper ends of the
80 flexible strips are rigidly positioned intermediate jaw plates 15 and 16 of bracket members 17 which are mounted on the side portions of the screen members 1 and 2, respectively.
85

The several spring members supporting the screens 1 and 2 extend downwardly from the bracket members 17 in an inclined direction toward the supporting side members 13 and 14 and are secured at their lower ends
90 to upwardly extending inclined flange members 18 and 19 thereof. The upper end portions of the flanges 18 and 19 are provided with threaded perforations to receive adjusting screws 22 having corresponding ends
95 thereof in engagement with the flat sides of the spring supporting legs, whereby the force of the spring legs may be varied to adjust the natural vibrational frequency of the screen members 1 and 2 to a desired
100

value, all as will be explained more fully hereinafter.

The screens 1 and 2 may be given a longitudinal reciprocal motion by means of connecting rods 23 and 24 which have their opposite ends connected, respectively, to bearing rods 25 and 26 on the ends of the screens 1 and 2, and to oppositely disposed cranks 27 and 28 of a crank-shaft 29. Experiment has shown that the hereindescribed construction, wherein the screening apparatus is divided into two parts and the cranks of the driving crank-shaft mechanism disposed 180° apart, effects a material reduction in the undesirable mechanical vibration incident to the operation of the screen apparatus. The opposite ends of the crank-shaft 29 may be supported in bearings 31 and 32, formed in pedestals 33 and 34 constituting extensions of said side members 13 and 14. One end of the crank-shaft 29 may be extended beyond the bearing 31 to provide a support for a fly wheel 35. The other end of the crank-shaft 29 is similarly extended to provide a support for a gear wheel 36 which is operatively associated with a source of energy (not shown).

When power is supplied to the crank-shaft mechanism and the connecting rods 23 and 24, which are mounted substantially at right angles to the supporting spring legs, oppositely reciprocated, the screen members 1 and 2 are correspondingly reciprocated in a direction which is inclined to the horizontal. The vertical component of this motion serves the double purpose of preventing the material in the screens from locking or blinding the screen holes, and also imparts a so-called "jig action" which drives the larger and heavier particles to the surface of the mass and allows the finer particles to pass through the mesh of the screen. The horizontal component of the screen motion serves to propel the material forward on the screen. For purposes of illustration, a hopper 37 is shown at the forward end of the screens for receiving the over-size material, while a hopper 38 is shown beneath the screens 1 and 2 for receiving the finer material directly passing through the same.

As hereinbefore stated, I have found that if the screen apparatus is so designed that its natural period of vibration corresponds with the speed at which it is driven by the crank-shaft mechanism, substantially all the undesirable mechanical vibration incident to the reciprocal movement of the screen members 1 and 2 is avoided. Accordingly, in operation, the force of the supporting spring legs is adjusted by the screw member 22 to the point where the vibration of the screen members resulting from a sudden force corresponds with the speed at which they are driven.

While I have shown only one form of embodiment of my invention, for the purpose of describing the same and illustrating the underlying principles of construction and operation, it is apparent that various changes and modifications may be made therein without departing from the spirit of my invention, I desire, therefore, that only such limitations shall be imposed thereon as are indicated in the appended claims or as are demanded by the prior art.

I claim:

1. In combination, a screen member, a base member, means for resiliently mounting one of said members on the other comprising a bracket member rigidly secured to said screen member, a spring member having one end secured to said bracket member and extending toward said base member, said last-mentioned member having an upwardly extending flange portion, the remaining end of said spring member being secured to said flange portion, and adjusting means carried by said base member co-operating with said spring member, whereby the force of the spring member may be varied.

2. In combination, a screen member, a supporting member having flange portion, a spring member having opposite ends, a bracket mounted on said screen member and rigidly secured to one end of said spring member, the remaining end of said spring member being rigidly secured to said flange portion, and an adjustable screw member also carried by said flange portion for varying the force of said spring member, whereby the vibrational frequency of said screen member may be adjusted to a desired value.

3. In combination, a screen member having opposite sides, a pair of spring members having their upper ends secured respectively to said opposite sides, a pair of supporting members positioned on opposite sides of said screen member and provided with flange portions, means for securing the lower ends of said spring members to the flange portions of adjacent supporting members, and means also carried by said supporting members for varying the tension of the spring members, whereby the vibrational frequency of said screen member may be adjusted to a desired value.

4. In combination, a screen having opposite sides, a pair of springs respectively secured to said opposite sides, a pair of supporting members positioned on opposite sides of said screen and provided with flange portions, means for respectively securing said springs to the flange portions of adjacent supporting members, means also carried by said supporting members for varying the tension of said springs, a second screen and driving mechanism comprising a driving

shaft and connecting rods adapted to be oppositely reciprocated by said shaft and operatively associated, respectively, with said screens, said side members being 5 formed to constitute bearing pedestals for said driving shaft. member provided with a flange, a spring secured to said screen and said flange, and means extending between said flange and 10 said spring for adjusting the force of the latter.

5. In combination, a screen, a supporting

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