No. 672,420. Patented Apr. 16, 1901.

A. L. LE GRAND.

STROKE CUSHION ATTACHMENT FOR SHAKING SCREENS.

(No Model.) (Application filed May 10, 1900.)

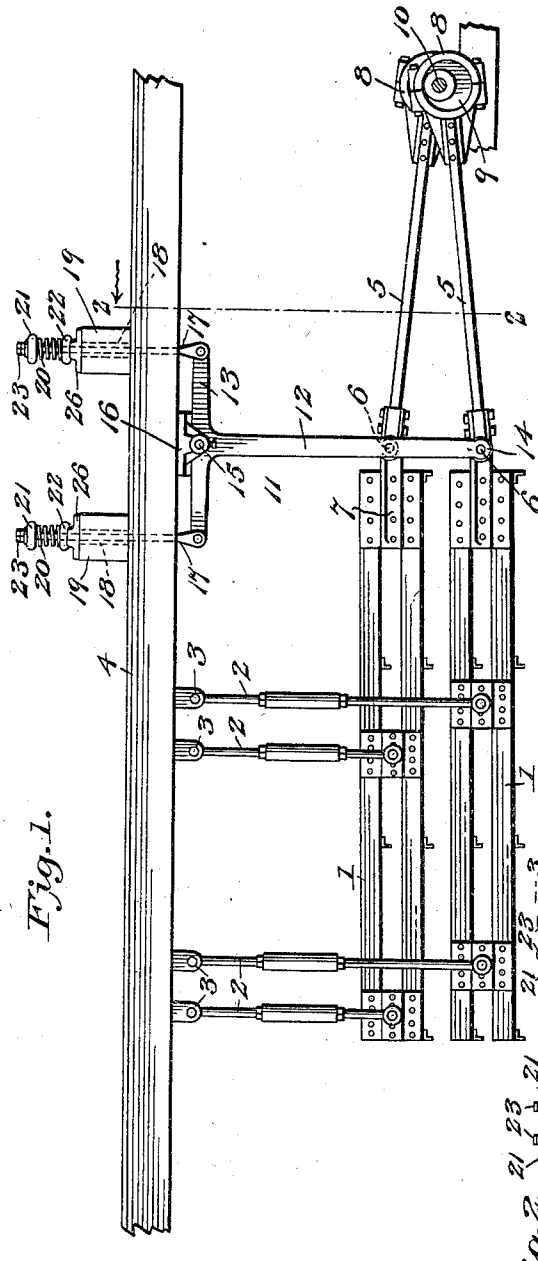


Fig. 1.

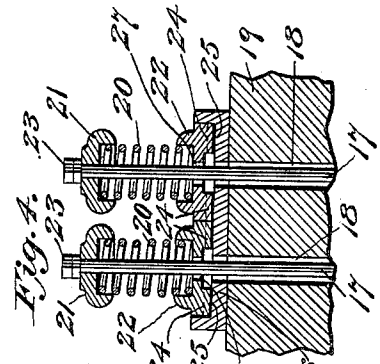


Fig. 4.

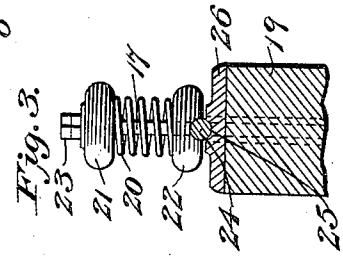


Fig. 3.

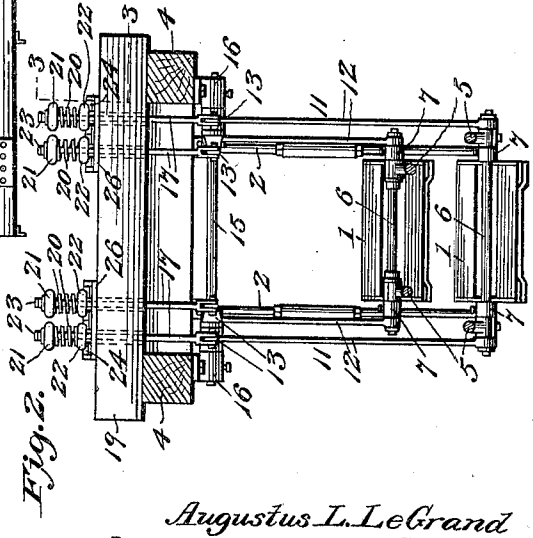


Fig. 2.

Witnesses
Edwin G. McKee
D. C. Hallauer

Augustus L. LeGrand
Inventor
By
E. G. Siggers
Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

AUGUSTUS L. LE GRAND, OF WEST PITTSTON, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO JOHN N. THOMAS, OF SAME PLACE.

STROKE-CUSHION ATTACHMENT FOR SHAKING-SCREENS.

SPECIFICATION forming part of Letters Patent No. 672,420, dated April 16, 1901.

Application filed May 10, 1900. Serial No. 16,205. (No model.)

To all whom it may concern:

Be it known that I, AUGUSTUS L. LE GRAND, a citizen of the United States, residing at West Pittston, in the county of Luzerne and State of Pennsylvania, have invented a new and useful Stroke-Cushion Attachment for Shaking-Screens, of which the following is a specification.

In the separating and grading apparatus used in and about collieries there are usually employed what are commonly known in the art as "shaking-screens." These screens are arranged in tiers in successive order, according to the mesh of the screen, to provide for grading or assorting the coal into different sizes, and said screens are usually of great weight and length. Ordinarily the momentum thereof is necessarily so great as to transmit a violent jar to the driving or operating mechanism at the end of each stroke, thus rendering the motion of the screens not only jerky, but also causing a severe vibration of all the parts of the machinery, and especially the driving or operating mechanism. This occasions frequent breakages and constant impairment of the driving mechanism, thus entailing frequent repairs and adjustment of the different parts of the machinery associated with the screens.

Screens of the character referred to are used in different relations, but those to which the invention is specially applicable constitute a part of the grading apparatus for separating the coal into its different sizes or grades; and the main and primary object of the invention is to provide novel and efficient means for not only rendering the motion of the shaking-screen uniform and steady, but at the same time providing an effective cushion to completely absorb the momentum of the screen at the ends of its strokes, thus entirely relieving the driving mechanism from jar and strain.

To this end the invention consists in the novel construction and arrangement of cushioning attachment hereinafter more fully described, illustrated, and claimed.

The essential features of the attachment to insure a cushioning of the screens at the ends of the strokes thereof are necessarily susceptible to some modification without departing from the spirit or principle of the invention; but the preferred arrangement thereof is shown in the accompanying drawings, in which—

Figure 1 is a side view of a pair of shaking coal-screens fitted with the attachment contemplated by the present invention. Fig. 2 is a sectional end elevation on the line 2 2 of Fig. 1. Fig. 3 is a detail sectional view on the line 3 3 of Fig. 2, showing more plainly the rocker-support for the individual cushioning-springs. Fig. 4 is a sectional view through a pair of the individual cushioning-springs, showing the mounting of the rocker-supports therefor within a single bearing-plate.

Like numerals of reference designate corresponding parts in the several figures of the drawings.

As already explained, the invention is necessarily applicable for use in connection with the shaking element of a separating or grading apparatus, but is especially designed for use in connection with the ordinary longitudinally vibrating or shaking screens used in a separating or grading apparatus for coal, so for illustrative purposes the invention is shown in the drawings as applied to screens of this character.

Referring to the drawings, the numerals 1 1 designate a pair of longitudinally vibrating or shaking screens of the ordinary type, arranged one above the other and constituting a part of the usual tier or succession of screens employed in coal-grading apparatus; but inasmuch as the manner of hanging and operating all of the screens is the same it is deemed sufficient to illustrate a pair of these screens. The said screens are fitted with the usual sieves, and each of the same is pivotally suspended from a plurality of swinging hanger-links 2, pivotally connected at their lower ends with the screen-frames, at the sides thereof, and pivotally attached at their upper ends, as at 3, to a supporting-beam 4 or other fixed point of support, and each of the shaking-screens 1 is designed to have a longitudinally reciprocating or vibrating motion imparted thereto by means of the pitmen 5, which are pivotally connected with one end

of the screen through the medium of a coupling-rod 6, mounted in suitable brackets 7, fitted to the screen frame or body. The other ends of the pitmen 5 for each shaking-screen are carried by the eccentric-straps 8 of the eccentrics 9, mounted on a driving-shaft 10, which is usually common to all of the screens; but the eccentrics are necessarily arranged in different relations to provide for imparting opposite movements to adjacent screens. These features constitute common appurtenances of the ordinary shaking-screens, and in carrying out the present invention there is associated with each screen a stroke-cushioning attachment, which preferably includes a pair of oscillating levers 11, suitably connected with the same end of the screen. The pair of oscillating levers for each screen are preferably of a T shape, consisting of the straight stems 12 and the cross-arms 13 at one end of the said stems. The said straight stems 12 of each pair of oscillating levers are pivotally connected at their lower ends, as at 14, with one end of the shaking-screen with which they are associated, said pivotal connections 14 being preferably effected by fitting the lower ends of the levers directly upon the extremities of the coupling-rod 6 for the screen.

The oscillating levers 11 of each pair for each shaking-screen are mounted at their upper ends upon a supporting-shaft 15, whose extremities are arranged in the brackets 16, fitted to the supporting-beam 4 or other fixed point of attachment. The said shaft 15 constitutes a pivotal support for the said levers 11, whereby the same may be readily rocked thereon. The cross-arm 13, at the upper end of each oscillating lever 11, projects at equal distances beyond each side of the main stem of the lever and has pivotally connected to its opposite extremities oppositely-arranged motion-transmitting stems 17, extending upward loosely through openings 18 in a cross-beam or support 19 and having coiled upon their upper end portions, above said beam or support, normally-compressed cushioning-springs 20, which are interposed between the socketed holding-caps 21 and 22, also arranged upon the stems. While the stems 17 constitute motion-transmitting elements, it will be understood that the motion-transmitting device proper consists not only of the stems, but also of the oscillating levers 11, carrying the same. The upper extremities of the motion-transmitting stems 17 are threaded to receive thereon the adjusting-nuts 23, working above the upper holding-caps 21 to provide for regulating the tension of the springs 20, and the lower socketed holding-caps 22 constitute rocker heads or supports for the lower ends of the springs, each of the said rocker-supports 22 not only having a socket portion to receive therein the lower end of the spring associated therewith, but also provided at its under side with oppositely-arranged rounded journal-lugs 24, which are adapted to turn in the correspondingly-shaped bearing-seats 25, formed in the base of the flanged bearing-plate 26, mounted on top of the cross-beam or support 19. The openings 27 through the lower holding-caps or rocker-supports 22 are larger than the stems 17 passing therethrough to permit of the rocking movement of the said supports 22, and at this point it will be observed that to provide for a compact arrangement of the stroke-cushioning attachments for adjacent screens the said attachments are arranged side by side and the springs for adjacent screens are grouped in pairs, so that the lower rocker-supports 22 therefor may be arranged side by side, so as to work within a single bearing plate or casting 26, as plainly illustrated in Figs. 2 and 4 of the drawings.

In the operation of the screens by reason of the T-shaped construction of the oscillating levers 11 the motion of the screens is transmitted directly to the cushions or springs associated with both ends of the cross-arms of the levers, thus insuring a steady and uniform movement of the screens, besides providing for the complete absorption of the vibration or strain occasioned by the momentum of the screens at the ends of the strokes thereof, thus entirely relieving the driving mechanism from the jar or strain.

It will be further observed that the cushioning attachment is itself relieved from undue strain by reason of providing the rocker-supports 22 for the cushioning-springs, so that they will accommodate themselves to any lateral thrust which may be imposed thereon.

The invention has been represented in its simplest aspect; but it will be obvious that the T-shaped levers may be braced or suitably strengthened in any desired manner, and, in fact, any suitable changes in the form, proportion, and minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

Having thus described the invention, what is claimed as new, and desired to be secured by Letters Patent, is—

1. The combination with the shaking-screen, and the swinging supports and driving mechanism therefor, of a cushioning-spring for the screen having an individual rocker-support at one end independent of the screen-supports, and a motion-transmitting device having a member connected with the spring opposite its individual rocker-support, said motion-transmitting device being also operatively connected to the screen.

2. The combination with the shaking-screen and the driving mechanism therefor, of separate cushioning devices supported independent of the screen and spaced apart, and a motion-transmitting device having a single connection with the screen and separate connections respectively with the individual cushioning devices.

3. The combination with the shaking-

screen, and the supports and driving mechanism therefor, of normally-compressed stroke-cushioning springs supported independently of the screen and its support, and arranged in spaced parallel relation, and means for transmitting the motion of the screen in both movements thereof to said springs, and acting simultaneously in opposite directions on said springs.

4. The combination with the shaking-screen, and means for reciprocating the same, of separate cushioning devices supported independent of the screen and spaced apart, and a single oscillating motion-transmitting element having a single connection with the screen and separate connections respectively with the individual cushioning devices.

5. The combination with the shaking-screen, and means for reciprocating the same, of separate normally-compressed cushioning-springs supported independent of the screen and spaced apart in parallel relation, and a single oscillating motion-transmitting element having a single connection with the screen and separate connections respectively with the individual cushioning-springs.

6. The combination with the shaking-screen and means for reciprocating the same, of oppositely-arranged cushioning devices, an oscillatory lever operatively connected with the shaking-screen, and motion-transmitting elements connected with said lever at opposite sides of its fulcrum, and also connected with said cushioning devices, substantially as set forth.

7. The combination with the shaking-screen and means for reciprocating the same, of an oscillating lever having a cross-arm and connected with the shaking-screen, motion-transmitting stems connected respectively with opposite ends of the cross-arm of the lever, and normally-compressed cushioning-springs connected with said stems.

8. The combination with the shaking-screen, and means for reciprocating the same, of an upright cushioning-spring having an individual rocker-support at one end, entirely independent of the support for the shaking-screen, and a motion-transmitting element having an operative connection with the opposite end of the spring and also with the shaking-screen.

9. The combination with the shaking-screen and means for reciprocating the same, of normally-compressed cushioning devices having rocker-supports for their lower ends, a T-shaped oscillating lever having the main stem thereof connected with the shaking-screen, and motion-transmitting stems pivotally connected respectively to opposite ends of the cross-arm, and also connected with said springs, substantially as set forth.

10. The combination with the shaking-screen and means for reciprocating the same, of stationary bearing-plates having bearing-seats therein, normally-compressed cushioning-springs, rocker-supports for the lower ends of the springs, said rocker-supports being provided with journal-lugs mounted in said bearing-seats, a lever pivotally connected with the screen and provided with a cross-arm, and motion-transmitting stems connected respectively with opposite ends of said cross-arm and also operatively connected with said springs.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

AUGUSTUS L. LE GRAND.

Witnesses:

SAMUEL C. WEBB,

HENRY GAUPP.