(No Model.) 2 Sheets—Sheet 1.

E. B. COXE.

CONVEYER.

No. 481,106. Patented Aug. 16, 1892.

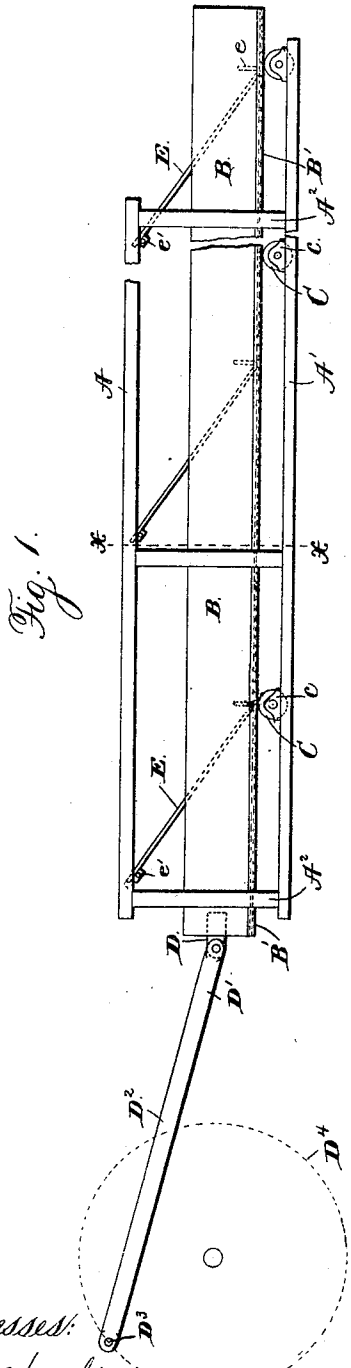

Fig. 1.

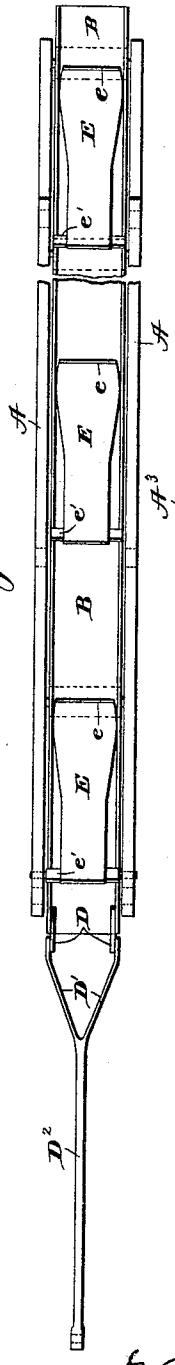

Fig. 2.

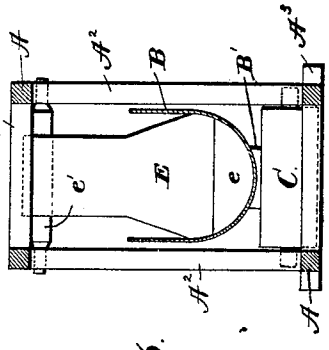

Fig. 3.

Witnesses:
Jas. E. Hutchinson
Henry C. Hazard.

Inventor.
E. B. Coxe, by
Prindle and Russell his Attys.

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

(No Model.) 2 Sheets—Sheet 2.

E. B. COXE.

CONVEYER.

No. 481,106. Patented Aug. 16, 1892.

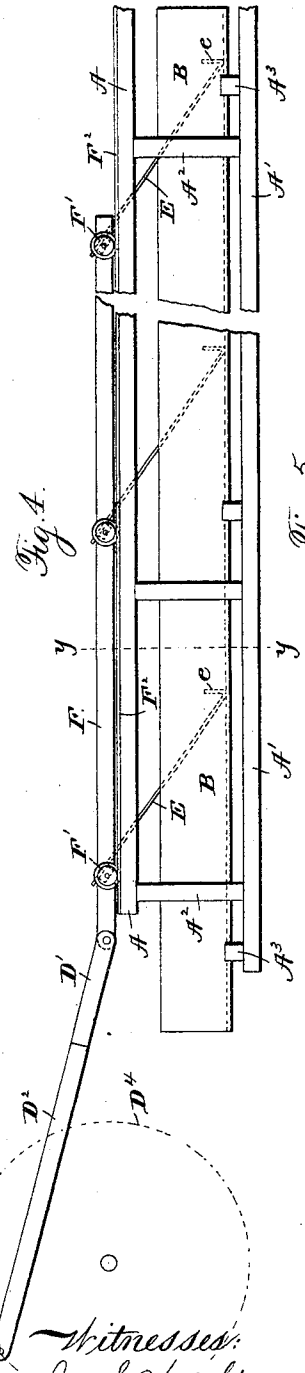

Fig. 4.

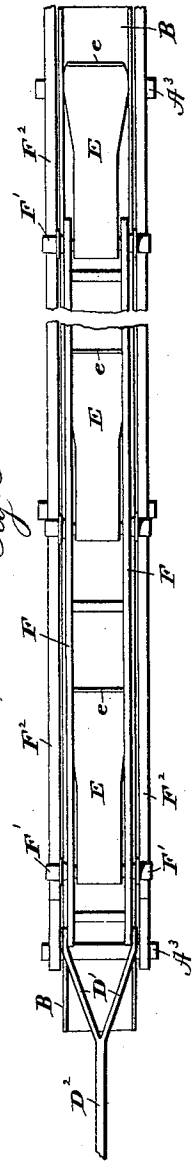

Fig. 5.

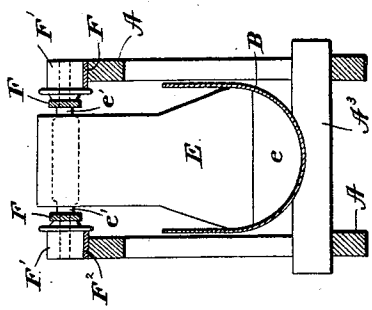

Fig. 6.

Witnesses:
Jas. E. Hutchinson
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E. B. Coxe by
Pindle and Russell his Attys

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

UNITED STATES PATENT OFFICE.

ECKLEY B. COXE, OF DRIFTON, PENNSYLVANIA.

CONVEYER.

SPECIFICATION forming part of Letters Patent No. 481,106, dated August 16, 1892.

Application filed March 7, 1891. Renewed July 7, 1892. Serial No. 439,196. (No model.)

To all whom it may concern:

Be it known that I, ECKLEY B. COXE, of Drifton, in the county of Luzerne, and in the State of Pennsylvania, have invented certain new and useful Improvements in Conveyers; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 shows a view of one form of my conveyer in side elevation; Fig. 2, a plan view of the same; Fig. 3, a view of a section on line *x x* of Fig. 1; Fig. 4, a view of another form of the apparatus in side elevation; Fig. 5, a plan view of such other form; Fig. 6, a view of a section on line *y y* of Fig. 4.

Letters of like name and kind refer to like parts in each of the figures.

The object of my invention is to provide an improved apparatus for conveying coal, slate, chips, sawdust, shavings, stones, and other materials; and to this end my invention consists of the conveyer and the parts thereof, as hereinafter specified.

In the drawings the frame for supporting the various parts of the apparatus is shown as consisting, essentially, of the upper and lower pairs of longitudinal side bars A A and A′ A′, respectively, uprights A^2 A^2, of any desired number and construction, supporting the upper side bars from the corresponding lower ones, and transverse brace bars or beams A^3 A^3, also of any suitable number and shape, connecting the corresponding side bars of the two pairs. This special form of frame is desirable, but not necessary, and can be changed without departure from my invention. Within the frame, between its sides, is the longitudinal trough B, preferably constructed of sheet metal bent into the proper form.

Where the distance through which the material is to be conveyed is so great that a single sheet of metal long enough to make the trough cannot be readily obtained, I can use a series of sheets, each bent into trough shape, arranged so that they overlap each other like shingles in the direction in which the material is to be conveyed. Such sheets can be riveted or otherwise fastened together, as desired. On the under side of the trough in the apparatus shown in Figs. 1, 2, and 3 is riveted a flat bearing-piece B′, which can be formed of a single plate or a series of plates arranged end to end adapted to run upon the series of rollers C C, journaled in suitable bearings *c c* on the frame.

At one end of the trough are the arms D D attached to the inner face of the trough sides, and pivotally connected with such arms are ends of the fork-arms D′ D′ on the pitman D^2, which at its outer end engages the crank-pin D^3 on the crank-wheel D^4. The arms D D are attached, as shown, to the inner faces of the trough sides to economize in the space necessary between the sides of the frame, and can therefore be otherwise arranged when such economy is not desired. The crank-wheel D^4 is to be connected with and driven by any desired form of motor or source of power, and usually its crank-pin is so situated as to give the pitman-rod D^2 a throw of five or six feet, though I do not limit myself to such arrangement. The pitman throw can obviously be made shorter or longer, as desired.

Pivoted or hinged to the upper bars of the frame are the pushers E E, which, preferably arranged five feet apart, extend downward and forward with reference to the direction in which the material is to be conveyed at about an angle of thirty degrees, and have their lower ends, substantially fitting the trough, provided with upwardly-turned portions *e e*, adapted to present abrupt surfaces turned toward the discharge end of the trough. As shown best in Fig. 3, each pusher has the narrower upper portion attached to a rock-shaft *e′*, journaled at its opposite ends in suitable bearings on the frame, and the larger lower part which extends from side to side of the trough and has its edges curved to fit the curvature of the trough. The upturned part *e* also has its sides adapted to fit the trough when the pusher end rests upon the bottom of the latter.

With the construction and arrangement of parts described as the crank-wheel is turned the trough will be caused to reciprocate upon its supporting-rollers C C, which, being well distributed along under the bearing-plate on the trough, will make the reciprocation an easy one. If now the crank-wheel be revolved so as to move the trough forward and back through a distance of five feet and the

coal, slate, stone, or other material be fed into the trough at its rear end, the forward travel of the trough will carry a portion of such material under the first pusher, which will yield to allow it to pass. Upon the trough's return movement the pusher will, with its abrupt upturned part, prevent the material from traveling back. The result is that as the trough moves the material will be caused to advance therein. A subsequent forward movement of the trough carries the material previously retained by the first pusher under the second one, which, as the trough moves back again, is operated upon by the second pusher just as it was by the first one. As the reciprocations of the trough are kept up the material will be caused to pass along in and fill the latter and issue from its discharge end. Each time that the trough travels rearward the mass of material contained within it, the different portions of which are held from moving back with the trough, is in effect advanced five feet within the latter. Twenty reciprocations would then cause a forward movement of the material being conveyed through a distance of a hundred feet.

With the trough supported as shown and described and the numerous pushers acting at the same time upon different small portions of the entire amount of material within the trough, I have found that coal, slate, stone, or other substance broken into pieces can be easily moved a hundred feet or more without the necessity of any great power to drive the crank-wheel or undue strain on the parts of the apparatus.

In Figs. 4, 5, and 6 I show another form of my conveyer, which can be used, if desired, instead of that already described. It has a frame substantially like that shown in Figs. 1 and 2; but the trough B is a fixed one and not supported upon rollers, so as to be reciprocable, while the pushers E E, of substantially the same shape as those already described, are hinged to a reciprocating carriage F, which has supporting-wheels F′ F′ running upon tracks on the upper side frame-bars A A. The rock-shafts e', to which the respective pushers are attached, are journaled in the sides of this carriage just as the other ones are in the said bars A A of the frame.

The form of carriage which I show is a single one, consisting, essentially, of parallel longitudinal pieces connected by suitable cross bars or braces; but I do not limit myself to such construction.

The wheels F′ F′, journaled on suitable axles, are preferably provided with flanges to keep them in place on the strips or tracks F^2 F^2, fastened upon the upper faces of beams A A.

The driving-pitman D^2 is shown as having its fork-arms D′ D′ pivotally connected with the ends of the side bars of the carriage at the end of the latter nearest the receiving end of the trough, and this is the arrangement which I prefer in this form of my apparatus, though I do not intend to limit myself thereto. Instead, the pitman operated by the crank-wheel D^4 could be connected with the carriage at any other point of the same and in any desired way.

The operation of this form of conveyer, with its pushers extending downward and forward into the trough, preferably at an angle of thirty degrees, as in the other construction of apparatus hereinbefore described, is briefly as follows: The carriage carrying the pushers is reciprocated by the crank-wheel and pitman, so that said pushers are moved toward and from the discharge end of the trough. As they travel forward, each one pushes on with its upturned part *e* its particular portion of the material within the trough. Having moved such portion to the end of its throw, the pusher is drawn back by the return of the carriage, rides up over that part of the material just advanced by the next pusher behind it, and then as the carriage moves forward again engages and pushes such part on within the trough. The result is, as in the case of the other form of conveyer, that as the reciprocations of the carriage are continued the material being acted upon will be moved along to and out of the discharge end of the trough.

It will be observed that in both forms of conveyer the pushers are long enough to have their lower ends resting upon or supported by the trough, which limits their downward swing and consequently holds them from yielding as they engage the coal, slate, or other material being conveyed during the rearward travel of the trough or forward movement of the carrier supporting the pushers when such carrier is used with the stationary trough. By this arrangement I prevent all chance of strain or breakage which would exist were it attempted to support the hinged pushers against backward movement, as they engage the coal by stops or other devices engaging them at or near their pivotal portions.

Either form of my apparatus is easily and cheaply made and affords a simple and efficient means for conveying coal, slate, shavings, sawdust, rock, or other material to a considerable distance in a horizontal direction, which will not be so costly or difficult to run and keep in order as is the endless-belt form of carrier heretofore used for the same purpose.

Having thus described my invention, what I claim is—

1. In a conveyer for coal, slate, stone, and other material, in combination with the two principal parts, consisting of a trough and a longitudinal series of pushers hinged to a suitable support and extending downward and forward from the same into the trough and having their lower ends adapted to rest upon the trough-bottom, so that the latter forms the stop to limit the swing of the push-

ers upon their pivots, means for reciprocating one of said parts with reference to the other, substantially as and for the purpose specified.

2. In a conveyer for coal, slate, stone, and other material, in combination with the movable trough and means for reciprocating it, a series of pushers hinged to a suitable support extending at an angle forward and downward into the trough and having their lower ends adapted to rest upon the trough-bottom, so that the latter acts as a stop to limit their swing upon their pivots, said ends being provided with upturned portions presenting abrupt faces toward the discharge end of the trough, substantially as and for the purpose described.

In testimony that I claim the foregoing I have hereunto set my hand this 24th day of February, 1891.

ECKLEY B. COXE.

Witnesses:
JOHN ROHLAND,
SAMUEL SALMON.