H. W. CALDWELL.

Grain-Conveyer.

No. 164,715 Patented June 22, 1875.

Fig 5.

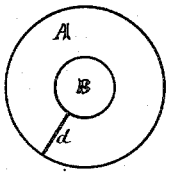


Fig 1.

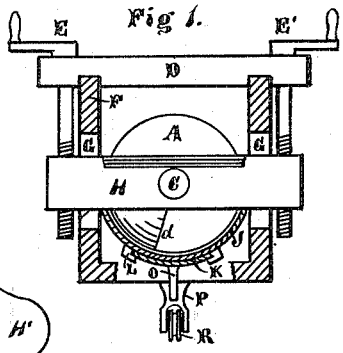


Fig 6

Fig 4.

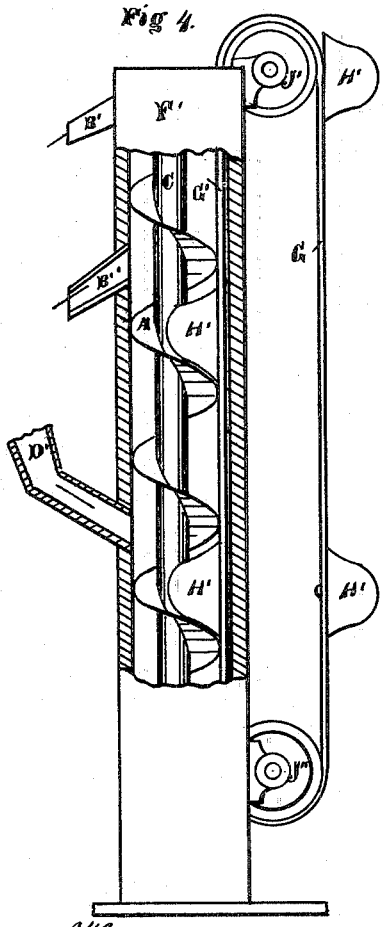


Fig 2.

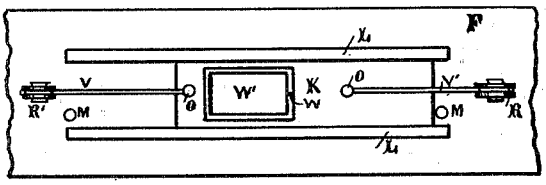


Fig 7

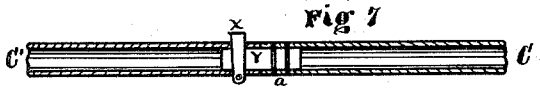
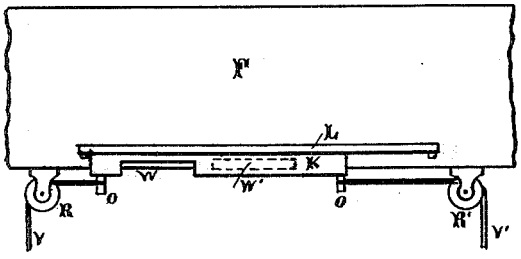


Fig 3.



Witnesses;

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UNITED STATES PATENT OFFICE.

HENRY W. CALDWELL, OF INDIANAPOLIS, INDIANA.

IMPROVEMENT IN GRAIN-CONVEYERS.

Specification forming part of Letters Patent No. **164,715**, dated June 22, 1875; application filed April 13, 1875.

To all whom it may concern:

Be it known that I, HENRY W. CALDWELL, of Indianapolis, county of Marion, State of Indiana, have invented an Improvement in Conveyers, of which the following is a specification:

The object of my invention is to use wrought-iron pipe for the shaft of the conveyer, on which is secured in any manner the flights, which are cut to a peculiar pattern, so as to fit the shaft with any desired pitch, and form a continuous screw. I also construct the gates of the delivery-openings of the conveyer-box in such a manner that any one of them can be opened and closed by means of cords properly arranged. I also have a peculiar manner of coupling my pipe-shafts together, so that any number of sections can be worked at once. I have also arranged the conveyer in an upright position, and inclose it in a tight box lined with iron to form an elevator, in connection with a set of followers worked on an endless chain or belt, which propels the grain upward as the screw revolves, and conveys to any desired height.

Figure 1 represents an end view of the conveyer-box, showing the arrangement of the adjustable bearings, and also an end view of the delivery-gate. Fig. 2 is a view of the bottom of the conveyer-box, showing a plan of the delivery-gate. Fig. 3 is a side elevation of Fig. 2. Fig. 4 represents my improved hollow-shaft conveyer, set perpendicular to form an elevator, and also represents the followers attached to the endless chain or belt. Fig. 5 is a plan view of the pattern of the conveyer-flight. Fig. 6 is a view of the flight as cut by the pattern in Fig. 5, and stretched out to the given pitch. Fig. 7 is a sectional view of the hollow shaft, and shows the manner of coupling.

In the drawings, A represents the flights, which are cut to a peculiar pattern, as in Fig. 5. To enable others to cut these flights to fit any desired size shaft, at any given pitch, it is necessary to resort to the following geometrical proposition, that the hole cut will when drawn fit the pitch: First, get the circumference of the shaft by multiplying the diameter by 3.1416; also, the pitch desired. Then square the circumference, square the pitch, and add these products together. The square root of this product will give the helix. Divide this product by 3.1416, and this product gives the diameter to cut the hole that will fit the shaft of the given diameter at the given pitch when stretched to fit the shaft, where it can be secured by soldering, or otherwise. The natural tendency of a flight cut to this pattern is to seek the shaft or center at any point of pressure, thus preventing the possibility of the flights working loose or breaking off by pressing grain. If greater strength is required, especially where the flights are very wide, a groove or thread can be turned in the shaft, as thread of screw of the desired pitch, and the flights securely fastened therein. At the extreme end of the sections we can rivet the flight through the pipe, so as to prevent any tearing loose at the point where the greatest strain comes. D represents the top bar of the adjustable hanger, and extends across the top of the conveyer-box. At each end of the bar D is a hole, in which the adjusting-screws E E are inserted. At each side of the conveyer-box, immediately under the bar D, is mortised the holes G G, in which the bearing-bar H is inserted, with the shaft C shown in the bearing. At each end of the bar H the screws E E′ work in proper nuts, all arranged so as to adjust the shaft C of the conveyer. J represents the sheet-iron bottom of the conveyer-box, and is curved so as to conform to the shape of the conveyer, and is provided at several places with delivery-holes W′, so as to allow grain to be deposited in any bin or elevator wanted. Under each of these openings W′ is fitted a slide, K, which works in guides L L. The slide K also has a hole, W, that corresponds with the hole W′ in the bottom of the conveyer-box. The slide K is made long enough to cover the hole W′ when shut, and to bring the two holes W and W′ opposite each other when open. The slide K is worked by means of cords V V′, working over pulleys R R′, so that it is not necessary to go to the slides when they are wanted to be opened or closed. The shaft C is wrought-iron pipe, and each section is coupled together by means of a plug, Y, Fig. 7, which is securely fastened in one end of each section, and the other end of the plug Y forms a bearing for the next section of pipe, which can revolve on the plug-bearing, if desiring to

allow the balance of the shaft to remain idle; or the sections can be coupled together with the key *x*, as shown.

The use of the hollow shaft is of great value, it being more perfect, much lighter, stronger, and not subject to the warp or swag incident to the wooden shaft, and requires less power to drive it than the wooden or other shafts. The capacity to carry grain is greatly increased, while the size of the conveyer-box is diminished.

In Fig. 4 I have represented my improved conveyer in a perpendicular position, working in a closed box lined with iron, for the purpose of elevating grain.

The pulleys J′ J″ at the top and bottom of the elevator are for the endless chain or belt G′ to work over. On this chain or belt are securely fastened the followers H′ H′, which enter the elevator-box at the bottom, and as the conveyer-screw revolves these followers are carried up between the flights, and all grain that is admitted to the elevator through the spout D′ is elevated to the top, or tapped at any desired place, as at B′ B″. There are several followers, H′ H′, secured to the chain or belt G′, so that there are several of them always in the elevator at once.

I do not claim a conveyer the flights of which are cast or on a hollow hub to fit on a wrought-iron shaft.

What I do claim as new, and which I wish to secure Letters Patent, is—

1. The conveyer-screw arranged in an upright position in a tight box, in combination with the followers H′ H′, operated substantially as specified.

2. The flights A, constructed and applied to the hollow shaft C, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY W. CALDWELL.

Witnesses:

E. O. FRINK,

S. C. FRINK.