C. PEDERSEN.

CONVEYING DEVICE.

APPLICATION FILED MAR. 4, 1920.

1,343,373.

Patented June 15, 1920.

2 SHEETS—SHEET 1.

Fig 1.

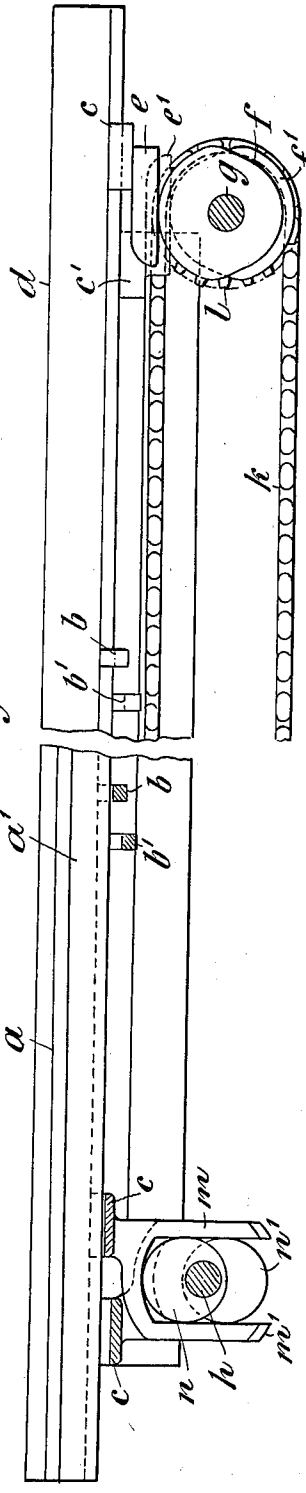


Fig 3

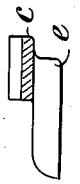


Fig. 2.

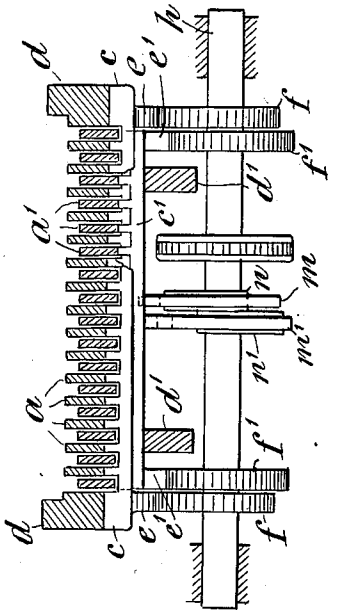
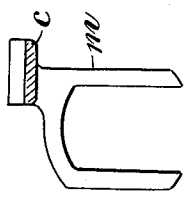


Fig 4



Inventor:
Carsten Pedersen
By Lawrence Langner
Attorney

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2 SHEETS—SHEET 2.

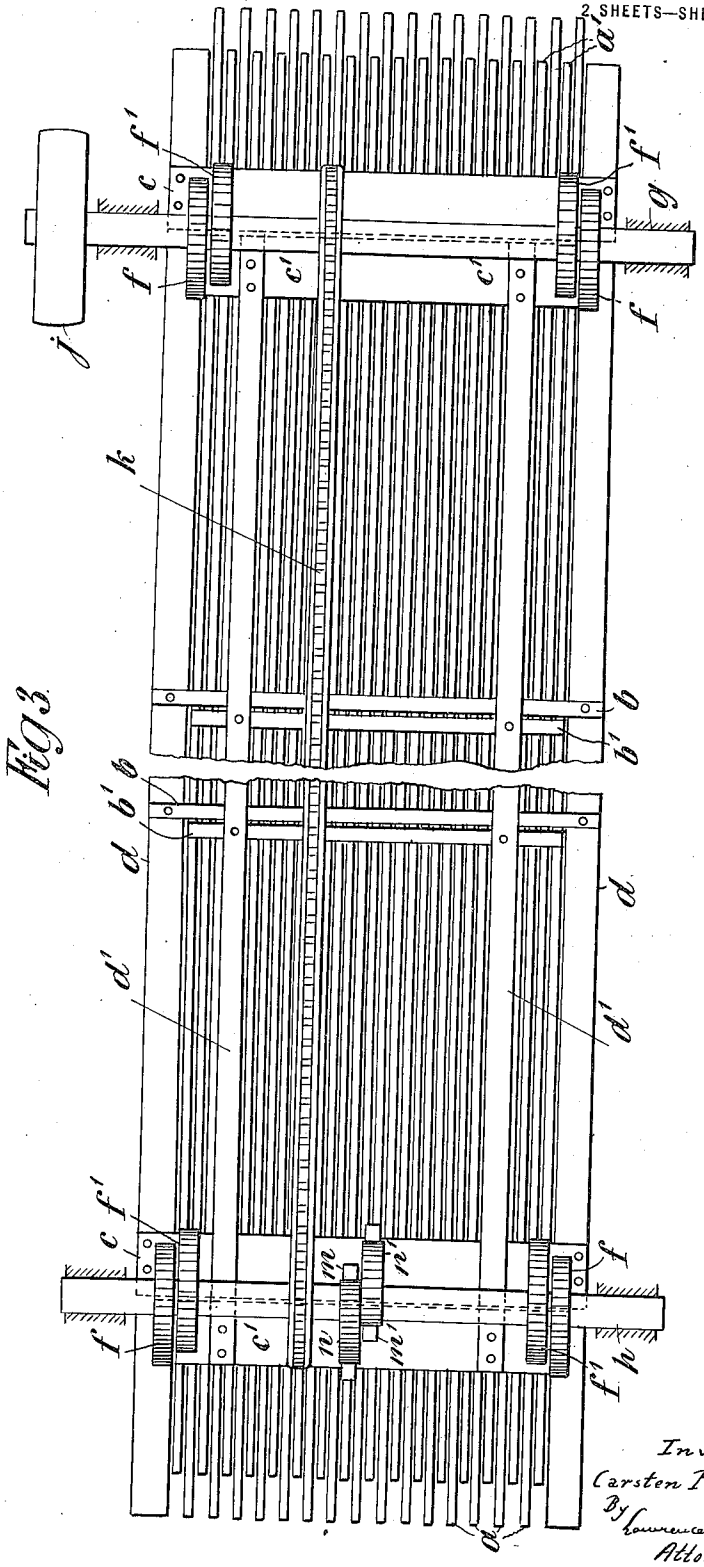

Fig 3.

Inventor:
Carsten Pedersen.
By Lawrence Langner
Attorney.

UNITED STATES PATENT OFFICE.

CARSTEN PEDERSEN, OF COPENHAGEN, DENMARK.

CONVEYING DEVICE.

1,343,373. Specification of Letters Patent. Patented June 15, 1920.

Application filed March 4, 1920. Serial No. 363,133.

To all whom it may concern:

Be it known that I, CARSTEN PEDERSEN, a subject of the King of Denmark, residing at Copenhagen, Denmark, have invented new and useful Improvements in Conveying Devices; and I do hereby declare the following to be a full, clear, and exact description of the same.

The invention relates to a conveying device of the kind comprising a plurality of grates, each grate being movable vertically and horizontally in relation to the other and arranged in a horizontal or slightly sloping position, the individual bars of each grate being interposed with and movable between the bars of the other grate, so that the material or articles to be conveyed placed on the grates are moved a distance alternately by one and the other of the grates.

A feature of the present invention is the provision of separate means for causing the vertical movement independent of the means for causing the horizontal movement with the result that a simpler and more reliable device is produced.

For this purpose each grate is supported in a substantially horizontal plane by cams engaging shoes carried by the grates so that at the rotating movement of the cams the grates are alternately moved up and down, the shoes being adapted to slide on the cams during the reciprocating movement of the grates. The movement may be effected by two or more eccentrics or cam disks rotating in guides or forks secured to the grates, which forks permit the vertical movement of the grates.

One form of the apparatus according to this invention is shown in the drawing, accompanying in which—

Figure 1 represents a side view and partial section of the apparatus, some details being omitted.

Fig. 2 shows the same in section.

Fig. 3 shows the same in bottom plan view.

Fig. 4 shows one of the forks which are secured to the grates.

Fig. 5 shows one of the shoes which are secured to the grates.

One grate consists of a number of parallel bars *a* arranged in the spaces between the parallel bars *a'* of the other grate. The bars *a* are mounted on the top of the teeth of two narrow combs *b* and two broader combs *c* all of which are secured on the under side of two longitudinal beams *d*, the upper edges of which extend higher than the laths *a* and thus serve for keeping in place on the grates the objects to be conveyed.

The bars *a'* are mounted on the top of the teeth of two narrow combs *b'* and two broader combs *c'*. All these combs are secured crosswise on top of two longitudinal beams *d'*.

It will be understood that the parts *a*, *b*, *c* and *d* form a unit as do the parts *a'*, *b'*, *c'* and *d'*, and therefore, owing to the special arrangement of the bars, the two grates are movable relatively to one another through a limited distance up and down as well as forward and backward.

In the form of the invention shown the up and down movement of the grates is effected in the following manner:

The grate *a*—*d* is provided with four shoes *e* secured to the underside of the combs *c*, which shoes can slide on the circumference of cam disk *f*. The grate *a'*—*d'* has in a similar manner four shoes *e'* which can slide on the circumference of cam disks *f'*. The four cam disks *f* and *f'* at one end of the apparatus are secured on a shaft *g* which is journaled in fixed bearings and which carries a pulley *j*, Fig. 3, by which the apparatus can be driven. The four cam disks *f* and *f'* at the other end of the apparatus are mounted on a common shaft *h* which is connected with the shaft *g* by a sprocket chain *k* which is laid over two sprockets *l*. The cam disks *f* and *f'* are alike; but on each shaft the two cam disks *f* are displaced 180° in relation to the two cam disks *f'* so as to alternately become effective to raise the grates.

In order to reciprocate the grates, which movement is permitted by the sliding contact of the shoe *e*, *e'*, and the disks *f*, *f'*, a fork *m* is secured on the comb *c* at one end of the apparatus, which fork engages an eccentric *n* secured on the shaft with two vertical sliding edges. In a similar manner, a fork *m* is secured to the comb *c'* embracing an eccentric *n'* on the same shaft. The two eccentrics are displaced 180° in relation to one another as shown in Fig. 1, so as to alternately become effective to move the grates longitudinally.

The two grates with their shoes and forks can be lifted up from the eccentrics and the

cam disks and therefore can be easily removed for repair or substitution of new grates.

The circumference of each cam disk *f* and *f'* is appropriately shaped as two circle arcs of different diameters, which arcs are connected by short oblique edges, whereby each grate is advanced exactly horizontally when in its uppermost position, and is moved exactly horizontally backward when in its lowermost position in such a manner that the two grates alternately advance the objects to be conveyed placed on the grates a distance in horizontal direction which is effected quite evenly.

The movements of the grates in vertical and horizontal directions can be effected in any other suitable manner within the scope of the annexed claims without departing from the spirit of this invention.

The apparatus constructed according to the invention may be used for various purposes, for instance as an automatic stoker for steam boilers and similar purposes.

The utility of the invention, however, is not restricted to any particular art.

In the form shown the up and down movement of the grates is effected by revolving cam disks; the same may be substituted by other means, for instance, a number of rocking arms provided with rolls at top on which the grates are resting. The rocking arms the fulcrums of which are found beneath the rolls can for instance be swung forward and backward by means of connection rods and cranks.

I claim as my invention:

1. A conveying device comprising in combination, a plurality of horizontal grates each comprising spaced bars, the bars of one grate being interposed with and movable between the bars of the other grate; means for alternately moving the grates vertically; and means separate from the last named means for horizontally reciprocating the grates alternately.

2. A conveying device comprising in combination, a plurality of horizontal grates each comprising spaced bars and comblike supporting bars for securing the spaced bars together, the bars of one grate being interposed with and movable between the bars of the other grate; means for alternately moving the grates vertically; and means separate from the last named means for horizontally reciprocating the grates alternately.

3. A conveying device comprising in combination, a plurality of horizontal grates each comprising spaced bars, the bars of one grate being interposed with and movable between the bars of the other grate; shoes carried by the grate; cam disks adapted to engage said shoes for moving said grates vertically in alternation; and separate means for reciprocating the grates alternately horizontally.

4. A conveying device comprising in combination, a plurality of horizontal grates each comprising spaced bars, the bars of each grate being interposed with and movable between the bars of the other grate; means for moving said grate vertically in alternation; and separate means for reciprocating the grates alternately horizontally comprising forks carried by the grates and eccentrics adapted to engage in said forks.

5. A conveying device comprising in combination, a plurality of grates each comprising spaced bars, the bars of one grate being interposed with and movable between the bars of the other grate; shoes carried by the grates; cam disks for engaging said shoes for moving said grates vertically in alternation, said cam disks each having two circular portions one of shorter radius than the other; and separate means for moving the grates alternately horizontally.

6. A conveying device comprising in combination, a plurality of horizontal grates each comprising spaced bars, the bars of one grate being interposed with and movable between the bars of the other grate; shoes carried by the grate; cam disks, said cam disks being provided with relatively abrupt elevating surfaces whereby the grates are rapidly raised; and separate means for reciprocating the grates alternately horizontally.

In testimony whereof I have affixed my signature in presence of two witnesses.

CARSTEN PEDERSEN.

Witnesses:
F. PETERSEN,
K. YENSEN.