Oct. 25, 1927. 1,646,865

J. JONSSON ET AL.

PINE SEED SEPARATOR

Filed May 6, 1926

Fig. 1.

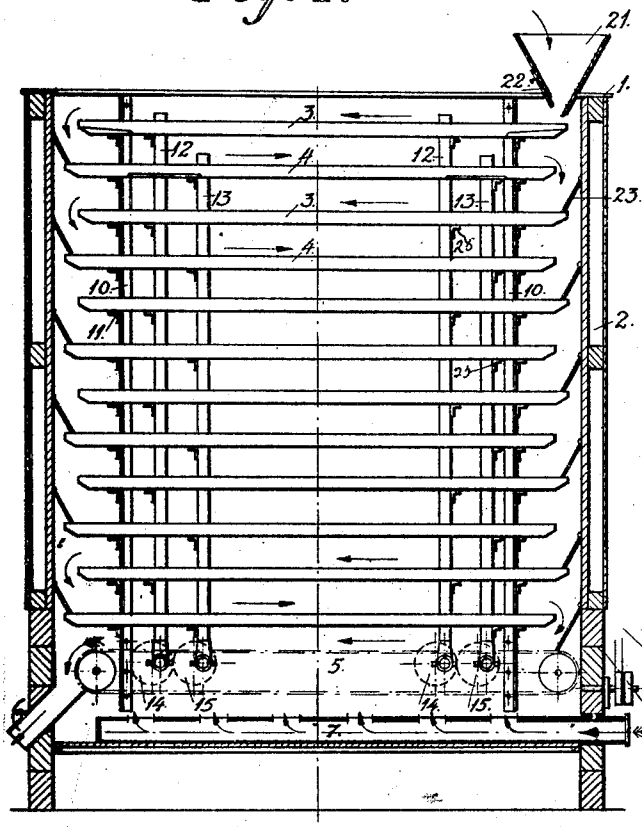


Fig. 2.

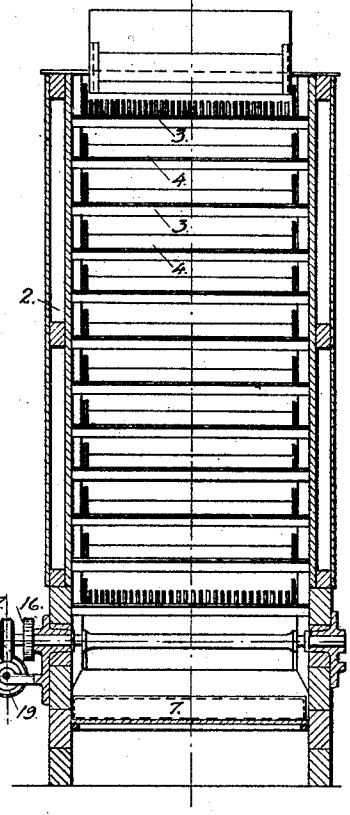


Fig. 3.

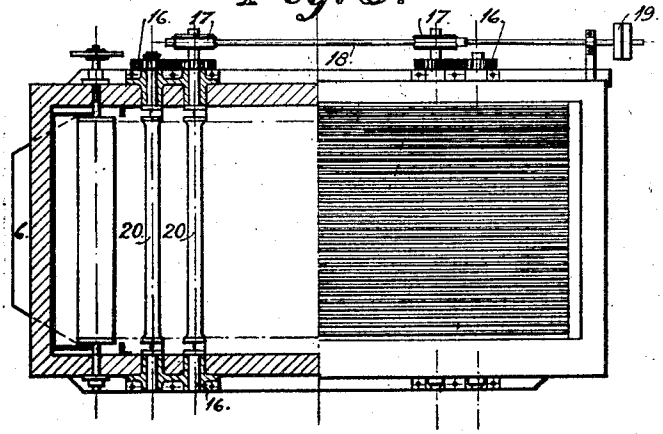
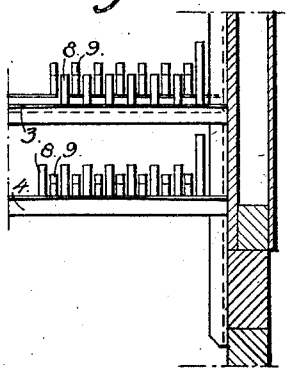


Fig. 4.



Inventors:

Jonas Jonsson.

Carl Wilhelm Lybock.

Patented Oct. 25, 1927. 1,646,865

UNITED STATES PATENT OFFICE.

JONAS JONSSON, OF VANSBRO, AND CARL WILHELM DYBECK, OF FALUN, SWEDEN.

PINE-SEED SEPARATOR.

Application filed May 6, 1926, Serial No. 107,198, and in Sweden November 20, 1925.

The separation of pine seed from the pine cones has hitherto generally been effected by pouring the cones into flat boxes, placing these boxes in a heated room until the cones have opened out, taking the boxes out and pouring the cones and seed into a rotary screen, all by hand. This process is very expensive, requiring a great number of workers.

The purpose of the present invention is a pine seed separator, working chiefly in a mechanical way, with very little manual labour, thus bringing down the workers needed to one or two for each plant. The expense of the work is only a small fraction of that of the present method.

The principle of the present invention is that the cones, poured into the separator, are mechanically conveyed backwards and forwards from one end of the separator to the other and simultaneously step by step downwards from the top of the separator to its bottom against an ascending hot air current, slowly enough to allow the cones sufficient time to open out completely. During said conveying the cones are shaken and rolled, making the seeds fall out. At the bottom of the separator the cones and seeds alight on a moving belt and are conveyed to a discharge spout, leading to a rotary screen.

In the accompanying drawing an embodiment of the invention is illustrated by way of example:

Fig. 1 is a vertical longitudinal section through the separator, showing movable shelves for the conveying of the cones and a movable belt at the bottom,

Fig. 2 is a vertical cross section of same,

Fig. 3 shows, at the left, the separator seen from above, and, at the right, a horizontal cross section of same,

Fig. 4 is a detail of the shelves, in cross section.

In the embodiment illustrated, and hitherto found the most suitable, the separator of the invention consists of a rectangular chamber or box 1 with heat-insulating walls 2, Fig. 1. In this chamber are placed above each other a number of shelves 3 and 4, each covering nearly the whole of the cross area of said chamber, projecting alternately over each other at the ends. Further there is at the bottom placed an endless belt 5 for carrying off the cones and seeds, a discharge spout 6, and the moving apparatus. The bottom of the chamber consists of an air box 7, with perforated cover, for letting in an even current of heated air.

Each of said shelves 3 and 4 consists of a number of longitudinally placed, parallel laths, alternately fixed, 8 Fig. 4, and movable, 9. The fixed or stationary laths 8 are fastened to uprights 10 by means of angle bars 11, the uprights 10 being attached to the walls of the chamber. The movable laths 9 are rigidly fastened, also by means of angle bars 25, to four pairs of uprights 12 and 13, the laths of every other shelf 3 on two pairs 12 and those of the other shelves on the other pairs 13. These uprights are in their turn carried and moved by four pairs of eccentrics or cranks 14 and 15, driven by means of gears 16 and worms 17 by a shaft 18 and pulleys 19.

The separator of the invention works in the following manner. The pine cones are poured, from a receptacle or from wagons, into a funnel or trough 21 at the top of the separator, and through an opening at the bottom of the funnel, adjustable by a slide 22, fall down on the end of the uppermost shelf. The movable laths of this shelf are, by the motion of the eccentrics 14 and the uprights 12, lifted up over the fixed laths of the same shelf, moved in the direction from the funnel, carrying with them the cones, lowered down under the fixed laths, leaving the cones on these, and finally returned to repeat the same movement. By this means the cones are moved step by step from the funnel towards the opposite end of the shelf, where they fall down on the next lower shelf. The movable laths of this second shelf having a motion, contrary to that of the first shelf, the cones are now conveyed in the opposite direction and then, falling down on the third shelf, returned again and so forth, thus passing backwards and forwards and down through the chamber and against an ascending hot air current. Guides or wickets 23 at the ends of the shelves prevent the cones from falling past the next lower shelf. Finally the cones and seeds alight on the moving endless belt 5 and are carried to the discharge spout 6 and from there to the screen, generally a rotary screen.

By a suitable speed of the eccentrics 14 and 15, as a rule one or two revolutions in the minute, sufficient time is allowed for the cones to open out completely and to release the seeds, which is facilitated by the shak-

ing and rolling of the cones, effected by the motion of the laths 9.

The upper surfaces of the laths generally are made smooth, but may, if required, be toothed or provided with elevations or depressions for better catching the cones.

The final separation of the seeds from the mixture with the cones follows in the usual way, generally by means of rotary screens or the like.

The invention, especially the above described and illustrated embodiment, has proved much more effective and convenient and much less expensive than the devices hitherto used.

We claim:

1. In a machine for moving objects from an upper to an lower level, the combination of a plurality of superposed forwarding shelves, a plurality of parallel longitudinal members constituting each shelf, means rigidly connecting alternate members of alternate shelves whereby movement imparted to said means will impart a corresponding movement to the interconnected members, and means for supporting and imparting movement to said means comprising devices movable in circular orbits.

2. In a machine for moving objects from an upper to a lower level, the combination of a plurality of superposed forwarding shelves, a plurality of parallel longitudinal members constituting each shelf, uprights rigidly connecting alternate members of alternate shelves whereby movement imparted to the uprights will impart a corresponding movement to the interconnected members, and means for supporting and imparting movement to said uprights comprising crank shafts to the cranks of which the uprights are directly connected.

JONAS JONSSON.
CARL W. DYBECK.