

No. 839,925.

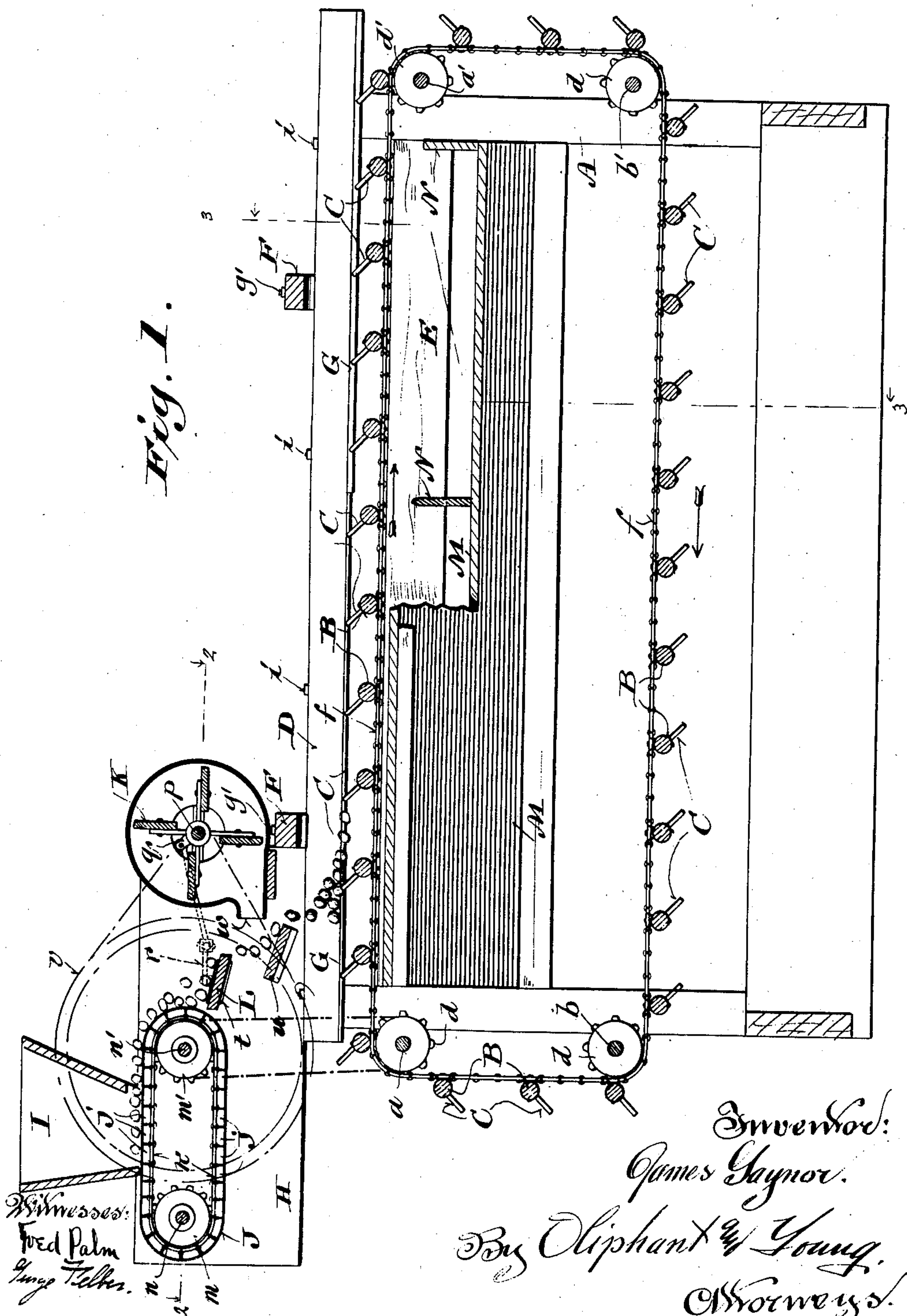
PATENTED JAN. 1, 1907.

J. GAYNOR.

CLEANING AND GRADING APPARATUS.

APPLICATION FILED FEB. 26, 1906.

3 SHEETS—SHEET 1.



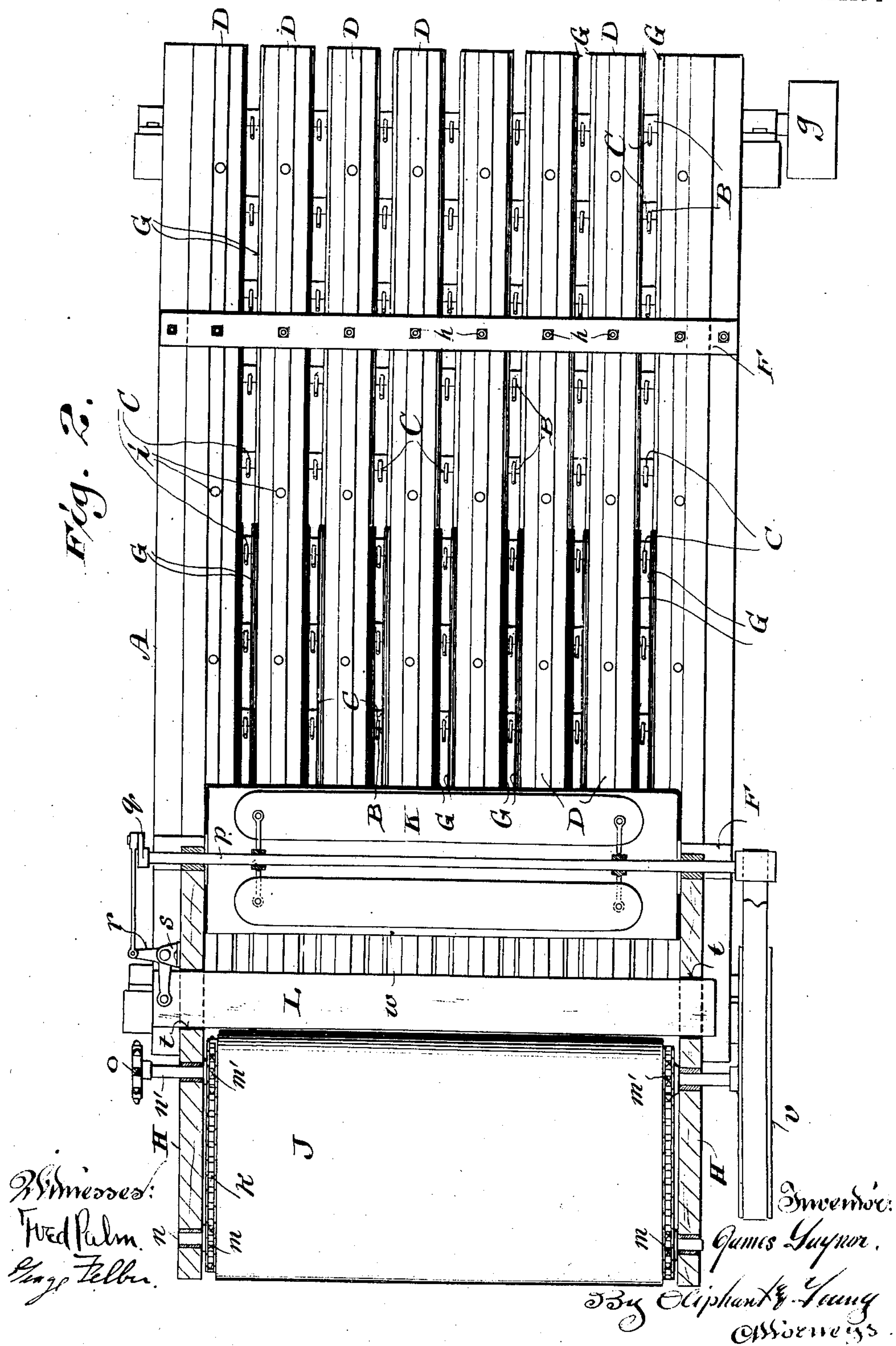
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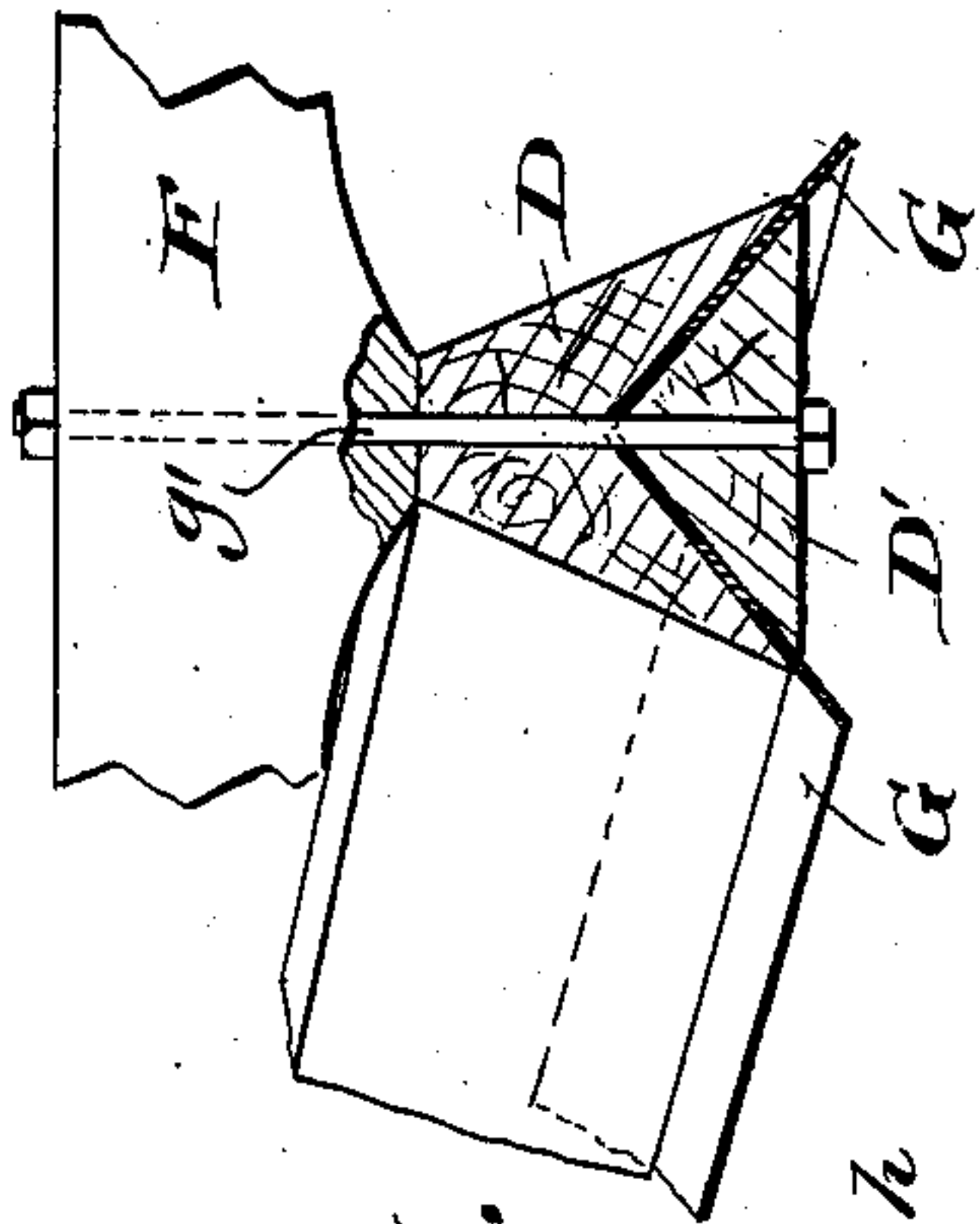
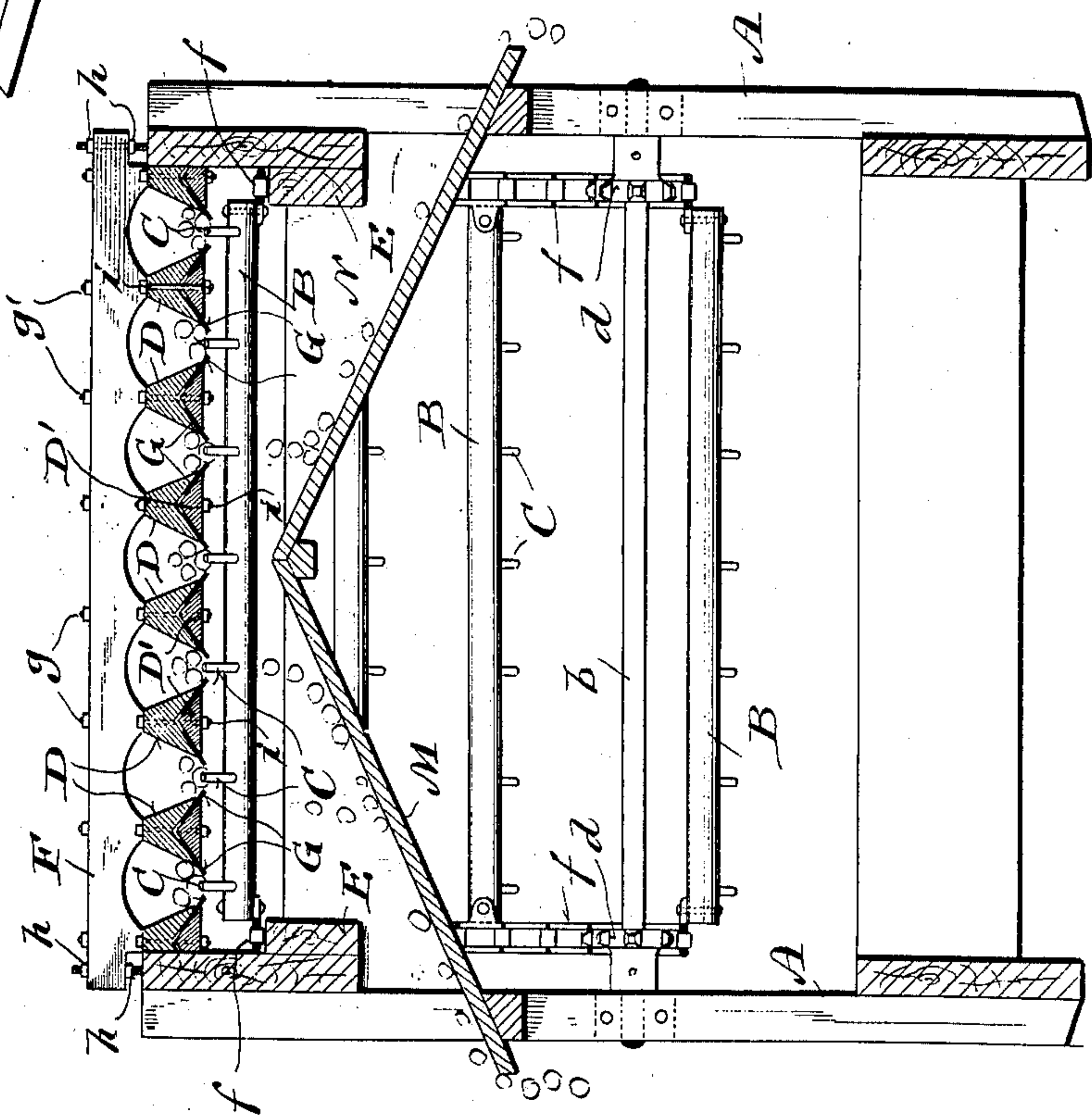


Fig. 4.

Fig. 3.



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UNITED STATES PATENT OFFICE.

JAMES GAYNOR, OF GRAND RAPIDS, WISCONSIN.

CLEANING AND GRADING APPARATUS.

No. 839,925.

Specification of Letters Patent.

Patented Jan. 1, 1907.

Application filed February 26, 1906. Serial No. 302,999.

To all whom it may concern:

Be it known that I, JAMES GAYNOR, a citizen of the United States, and a resident of Grand Rapids, in the county of Wood and State of Wisconsin, have invented certain new and useful Improvements in Cleaning and Grading Apparatus; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention has for its object to provide a simple and effective apparatus for cleaning, grading, and sorting discrete materials, it being especially applicable to cranberries or the like, said invention consisting in certain peculiarities of construction and combination of parts, as fully set forth hereinafter with reference to the accompanying drawings and subsequently claimed.

In the drawings, Figure 1 represents a transverse section of a cleaning and grading apparatus embodying the features of my invention; Fig. 2, a plan view of the same, the delivery and cleaning mechanism being in section upon a plane as indicated by line 2 2 of Fig. 1 with the feed-apron in full; Fig. 3, a cross-section of said apparatus as indicated by line 3 3 of Fig. 1, and Fig. 4 an enlarged detail view of one of the adjustable grading-bars.

Referring by letter to the drawings, A indicates a rectangular frame, at the ends of which are mounted in suitable bearings shafts $a a'$ and $b b'$, each shaft being provided with a pair of sprockets d , adjacent to the sides of the frame. The sprockets d at either side of said frame are fitted with endless chain belts f , which are driven, in this instance, by means of a pulley g , fast on the shaft a' , the disposition of the sprockets being such that the chain belts which travel over them form rectangles. The said chain belts are connected at intervals by a series of lags B, provided with rigid fingers C, which fingers in their travel from front to rear of the frame project upward and backward at an angle of forty-five degrees between grading-bars D and serve as agitators and carriers for feeding the material to be sorted. Said fingers also prevent clogging of the slots, and by reason of their inclination will not mar or bruise said material. In order to prevent sagging of said chain belts while in their working position, the frame A is provided with supporting-strips E at either side thereof, over which the aforesaid chains travel, the strips being parallel with said travel and lo-

cated between the upper set of sprockets $a a'$, as shown in Figs. 1 and 2 of the drawings.

The grading-bars D may be of any number and are suspended in parallel rows from cross-girders F, which girders are adjustably secured to the frame A by bolts and set-nuts h for the purpose of raising or lowering the said grading-bars with relation to the points of the fingers C of the carriers, said adjustment being desirable in order to adapt the apparatus to various kinds of materials or fruit-grading. The parallel grading-bars are preferably conical in cross-section and spaced apart to form a series of flared troughs having slotted bottoms or spaces through which the material drops as it is fed longitudinally by the fingers of the carriers, the width of the slots or spaces between the bars being regulated by sectional strips G, adjustably secured to said bars. The sectional strips G, as shown in Fig. 1 of the drawings, are so adjusted from end to end of the machine to form two widths of slots the narrowest of which is at the feed end of the machine, so that the smaller berries or particles of material to be graded will be separated first, and thereafter a second operation takes place, it being understood, however, that in practice any number of grades may be had by increasing the number of sectional strips in each bar. In order to secure the strips G in position, the bottom of each grading-bar is cut away, making a separable V-shaped rail D', between which and the bar the strips G are inserted and held by clamping-bolts i , passing through the center of said bar and rail, other clamping-bolts g' being provided which extend through the cross-girders F and also serve to hold the rails in suspension therefrom.

The feed end of the machine has secured thereto a frame H, having a feed-hopper I, under which and above the grading-bars is an endless apron J. This apron is fitted over backing-slats j , secured to drive-chains k , mounted upon sprockets $m m'$ of shafts $n n'$, the latter being driven by a sprocket o in link connection with a similar sprocket (not shown) carried by the shaft a of the carrier drive-chain. Directly in front and below the apron I is located a fan K, to the shaft p of which is secured a crank q in link connection with a bell-crank r , the latter being fulcrumed in a bracket s , fast to the hopper-frame. The free arm of the bell-crank is loosely connected to a spreader-

board L, which is located directly under the discharge end of the apron I and guided in slots *t* of the hopper-frame. This spreader-board by reason of its crank connected with the fan-shaft is vibrated so as to spread the material delivered thereon evenly previous to its final delivery to the grader mechanism, into which it falls after first striking a deflector *u* below said board.

The fan-shaft *p* is in belt connection with a pulley *v*, fast on the sprocket-shaft *n'*, from which the fan is driven. The discharge-nozzle *w* of the fan-casing is so positioned as to force the entire blast of air from said fan between the spreader-board and deflector *u*, thereby causing the berries or material being fed to the grader to be thoroughly cleansed of any foreign matter. As the material is sorted into the different grades it is delivered in its various sizes to suitable receptacles at either side of the apparatus by means of oppositely-inclined chutes M, which chutes are secured to the frame A below the grading apparatus, partitions N being provided at the junctions of each section of the strips G for the purpose of proper separation.

While I have shown and described a system of driven gears for the several mechanisms comprising my invention, it is understood that any suitable method of drive may be employed, the essential features of the invention being in the arrangement and location of a cleaner in connection with the longitudinal grading-bars and traveling carriers, which carriers were described as having fingers; but in some instances for the latter I may substitute brushes or any other form of flexible finger inclined rearward from a direction of their travel. In place of using section-strips G for obtaining different widths of space between the grading-bars it is obvious that the said strips may in some cases be in one piece and adjusted at angles to each other, so that the spaces would taper instead of having abrupt variations, as shown.

From the foregoing description it is clear that should the hopper be filled with cranberries, for instance, and the machine put in motion the apron will cause the berries to drop upon the spreader and by it be evenly distributed, so that they will uniformly fall to the deflector below, the air-blast in the meantime thoroughly cleansing therefrom all dust, &c., which is blown to the rear. The berries then fall between the grading rails and are picked up and forced longitudinally through the machine by the traveling carrier until they reach a section of the strips, the slot between which is of sufficient width to permit them to fall through upon the chute and from thence to the separate bins or receptacles provided for each grade. With each grade of berries after being thus sorted and cleaned, there will necessarily be a certain percentage of soft defective ber-

ries, which are of the same size as the sound fruit. These may also be screened or graded from those which are sound by permitting the entire bulk to remain for a time sufficient for the defective berries to shrink slightly. The berries may then be again screened, resulting in a separation of those which are shrunken or defective, and thus dispensing with a great deal of time which would otherwise have to be devoted to the preparation of cranberries for the market.

I claim—

1. In a grading apparatus, a plurality of longitudinally-parallel grading-bars, the said bars being conical in cross-section and composed of an upper member having an angled-faced bottom, and a lower member having a V-shaped face adapted to rest in the angled-faced bottom of the first-named member, longitudinal adjustable strips interposed between the aforesaid members, whereby the spaces between the bars are varied, and clamping-bolts arranged to pass through the aforesaid grading-bar members, whereby the latter, together with the strips are held in assemblage.

2. In a grading apparatus, a plurality of longitudinally-parallel grading-bars, the said bars being conical in cross-section, and composed of an upper member having an angled-faced bottom, and a lower member having a V-shaped face adapted to rest in the angled-faced bottom of the first-named member, longitudinal adjustable sectional strips interposed between the aforesaid members, whereby the spaces between the bars are varied, and clamping-bolts arranged to pass through the aforesaid grading-bar members, whereby the latter, together with the strips are held in assemblage.

3. A conical grading-bar composed of an upper member having an angled-faced bottom, and a lower member having a V-shaped face adapted to rest in the angled-faced bottom of the first-named member, in combination with strips adjustably secured between the said faces of the bar members, and bolts for clamping said members and strips together.

4. In a grading apparatus, comprising a plurality of parallel grading-bars, the said bars being formed in upper and lower separate sections and set apart to form series of fixed spaces, adjustable strips interposed between the upper and lower sections of the bars, whereby the width between said bars is varied, cross-girders connecting the aforesaid bars, traveling carriers arranged to project into the spaces between the bars, and means in connection with the cross-girders for vertical adjustment of the grading-bars with relation to the carriers.

5. In a grading apparatus, comprising a plurality of parallel grading-bars, the said bars being formed in upper and lower separate sections and set apart to form series of fixed spaces, adjustable strips interposed between the upper and lower sections of the bars, whereby the width between said bars is varied, cross-girders connecting the aforesaid bars, traveling carriers arranged to project into the spaces between the bars, and means in connection with the cross-girders for vertical adjustment of the grading-bars with relation to the carriers.

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6. In a grading apparatus, comprising a plurality of parallel grading-bars, the said bars being formed in upper and lower separate sections and set apart to form series of fixed spaces, adjustable strips interposed between the upper and lower sections of the bars, whereby the width between said bars is varied, cross-girders connecting the aforesaid bars, traveling carriers arranged to project into the spaces between the bars, means in connection with the cross-girders for vertical adjustment of the grading-bars with relation to the carriers, a feed-belt located above the bars and adjacent to one end there-

of, a hopper above the same, a vibratory spreader at the discharge end of the belt, and a blast-fan located between the spreader and said bars, whereby the material to be graded is cleaned previous to its delivery to the grading apparatus.

7. A grading apparatus, comprising a plurality of parallel longitudinal grading-bars, said bars being made in two pieces one above the other, adjustable sectional strips interposed between the two pieces constituting the bars, clamping-bolts for the strips and bars, a pair of endless traveling chains below said strips, lags connecting the chains, fingers carried by the lags inclined rearward from a direction of their travel and arranged to project above the aforesaid strips, and grading-chutes located beneath the grading apparatus.

In testimony that I claim the foregoing I have hereunto set my hand, at Grand Rapids, in the county of Wood and State of Wisconsin, in the presence of two witnesses.

JAMES GAYNOR.

Witnesses:

JOHN A. GAYNOR,

THOMAS MCGOVERN.