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SORTING MEANS.

(Application filed Mar. 13, 1900.)

(No Model.)

Fig. 1.

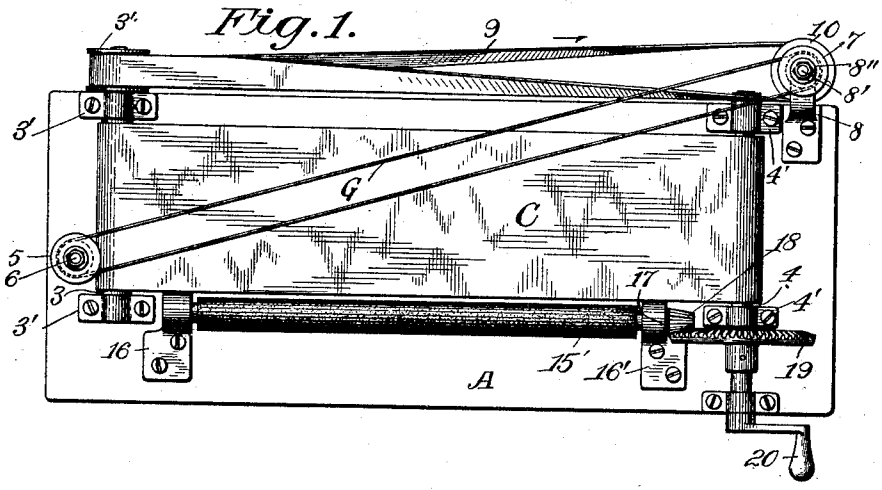


Fig. 2.

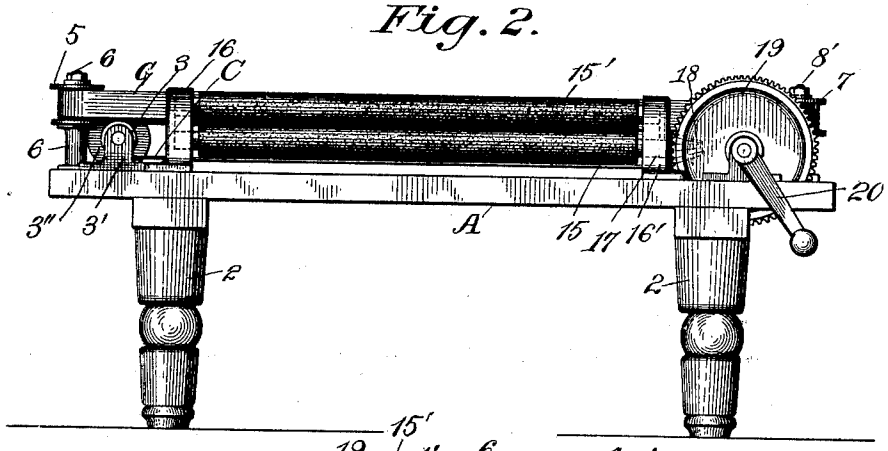


Fig. 3.

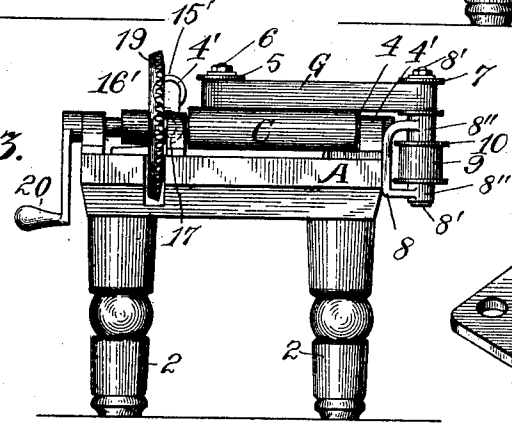
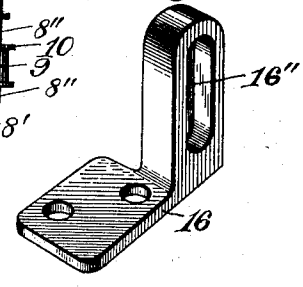


Fig. 4.



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SORTING MEANS.

SPECIFICATION forming part of Letters Patent No. 660,611, dated October 30, 1900.

Application filed March 13, 1900. Serial No. 8,461. (No model.)

To all whom it may concern:

Be it known that we, PETER J. ZEHNDER and BERNARD H. ZIEHLER, citizens of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Sorting Means, of which the following is a specification.

This invention relates to sorting means for grading articles of different sizes in different classes in such a manner that each class or group will contain articles of approximately the same size, this result being secured in the present case by dimension-determining sorting means, in which the articles to be graded will traverse a sorting-path of different widths at different points in the direction of travel of the articles.

Our invention is embodied in any apparatus in which a guide and a support or carrier are so disposed relatively to each other as to form between them a sorting-path, which varies in width at different points, the sorting-path, it should be understood, being defined by the discharging edge of the support or carrier and by a guide-line, the latter of which is the line of intersection of the paths in which the guiding and support or carrying surfaces, respectively, are disposed. In the preferred construction the sorting-path will range longitudinally of the carrier and will be of different widths at different points in the length of the latter. Moreover, either one or both of the two principal members of the sorting means may be movable, and in this case both are so shown, the guide being preferably an endless belt and the carrier also an endless belt movable in unison with the guide-belt. In order to form a most effective guide, the latter will be disposed transversely to the working surface of the carrier, and preferably obliquely thereto, in such a manner that the guiding-surface will extend for a considerable distance above the carrying-surface, and thus form a guide of a sufficient width to assure its proper coöperation with the articles to be sorted. Ordinarily the guide when positioned in this manner will be so disposed that the edge thereof which is nearest to the carrying-surface will be substantially in juxtaposition with the latter, the parts being positioned in this manner in order to prevent the articles to be sorted from working under the edge of such guide. This is especially important when the guide employed is in the form of a movable or traveling belt, as is the case herein.

One of the most important features of this invention is the location of the guide and the carrier in such a manner with respect to each other that the sorting-path formed therebetween will be of progressively-varying or progressively-decreasing widths throughout its length, the object of course being to so grade the articles that they will be sorted at the discharging-line of the carrier into successive groups containing, respectively, articles of successively-decreasing sizes considered with respect to that dimension of each article which determines the grading thereof.

In order to form a sorting-path which decreases progressively in width, we deem it desirable to dispose the guide in such a manner that the guide-line formed by the intersection of the paths of the guiding and carrying surfaces will be oblique to the discharging-line or discharging edge of the latter surface, and when the parts are so located with respect to each other it will be evident that a guide-belt, if drawn taut, may travel in its proper path without the use of intermediate guide-rollers therefor.

Our improved sorting means may be employed for sorting articles of many different kinds; but in the present case it is particularly adapted and intended to be employed in connection with leaves, such as cured tobacco-leaves, which it is desirable to grade in different groups, according to the lengths thereof, in order to avoid mingling long, high-grade, and expensive leaves with short, low-grade, and cheap leaves.

The endless carrier and guide-belts shown herein form a suitable means for operating upon tobacco-leaves to grade the same properly; but in connection therewith we deem it desirable to employ some means for removing each leaf from the carrier as soon as the determination of its grade or length has been accomplished, and for this purpose we make use of receiving means or transferring means, preferably transfer-rollers, disposed along and coöperating with the discharging-line or discharging edge of the carrier and located in such

a position that one end of the leaf, preferably the tip thereof, will be gripped and the leaf drawn out of the way immediately on the determination of such length. If this transferring means moves at the same rate of speed as the carrier-belt, it is obvious that the leaf will not be drawn out of the way quickly enough, and while the carrier-belt and the guide-belt may, and as a matter of fact should, move in unison the transferring means should move at a relatively rapid rate of speed as compared with that of said carrier. Hence if the peripheral speed of the transfer-rollers is several times the rate of advance of the carrier-belt each leaf as its tip is engaged by the rollers will be drawn out of the way quickly and may be carried to or dropped into a suitable receiver, (not shown,) and therefore it will not remain on the carrier-belt long enough to interfere with the movements of other leaves adjacent thereto.

In the drawings accompanying this specification and forming part of the present application, Figure 1 is a plan of sorting means embodying our present invention. Fig. 2 is a side elevation of the same. Fig. 3 is an end elevation of the same, and Fig. 4 is an enlarged perspective view of a detail illustrating a bearing-bracket for the transfer-rollers.

Similar characters designate like parts in the different figures of the drawings.

Any suitable framework may be employed for supporting our improved sorting means; but in the present case we have illustrated a flat bed or table A, mounted on legs 2, all of the various operative parts being supported in this case directly on said table.

As before stated, the guide and the support or carrier may be of any suitable construction and may be disposed in any proper manner with respect to each other, provided that the sorting-path between them is of different widths at different points in such path; but here we have illustrated a guide in the form of an endless belt, such as G, which coöperates with a carrier or carrier-belt, such as C, the latter passing around a pair of rollers carried by shafts, such as 3 and 4, journaled at their ends in bearings carried on the table A, these bearings being preferably removable brackets, such as 3′ and 4′, which may be adjusted in any desired positions with respect to one another. The guide-belt G is mounted in such a manner as to travel in a path transverse to the path of movement of the carrier-belt and obliquely across the latter, one end of the guide-belt being carried in this case around a pulley 5, journaled on a fixed stud or arbor 6, rising from one end of the table A, while at its other end said belt passes around a corresponding pulley 7, secured to the upper end of a short shaft or arbor 8′, journaled in bearings 8″ of a bracket-arm 8, secured to the table at the other end thereof, preferably in such a manner as to be adjustable with respect to the stud 6. The belt G may be driven from the shaft 3, and in this case we have shown on the end of the latter a pulley 3″, from which a belt 9 passes to a second pulley 10, secured to the shaft 8′, journaled in the bracket 8. As the pulleys 3″ and 10 are of the same size, it will be obvious that the belt G will be driven at the same rate of speed as the carrier C and, moreover, the two will be driven in the same direction.

From the foregoing description of the construction and mode of operation of the guide and the carrier it will be evident that if the proper articles, such as tobacco-leaves, are placed on or fed onto the right-hand end or receiving end of the belt C said articles will be carried toward the left in the direction of the movement of the carrier-belt until they strike the guide-belt, whereupon the latter will shift the articles little by little toward the discharging edge of the carrier-belt while said articles are traveling with the latter. If these articles are tobacco-leaves, the stems thereof should be presented toward the working run of the guide-belt in order that they may oppose sufficient resistance to said belt to assure the shifting of the leaves toward said discharging edge of the carrier-belt. The larger articles or leaves will have their outer ends or tips shifted into alinement with the discharging edge of the carrier-belt before the smaller articles or leaves, and hence the sorting means will determine their position or positions before the positions of the shorter leaves are determined. The longer leaves will therefore project over the discharging edge of the carrier-belt near the receiving end of the latter, while the shorter leaves will be carried along by said belt and will be projected over said discharging edge at points nearer and nearer to the opposite end of said belt. In this manner the leaves to be sorted may be separated into a large number of different groups, the position of each group being determined by a different point in the length of the discharging-line or discharging edge of the carrier-belt, and suitable receiving or transferring means may be located at each such point and will preferably extend along the whole of that portion of the carrier which is effective for sorting the leaves and which therefore determines the limits of the sorting-path and also the points at which leaves of different sizes are to be discharged.

The transferring means will preferably consist of a pair of rollers, such as 15 and 15′, and these are disposed in the present case along the discharging edge of the carrier-belt, the meeting plane of the rollers being preferably substantially in the plane of the working run of the carrier-belt. Each of said rollers should have a suitable flexible covering, preferably of rubber, in order that the rollers may grip the leaves most firmly and feed them positively. In this case said rollers are journaled at their opposite ends in a pair of bearing-brackets, such as 16 and 16′, having similar journal-openings. The

bracket 16 is shown in detail on an enlarged scale in Fig. 4, and as illustrated therein has a vertical journal-slot 16″ of substantially uniform width throughout and of the same width as the diameters of the ends of the transfer-rollers to be received thereby. When the rollers are journaled in bearings in this manner, it will be evident that the upper roller will be freely movable vertically relatively to the lower and will exert upon the leaves being fed between the rollers a yielding but sufficient pressure, which pressure will be maintained throughout the length of each leaf regardless of the thickness of the stem thereof.

The shaft of the lower transfer-roller 15 is designated herein by 17 and in this case passes entirely through the journal-opening in the bracket 16′, said shaft having at that end thereof a bevel-pinion 18, meshing with a bevel-gear 19 on the shaft 4, which latter gear serves in this instance as a means for driving the transfer-rollers. The shaft 4 may be rotated in any suitable manner either by power or by hand; but we have illustrated herein a crank 20 for operating the same. Obviously the upper of these two superimposed rollers is frictionally driven by the lower one, besides having a slight vertical movement relative to the lower positively-driven one, the weight of the upper roller being sufficient to assure a firm grip upon the leaves as they pass between said rollers.

It will be noticed that the pinion 18 is of relatively small diameter as compared with the diameter of the gear 19, and hence the rollers 15 and 15′ will be driven at a relatively high rate of speed as compared with the movement of the carrier-belt C. Hence each leaf as soon as it is gripped between the rollers will be rapidly drawn out of the path of others on the carrier-belt and will not be shifted any considerable distance longitudinally of said belt after the tip of the leaf has been gripped.

Having described our invention, we claim—

1. Dimension-determining sorting means embodying a guide and a support having their guiding and supporting surfaces, respectively, disposed in paths which intersect to form a guide-line, said guide-line and the discharging-line of the support forming between them a sorting-path of different widths, each width corresponding to a dimension of an article to be sorted at such point.

2. Dimension-determining sorting means embodying a guide and a movable carrier having their guiding and carrying surfaces, respectively, disposed in paths which intersect to form a guide-line, said guide-line and the discharging-line of the carrier forming between them a sorting-path of different widths, each width corresponding to a dimension of an article to be sorted at such point.

3. Dimension-determining supporting means embodying a guide and a movable endless carrier having guiding and carrying surfaces, respectively, disposed in paths which intersect to form a guide-line, said guide-line and the discharging-line of the carrier forming between them a sorting-path of different widths, each width corresponding to a dimension of an article to be sorted at such point.

4. Dimension-determining sorting means embodying a movable guide and a support having their guiding and supporting surfaces, respectively, disposed in paths which intersect to form a guide-line, said guide-line and the discharging-line of the support forming between them a sorting-path of different widths, each width corresponding to a dimension of an article to be sorted at such point.

5. Dimension-determining sorting means embodying a movable endless guide and a support having their guiding and supporting surfaces, respectively, disposed in paths which intersect to form a guide-line, said guide-line and the discharging-line of the support forming between them a sorting-path of different widths, each width corresponding to a dimension of an article to be sorted at such point.

6. Dimension-determining sorting means embodying a movable endless guide and a movable endless carrier having their guiding and carrying surfaces, respectively, disposed in paths which intersect to form a guide-line, said guide-line and the discharging-line of the carrier forming between them a sorting-path of different widths, each width corresponding to a dimension of an article to be sorted at such point.

7. Dimension-determining sorting means embodying a guide and a support having their guiding and supporting surfaces, respectively, disposed in paths which intersect to form a guide-line, said guide-line and the discharging-line of the support forming between them a long sorting-path of progressively-varying widths, each width corresponding to a dimension of an article to be sorted at such point.

8. Dimension-determining sorting means embodying a guide and a support having their guiding and supporting surfaces, respectively, disposed in paths which intersect to form a guide-line, said guide-line and the discharging-line of the support being disposed obliquely to each other and forming between them a sorting-path of progressively-varying widths, each width corresponding to a dimension of an article to be sorted at such point.

9. Dimension-determining sorting means embodying a guide and a support having juxtaposed guiding and supporting surfaces, respectively, disposed in paths which intersect to form a guide-line, said guide-line and the discharging-line of the support forming between them a sorting-path of different widths, each width corresponding to a dimension of an article to be sorted at such point.

10. Dimension-determining sorting means embodying a support, and a guide movable in a path which is transverse to that of the support and which intersects that of the support to form a guide-line, said guide-line and

the discharging-line of the support forming between them a sorting-path of different widths, each width corresponding to a dimension of an article to be sorted at such point.

11. Dimension-determining sorting means embodying a guide and a support having their guiding and supporting surfaces, respectively, disposed in paths which intersect to form a guide-line, said guide-line and the discharging-line of the support forming between them a sorting-path of different widths, each width corresponding to a dimension of an article to be sorted at such point, and receiving means coöperating with the discharging portion of the support.

12. Dimension-determining sorting means embodying a guide and a support having their guiding and supporting surfaces, respectively, disposed in paths which intersect to form a guide-line, said guide-line and the discharging-line of the support forming between them a sorting-path of different widths, each width corresponding to a dimension of an article to be sorted at such point, and transferring means coöperating with the discharging portion of the support.

13. Dimension-determining supporting means embodying a guide and an endless carrier having their guiding and carrying surfaces, respectively, disposed in paths which intersect to form a guide-line, said guide-line and the discharging edge of the carrier forming between them a sorting-path of different widths, each width corresponding to a dimension of an article to be sorted at such point, and receiving means extending along and cooperating with the discharging edge of the carrier.

14. Sorting means embodying a guide and an endless carrier having their guiding and carrying surfaces respectively disposed in paths which intersect to form a guide-line, said guide-line and the discharging edge of the carrier forming between them a sorting-path of different widths, and a pair of transfer-rollers extending along and coöperating with said discharging edge of the carrier.

15. Sorting means embodying a carrier-belt, a guide-belt disposed transversely to, and having one edge thereof in juxtaposition with, the working surface of the carrier-belt, said edge of the guide-belt and the discharging edge of the carrier-belt forming between them a sorting-path of different widths, and means for actuating said belts in unison.

16. Sorting means embodying a carrier-belt; a guide-belt disposed transversely to, and having one edge thereof in juxtaposition with, the working surface of the carrier-belt, said edge of the guide-belt and the discharging edge of the carrier-belt forming between them a sorting-path of different widths; means for actuating said belts in unison; and a pair of transfer-rollers extending along the discharging edge of the carrier-belt and having their meeting line in the plane of the working run of said carrier-belt.

17. Sorting means embodying a guide and a movable carrier having their guiding and carrying surfaces respectively disposed in paths which intersect to form a guide-line, said guide-line and the discharging-line of the carrier forming between them a sorting-path of different widths; transferring means cooperating with the discharging portion of the carrier; and means for actuating the carrier at one rate of speed and the transferring means at a high rate of speed relative to that of the carrier.

18. Sorting means embodying a guide and a movable carrier having their guiding and carrying surfaces respectively disposed in paths which intersect to form a guide-line, said guide-line and the discharging-line of the carrier forming between them a sorting-path of different widths; gripping transferring means coöperating with the discharging portion of the carrier; and means for actuating the carrier at one rate of speed and the transferring means at a high rate of speed relative to that of the carrier.

19. Sorting means embodying a guide and a carrier-belt having their guiding and carrying surfaces respectively disposed in paths which intersect to form a guide-line, said guide-line and the discharging edge of the carrier-belt forming between them a sorting-path of different widths; a pair of superimposed transfer-rollers coöperative with the discharging edge of the carrier-belt, the upper roller being freely movable vertically relatively to the lower; and means for actuating said carrier-belt and transfer-rollers.

20. Sorting means embodying a guide and a carrier-belt having their guiding and carrying surfaces respectively disposed in paths which intersect to form a guide-line, said guide-line and the discharging edge of the carrier-belt forming between them a sorting-path of different widths; a pair of separated brackets adjacent to the discharging edge of the carrier-belt and having elongated journal-openings; a pair of superimposed transfer-rollers coöperative with the discharging edge of the carrier-belt and journaled at their ends in said journal-openings; and means for actuating said carrier-belt and transfer-rollers.

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