A rack for grading cut flower material includes a bar element and a shelf element which support the flower heads. The shelf element is pivotally mounted for swinging movement about one edge to a vertical position. This increases the space between the bar element and the shelf element and permits easy removal of the bunch.
CENTRAL GRADING SYSTEM FOR CUT FLOWERS

This invention relates to methods and apparatus for processing cut flowers to produce graded flower bunches from ungraded cut flower material.

This invention relates particularly to a rack arrangement which is an improvement over that disclosed in copending U.S. application Ser. No. 788,113, now U.S. Pat. No. 3,517,809 filed Dec. 3, 1968 by Gerald L. Gregoire and assigned to the same assignee as the assignee of this application.

As noted in copending U.S. application Ser. No. 788,113 cut flowers are sold by grades. For example, the four top grades are select, fancy, standard and short.

Grading is done on three bases. Flowers are graded by blossom head size, by stem length and by stem strength.

Proper grading and consistency of grading are quite important. The cost of inconsistency in grading to the wholesaler is loss of customer confidence and the inability to build repeat business.

Inconsistency of grading also costs the retailer. The cost to the retailer is unavailability, excess cost in buying time, returned goods and outright losses.

Central grading by a wholesaler has advantages over grading by individual growers. Grading by individual growers is apt to be quite subjective. There may be differences in grading between different growers. The grading by individual growers also requires several handlings of the flowers by the grower.

This additional handling increases the chances for breaking and bruising of the flowers.

The present invention includes a rack arrangement which acts as a mechanical aid in grading, and which is particularly adapted for central grading by a wholesaler. Each of the racks includes a laterally spaced pair of support members for engaging the underside of flower heads to support the flowers as the flowers are inserted between the pairs of support members.

It is an important object of the present invention to construct the rack for ease of entrance of the flowers to be graded.

It is another important object of the present invention to open up the rack after the flower bunch has been formed so that the flowers can be easily removed from the rack.

In accordance with the present invention each pair of support members in the rack includes a shelf element which is positioned horizontally to support the flower heads while the flowers are being inserted into the rack. The shelf element is pivotally mounted for swinging movement about one edge to a vertical position to increase the space between the support members when the rack has been filled. This permits easy removal of the flower bunch from the rack.

It is another object of the present invention to effect automatic counting control of the flowers loaded into the rack. To achieve this object the shelf elements are formed with recessed edge portions. For example, the shelf element may be recessed to offset the first flower in the shelf to one side and to permit the next four flowers to be lined up one behind the other and to offset the last flower to one side.

It is another object of the present invention to include a linkage which is connected to the shelf elements and which is effective to rotate each of the shelf elements simultaneously on actuation of the linkage.

The linkage includes a bar element which acts as a handle for operating the linkage. The bar element also serves to position the lower ends of the flower stems close together as the flowers are placed in the rack.

A rack arrangement incorporating these structural features and effective to function in the manner described is a further, specific object of the present invention.

Other and further objects of the present invention will be apparent from the following description and claims and are illustrated in the accompanying drawings which, by way of illustration, show preferred embodiments of the present invention and the principles thereof and what are now considered to be the best modes contemplated for applying these principles.
As best shown in FIG. 2, the shelf element 23 preferably has recessed edge portions 23R. These recessed edge portions are useful to effect automatic counting control. Thus, the first flower is offset to one side, the next four flowers are lined up one behind the other, and the last flower is offset to one side as six flowers are placed between the pair of support members 23 and 24. Depending on the cut flower material being placed in the racks, the 1:4:1 offset arrangement might be used or some other offset arrangement might be used. For example, the shelf elements 23 might be formed with recessed edge portions effective to offset the first two flowers to one side and to offset the last one or two flowers to one side.

The support elements 24 may be bars or tubes.

In accordance with present invention linkage means, indicated generally by the reference number 41 in FIGS. 4 and 5, are connected to the shelf elements 23 so as to rotate all shelf elements in one rack simultaneously on actuation of the linkage means.

The linkage means 41 includes two sets of links with each set of links connected to operate two shelf elements. Both sets of links are connected to a bar element 42 which extends between the bins 32. This bar element serves a dual purpose. It helps to keep the lower end of the flower stems close together while the flower bunches are being formed. The bar element 42 also serves as the handle for actuating the linkages 41 after the bunch has been formed.

The bar element 42 is mounted for pivoting movement about pins 44 (see FIG. 3) and is connected in pin joint connections to upwardly extending rods 46. Each rod 46 is connected in a pin joint connection to a link element 48.

The link element 48 forms one arm of a bellcrank. The other arm of the bellcrank is a link element 50. The bellcrank formed by the link elements 48 and 50 is connected to the lower shelf element 23 so that this shelf element rotates in unison with the bellcrank.

The outer link element 50 is connected to a link element 52 in a pin joint connection. The link element 52 is connected to a link element 54 in a pin joint connection.

The link element 54 is connected, by a set screw or by other means, to the upper shelf element 23 so that this shelf element rotates with the link element 54.

In operation, as the bar element 42 is pressed downwardly the rods 46 move upwardly (because of the loader action produced by the pivot pins 44), and the various link elements of the linkage means 41 move from the position shown in FIG. 4 to the position shown in FIG. 5. This causes the shelf elements 23 to rotate from the horizontal position shown in FIG. 4 to the vertical position shown in FIG. 5.

The rack arrangement shown in FIG. 1 is constructed so that the lower ends of the flower stems in each flower bunch may be trimmed at the level of the guide bar 28. The rack arrangement 11 is also constructed so that the racks 14 and 16, the racks adapted to receive the standard and select grades respectively, are located at the right-hand side of the grading station as the operator faces the rack arrangement 11. The racks 18 and 20, the racks adapted to receive the fancy and short grades, are located at the left-hand side of the rack arrangement 11. About 70 percent to 80 percent of the volume is in the standard and select grades. Most graders are right-handed. Putting these two grades nearest to the right-hand minimizes the reaching that is required and produces the most efficient operation.

As noted above, flowers are graded by blossom head size, by stem length, and by stem strength. From a functional standpoint let us assume that an individual flower picked up by a grader has a head side which is too small to go in the select rack 16 or the fancy rack 18. The grader might then try to put the flower in the standard rack 14. If the stem is long enough, the flower would stay in the standard rack. If the stem length is not long enough, the flower would then go to the last position, the shorts rack 20.

If a flower head is a good size flower, the flower would go into one of the middle two racks, the select rack 16 or the fancy rack 18. This would be determined by stem lengths. This rack arrangement gives the grower the best possible grade.

While we have illustrated and described the preferred embodiments of our invention, it is to be understood that these are capable of variation and modification, and we therefore do not wish to be limited to the precise details set forth, but desire to avail ourselves of such changes and alterations as fall within the purview of the following claims.

What I claim is:

1. A rack apparatus for forming a graded bunch of cut flowers as cut flowers of that grade are placed in the rack apparatus and comprising, a plurality of laterally spaced pairs of support members for engaging the underside of flower heads to support the flowers, each of said pairs of support members including a shelf element horizontally positioned to support the flower heads and pivotally mounted for swinging movement about one edge to a vertical position to increase the space between the pair of support members and to permit easy removal of the bunch.

2. A rack apparatus as defined in claim 1 including linkage means connected to the shelf elements and effective to rotate each of the shelf elements simultaneously on actuation of the linkage.

3. A rack apparatus as defined in claim 2 wherein the rack apparatus includes four pairs of support members and wherein the linkage means includes two sets of links with each set of links connected to operate two shelf elements.

4. A rack apparatus as defined in claim 2 wherein the linkage means includes a bar element which serves to position the lower ends of the flower stem close together as the cut flowers are placed in the rack apparatus.

5. A rack apparatus as defined in claim 1 wherein each pair of support members includes a fixed rod element extending parallel to the shelf element.

6. A rack apparatus as defined in claim 1 wherein the shelf elements contain recessed edge portions to facilitate ease of counting.

7. A rack apparatus as defined in claim 6 wherein the shelf elements are recessed to offset the first flower in the shelf to one side and to permit the next four flowers to be lined up one behind the other and to offset the last flower to one side.

8. A flower grading station for simultaneously grading cut flowers and forming the graded flowers in bunches by grade and comprising, a plurality of flower holding racks for forming graded bunches of cut flowers as the flowers are placed in the racks by grades, each rack apparatus comprising a plurality of laterally spaced pairs of support members for engaging the underside of flower heads to support members for engaging the underside of flower heads to support the flowers, each of said pairs of support members including a shelf element horizontally positioned to support the flower head and pivotally mounted for swinging movement about one edge to a vertical position to increase the space between the pair of support members and to permit easy removal of the graded bunch from the rack after the rack has been filled.

9. A flower grading station as defined in claim 8 wherein the racks are arranged at the station in a manner such that the grade racks which correspond to the grades of the flowers making up the largest volume of the ungraded cut flower material to be graded at the station are located closest to the right hand of an operator facing the rack at the grading station to minimize the reaching that is required and to produce the most efficient operation.