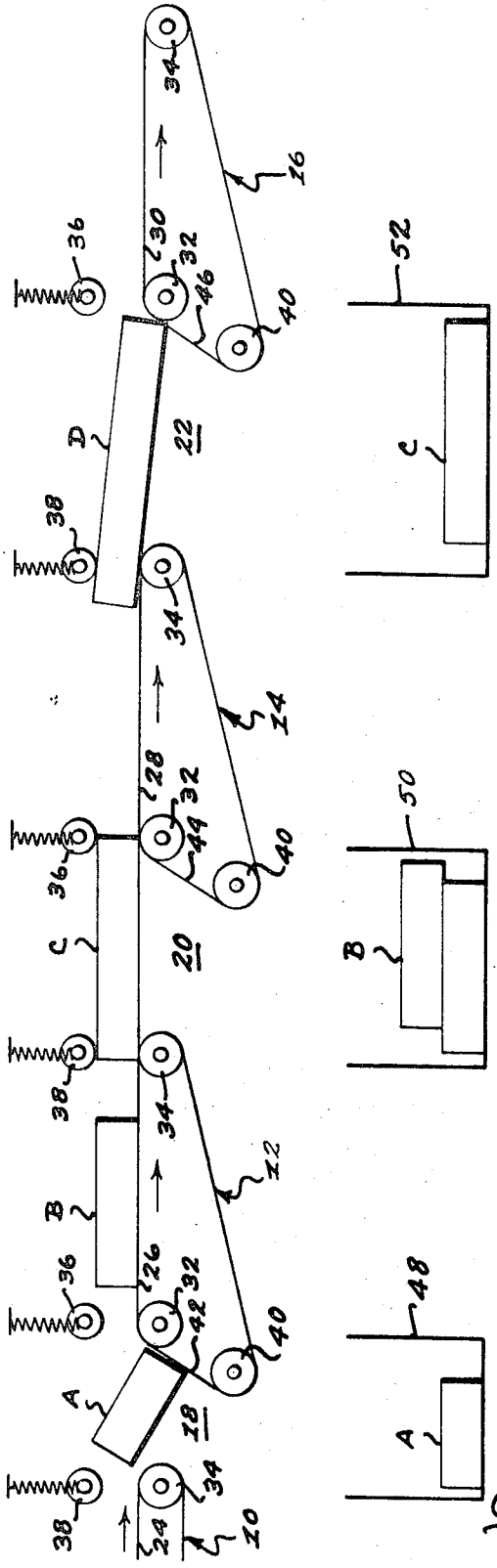
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METHOD AND MEANS FOR SORTING OBJECTS ACCORDING TO LENGTH

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METHOD AND MEANS FOR SORTING OBJECTS ACCORDING TO LENGTH

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ABSTRACT OF THE DISCLOSURE

An arrangement for sorting elongate objects of equal length from an indiscriminate mixture of such objects having varying lengths that differ discriminately within a selected length variation pattern; the sorting being effected by causing objects of the mixture to travel in lengthwise succession while providing for successive discriminate escape of objects from this succession in progressive relation to increasing length. The method and apparatus disclosed are applied representatively for sorting wooden, tubular sawn, billets obtained through cropping of imperfect cut stock to recover usable billets of selected shorter lengths therefrom.

CROSS-REFERENCE TO RELATED APPLICATIONS

This is a continuation-in-part of copending application Ser. No. 640,733, filed May 23, 1967, and concurrently abandoned in favor of the present application.

BACKGROUND OF THE INVENTION

This invention relates generally to the sorting of elongate objects according to length, and more particularly to such sorting from an indiscriminately mixed supply of objects differing discriminately in length through a substantial range and variety of selected length possibilities.

Elongate objects of the sort referred to are exemplified by billets of varying shorter lengths recovered from imperfect cut stock resulting from the operation of tubular sawing means of the type disclosed in U.S. Patent No. 3,163,190 for cutting cylindrical wooden billets from rough log sections. Such billets are well suited as blanks for many turned elements employed in furniture construction and the like. A normal consequence of cutting such billets from rough log sections, however, is a certain percentage of cut stock having imperfect lengthwise portions for one reason or another. And because tubular sawing means of the type indicated renders operation at high production rates possible, a normal percentage of imperfect cut stock commonly accumulates in sufficient quantity to warrant reclaiming.

The reclaiming is suitably done at a cropping saw equipped with selective gauging means allowing a maximum usable clear length of the imperfect cut stock to be measured off short of the defective portion before removal by the cropping saw. Because the imperfect portions will vary in extent and location, the salvaged clear lengths will likewise vary and produce a reclaim output at the cropping saw that is indiscriminately mixed as to length. By way of specific example, when the tubular sawing is done from log sections that are 46" in length, it has been found practical to arrange the selective gauging means for alternative cropping of the imperfect cut stock at any of 4", 6", 8", 10", 12", 16", 20" or 24" measurements from either end. The complementary clear lengths resulting from the cropping saw operation comprise an output of mixed character that must then be sorted as to length for useful reclaiming.

The prior art includes proposals for sorting by selective actuation of diverting mechanism in response to a sensing of length, as in U.S. Patent No. 3,080,052; as well as arrangements for delivering a dependable supply of elements normally having a given length by discarding imperfect elements from the supply in the course of delivery, as in U.S. Patents No. 2,501,403 and No. 3,106,291.

The method and apparatus of the present invention, on the other hand, effects sorting through direct length discrimination in a particularly simple manner providing consistent results at good handling rates.

SUMMARY OF THE INVENTION

Generally characterized, sorting is accomplished according to the present invention by transporting the elongate objects to be sorted in lengthwise succession while interrupting the transporting cause at successive intervals sized progressively for selectively releasing the objects in spaced progression according to increasing length. Selective release of the objects is effected by transiently holding the objects against release at the beginning of every interval interrupting the transporting cause as well as at the end of every such interval until reaching the one that is sized to corresponding length.

BRIEF DESCRIPTION OF THE DRAWING

The single figure of the drawing diagrammatically illustrates an arrangement of sorting means according to the present invention and indicates the manner of operation.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The drawing shows elongate objects A, B, C and D of varying length in the course of being sorted as to length.

The sorting is done by means of a plurality of serially spaced conveyor sections **10**, **12** **14** and **16** arranged for transporting the objects A–D to be sorted in lengthwise succession. The first conveyor section **10** serves in the extent not shown to receive or pick up the objects A–D indiscriminately from a mixed supply thereof and start them in the lengthwise succession through the sorting course in which the remaining conveyor sections **12–16** are successively aligned for receiving an object A–D from a preceding conveyor section **10–14** across the spacing therebetween whenever the object length will bridge the spacing, while these intervening spacings at **18**, **20** and **22** are sized in progressive correspondence with increasing object length so that the shortest length will not bridge the first spacing **18** and so on.

The conveyor sections **10–16** each include an active transport reach formed by generally horizontal runs **24**, **26**, **28** and **30** of moving belts trained over supporting rollers **32** and **34** defining the extent of each reach, and are additionally provided with holding rollers **36** and **38** paired with each supporting roller **32** and **34** at each conveyor spacing **18–22** and yieldably biased in opposed relation thereat, either directly above or somewhat offset from the related supporting rollers, for transiently riding and effecting transfer across each such spacing of all objects A–D that are long enough to bridge the spacing. All conveyor sections **12–16** but the first are also preferably provided with an auxiliary training roller **40** spaced below and sufficiently in advance of the supporting roller **32** defining the respective transport reach **26**, **28** or **30** to dispose a leading upwardly inclined reach **42**, **44** or **46** of the moving conveyor belt for righting action at a sagging end of any object A–D long enough to bridge the spacing **18**, **20** or **22** thereat.

The manner in which the sorting takes place is indicated by the drawing illustration in which an object A

of the shortest length included in the mixed supply to be sorted is shown being released through the first conveyor spacing **18**, while an object B of the next longer length appears after having passed across the spacing **18** to the second conveyor section **12**; a next longer object C is at the point of bridging the second conveyor spacing **20** under the holding influence of the riding rollers **36** and **38** thereat; and the longest object D is seen crossing the last conveyor spacing **22** and about to have its forward sagging end righted by the leading inclined reach **46** of the last conveyor section **16**.

The lengthwise succession of the objects A–D through the conveyor course is readily maintained by any suitable arrangement of channeling guides (not shown) and any suitable sort of receptacles, as at **48**, **50** and **52**, may be arranged below the conveyor spacings **18**, **20** and **22** to catch and accumulate a sorted supply of the respective objects A, B and C released thereat. The longest object D will simply be delivered by the last conveyor section **16** for similar accumulation. The number of conveyor sections **10–16** provided in a particular instance must correspond to the number of length variation possibilities in the mixed supply to be sorted, and it will be apparent that the succession of conveyor sections described can be extended to handle as many possibilities as are presented by a given length variation pattern.

The present invention has been described in detail above for purposes of illustration only and is not intended to be limited by this description or otherwise except as defined in the appended claims.

I claim:

1. The method of sorting elongate objects according to length from an indiscriminately mixed supply of such objects having varying lengths that differ discriminately within a selected length variation pattern, which method comprises causing objects from said supply to be transported horizontally in lengthwise succession, while interrupting the transporting cause at successive intervals sized progressively for releasing said objects from said cause in spaced progression according to increasing length, and transiently holding said objects against release at the beginning of every such interval as well as at the end of every interval except for the one that is sized to corresponding length.

2. Apparatus for sorting elongate objects according to length from an indiscriminately mixed supply of such objects having varying lengths that differ discriminately within a selected length variation pattern, said apparatus comprising a plurality of conveyor means arranged in serially spaced relation for transporting objects from said supply in lengthwise succession, the number of conveyor means corresponding to the number of possibilities in said length variation pattern, and the spacing between the conveyor means of said plurality being sized in progressive correspondence with increasing length possibilities of said objects, said spaced conveyor means each having an active transport reach, said active transport reaches being successively aligned for receiving objects from a preceding reach across the spacing therebetween, and means for transiently holding said objects against release at the beginning of every such spacing as well as at the end of every spacing except for the one that is sized to corresponding length.

3. Apparatus for sorting elongate objects as defined in claim **2** and further characterized in that said active transport reaches are formed by generally horizontal runs of moving belts trained over supporting rollers defining the extent of each reach, and in that each of said holding means is formed by rollers paired with each run defining supporting rollers at each conveyor spacing and yieldably biased in opposed relation thereat for transiently riding and effecting transfer across each spacing of all objects long enough to bridge the spacing.

4. Apparatus for sorting elongate objects as defined in claim **3** and further characterized in that all but the first of said serially spaced conveyor means including an auxiliary training roller spaced below and sufficiently in advance of each supporting roller defining the beginning of a transport reach to dispose a leading upwardly inclined reach of said moving belt for righting action at a sagging forward end of any object long enough to bridge the spacing thereat.

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