

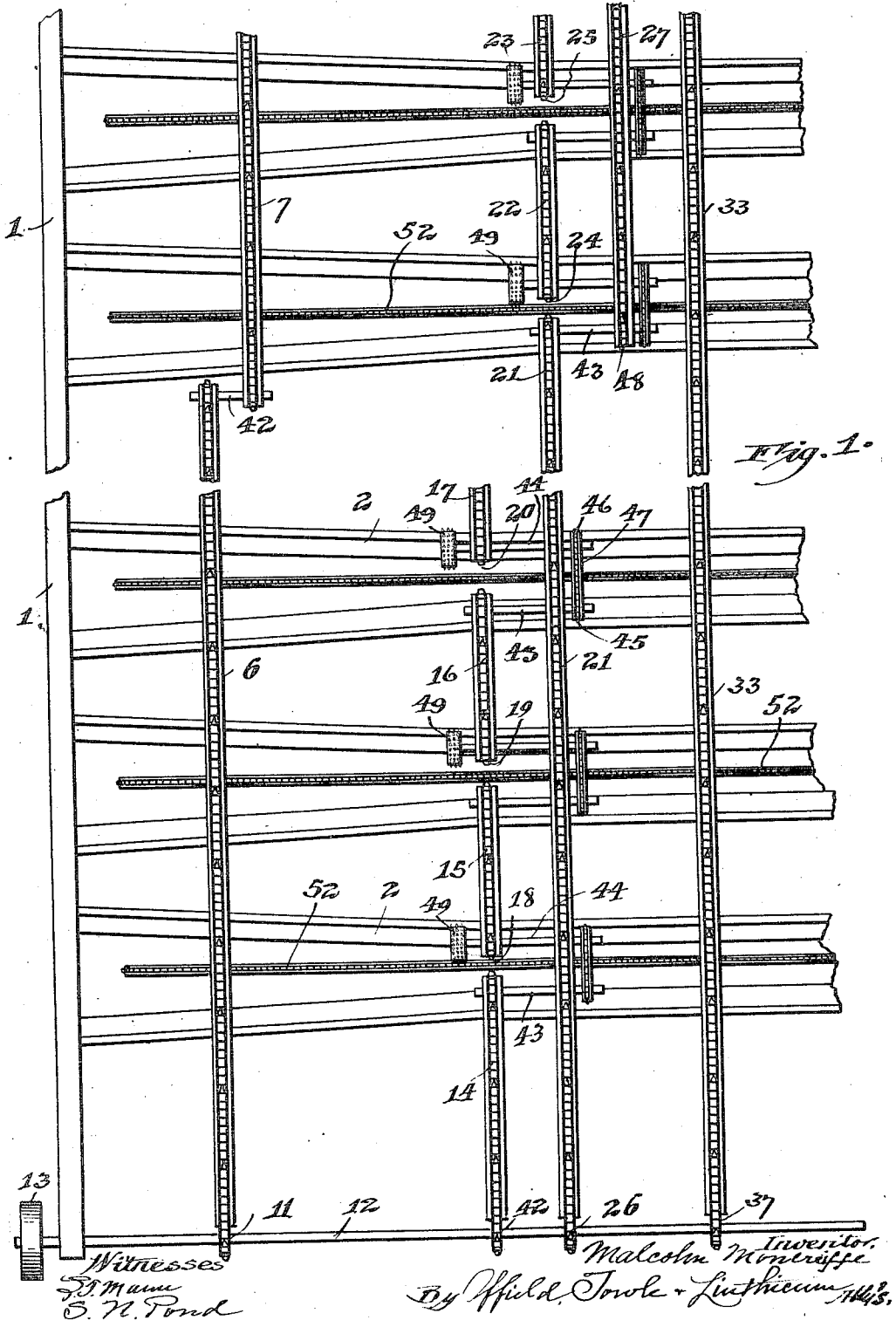
M. MONCREIFFE.
LUMBER SORTER.

APPLICATION FILED MAR. 27, 1909.

Patented July 19, 1910.

964,670.

4 SHEETS—SHEET 1.

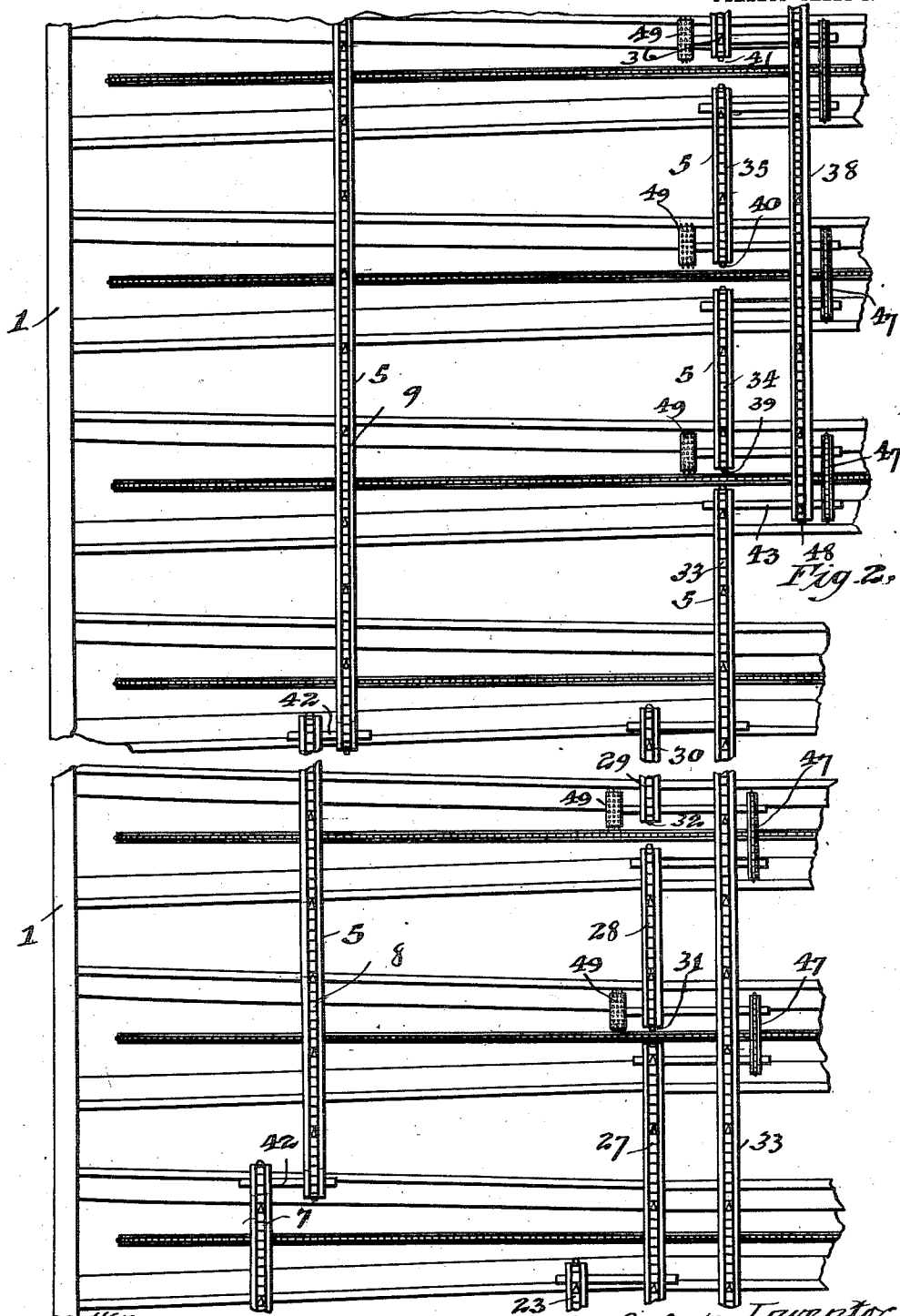


M. MONCREIFFE.
LUMBER SORTER.
APPLICATION FILED MAR. 27, 1909.

964,670.

Patented July 19, 1910.

4 SHEETS—SHEET 2.



Witnesses,
S. M. Mann
S. W. Ford

Inventor
Malcolm Moncreiffe,
By *Offield, Torrie & Smith*
Attys.

M. MONCREIFFE.

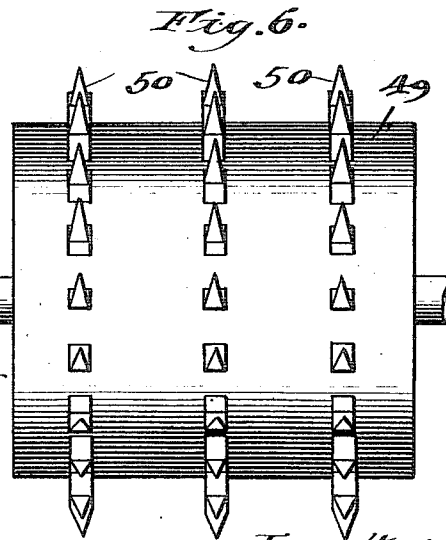
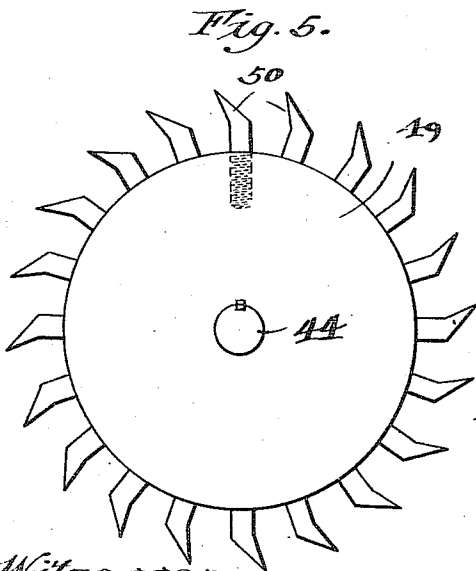
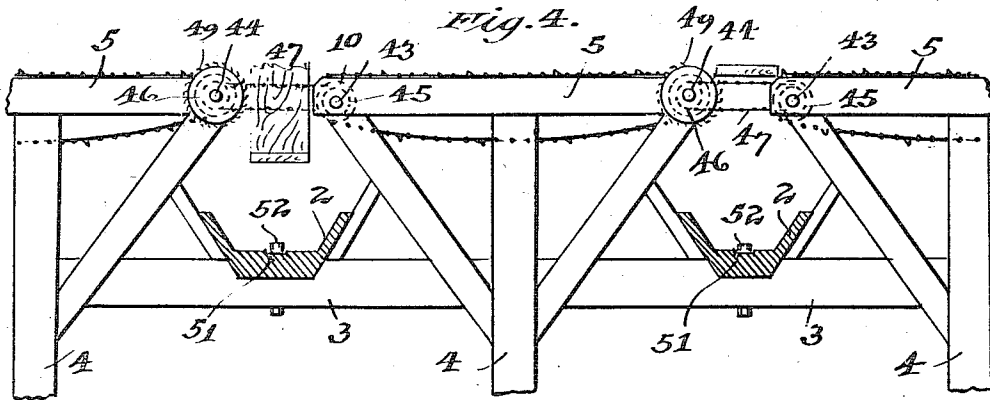
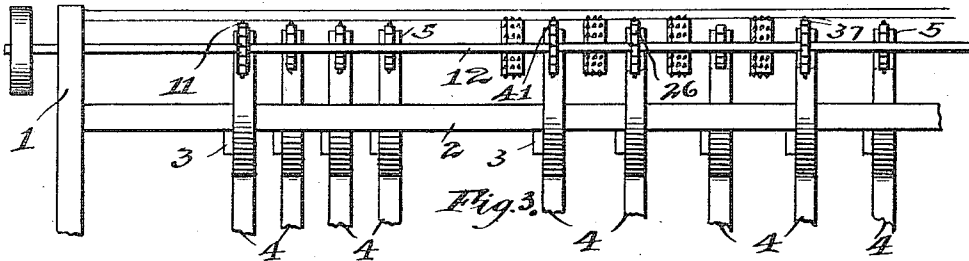
LUMBER SORTER.

APPLICATION FILED MAR. 27, 1909.

Patented July 19, 1910.

964,670.

4 SHEETS—SHEET 3.



Witnesses,
S. Mann
S. N. Pond

Inventor,
Malcolm Moncreiffe,
By Offield, Towle & Lathrop
Attys.

M. MONCREIFFE.
LUMBER SORTER.

APPLICATION FILED MAR. 27, 1909.

Patented July 19, 1910.

4 SHEETS—SHEET 4.

964,670.

Fig. 7.

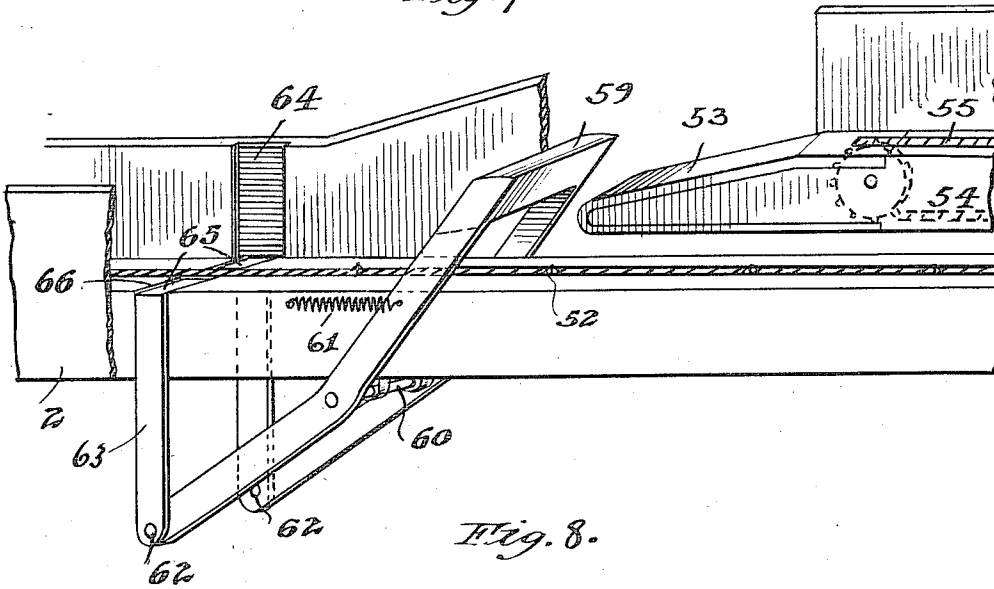


Fig. 8.

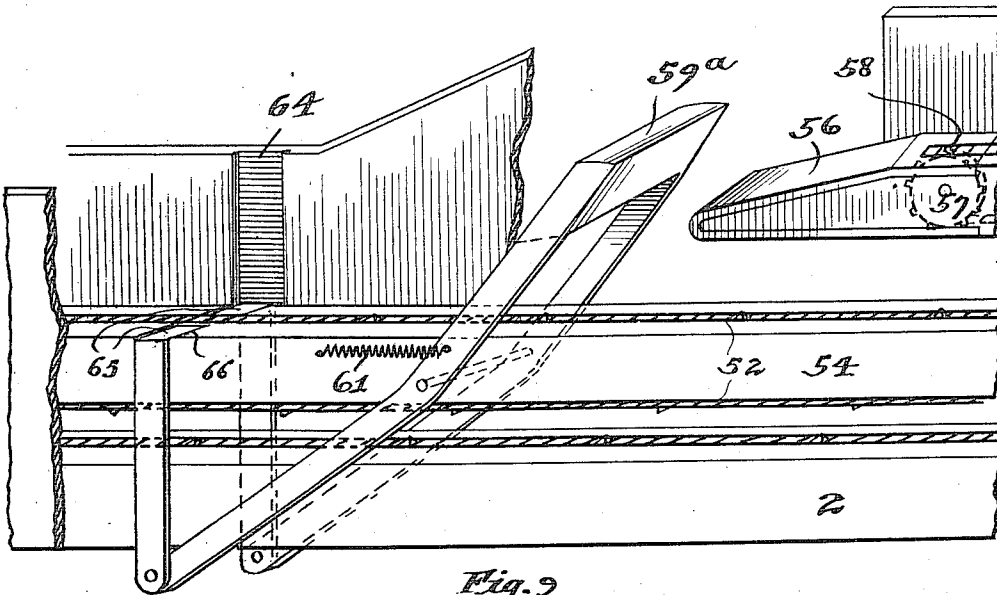


Fig. 9.

Witnesses,
S. Mann.
S. N. Pond

Inventor,
M. Moncreiffe,
By Offield, Fowler & Smith
Attys.

UNITED STATES PATENT OFFICE.

MALCOLM MONCREIFFE, OF BIG HORN, WYOMING.

LUMBER-SORTER.

964,670.

Specification of Letters Patent.

Patented July 19, 1910.

Application filed March 27, 1909. Serial No. 486,274.

To all whom it may concern:

Be it known that I, MALCOLM MONCREIFFE, a citizen of the United States, residing at Big Horn, in the county of Sheridan and State of Wyoming, have invented certain new and useful Improvements in Lumber-Sorters, of which the following is a specification.

This invention relates to the art of lumber-sorting devices, and has for its main object to provide a simple and automatic mechanism whereby boards and timbers of varying lengths, widths and thicknesses can be fed into the mechanism in miscellaneous order, and be sorted thereby.

In its most complete form, the apparatus of my invention effects a sorting or selection of the lumber according to length, width and thickness; but it is to be understood that the invention as defined by the appended claims is not necessarily limited to an apparatus having all of these functions, since the invention embodies novelty in the several mechanisms employed for effecting a sorting of the lumber according to any one or more of the several dimensions specified.

The apparatus, in its most complete form, wherein it effects a sorting according to the three dimensions referred to, comprises, generally stated, the following instrumentalities. A guide-rail or wall, adapted to constitute an abutment for one end of all the planks or timbers introduced to the machine, extends the full length of the apparatus on one side thereof. Disposed parallel with the guide-rail are a series of endless-chain conveyor sections which are offset laterally at varying distances relatively to each other and to the guide-rail so as to support and carry lumber of differing lengths between the shortest and the longest planks or timbers designed to be handled by the machine. These conveyor sections are so arranged that each plank or timber will be supported on at least a pair of said sections, one in the vicinity of each end; and one of these sections (the one most remote from the guide-rail) is formed at intervals with gaps, which gaps are of varying length; so that, as a plank or timber reaches one of said gaps, if it is narrower than the said gap, the end thereof supported by the conveyor will drop through the gap. If, on the other hand, the plank or timber is wider than the gap which it meets, it will override the gap, being assisted therein by a rotary lifting

device intended to prevent its being delayed or stuck in the gap, and will pass on until it comes to a gap of appropriate length to permit of its dropping therethrough. The planks or timbers, as fast as they drop through the width-sorting gaps, fall into underlying troughs and, by means of conveyers located in the bottoms of said troughs and running longitudinally thereof, are carried away endwise and are further separated according to thickness by a series of additional sorters which automatically select the successive planks or timbers according to the thickness thereof and divert them to different points of delivery.

In the drawings accompanying the present application I have represented, in part somewhat diagrammatically, an apparatus employing the principle and capable of performing the several functions of the invention, although it is to be understood that the particular apparatus illustrated represents but one of many specific forms in which the principle of the invention may find expression.

Referring to said drawings,—Figures 1 and 2 are broken plan views, the latter a continuation of the former, of that portion of the apparatus whereby the lumber is sorted according to length and width. Fig. 3 is an end elevational view of the entrance end of the apparatus, represented at the lower end of Fig. 1. Fig. 4 is an enlarged fragmentary side elevational view, in cross-section through the underlying troughs, more particularly illustrating the operation of the device which sorts the lumber according to width. Figs. 5 and 6 are end and side elevations, on an enlarged scale, of a rotary device which insures the passage across each of the sorting gaps of a board too wide to pass therethrough. Figs. 7 and 8 are perspective views of a device whereby the lumber is sorted according to thickness, Fig. 8 representing an extension to the right of the mechanism shown in Fig. 7. Fig. 9 is an enlarged detail in vertical longitudinal section through a portion of a delivery chute and a selective device therein.

Referring to the drawings, 1 designates a guide-rail or wall that extends continuously the full length of the machine at one side thereof and constitutes an abutment or guide for one end of all the boards, planks or timbers of varying lengths that are run through the machine.

2 designates each of a series of trough-shaped delivery chutes that are disposed at right angles to the guide-rail 1 at intervals throughout the length of the machine, said
 5 troughs at one end lying against or extending substantially into the vertical plane of the guide-rail 1 and being supported on rails 3 that are, in turn, secured to and supported by a series of uprights 4. Secured to and
 10 properly braced on the upper ends of said uprights 4 are a series of bars 5 of varying lengths that are channeled longitudinally of their upper sides to provide supports and ways for a corresponding number of endless
 15 conveyer chains. These several conveyer chains are of varying lengths, and are variously disposed so as to effect an automatic sorting of the lumber according to both length and width, as the lumber is carried along
 20 thereby, as will now be explained. At the left hand side of the machine, as viewed in Figs. 1 and 2, and lying nearest to the guide-rail 1, are a series of laterally offset conveyers designated by 6, 7, 8 and 9, these endless
 25 conveyers being mounted at their ends on sprocket wheels, such as 10 (Fig. 4) journaled in the ends of the several bars 5, with the exception of one end of the conveyer 6 which is mounted upon a driving
 30 sprocket 11 fast on a driving shaft 12 mounted across the entrance end of the machine and actuated from a suitable source of power by a pulley 13.

The several offset conveyers 6, 7, 8 and 9
 35 are designed to support and carry forward the ends of the lumber which lie against the guide-rail 1. The other ends are supported and carried forward by various other conveyer sections which are separated or spaced
 40 apart at varying distances above the several troughs 2 to permit said ends of the lumber to drop therethrough according to the width thereof; said remaining conveyer sections being also laterally offset so as to effect a
 45 sorting of the lumber according to length. To this end, at the entrance portion of the machine represented on Fig. 1, there is provided a series of short sections such as 14, 15, 16 and 17 extending between a driving
 50 sprocket 72 on the driving shaft 12 and the first trough 2 and between the successive adjacent troughs 2 which lie nearest the entrance end of the machine and are designed to sort according to width the shortest pieces of
 55 lumber. The proximate ends of said conveyer sections 14, 15, 16 and 17 are spaced or separated directly over said troughs at varying distances from each other, as shown at 18, 19 and 20. Next beyond the broken or
 60 interrupted conveyer represented by the short sections 14, 15, 16, 17, etc., and laterally offset therefrom in a direction away from the guide-rail 1, is a second broken or interrupted conveyer comprising sections 21,
 65 22, 23, etc., which lie opposite the conveyer

section 7. These sections 21, 22, 23, etc., are likewise spaced or separated directly above the several troughs which they overlie at varying distances from each other, as shown at 24 and 25. The sections 21, 22, 23, etc.,
 70 in coöperation with the offset continuous section 7, are designed to handle and effect the sorting of the next longest pieces of lumber; and in order that the latter may be carried over the several spaced sections 14, 15,
 75 16, 17, etc., I extend the first section 21 of the series back alongside the sections 14, 15, 16, 17, etc., to the entrance end of the machine, driving said section by a sprocket 26 on the driving shaft 12. This same principle may be carried forward to any extent,
 80 according to the number of different lengths into which it is desired to separate or sort the lumber. In the machine as illustrated, I have shown, beyond the separated sections
 85 21, 22, 23, etc., and laterally offset in a direction away from the guide-rail 1, another interrupted conveyer comprising the sections 27, 28, 29, 30, etc., the section 27, like the section 21 of the preceding series, being extended
 90 inwardly alongside of the sections 21, 22, 23, etc., in order to form a support for the longer lengths intended to be sorted by the sections 27, 28, 29, 30, etc., and the last-named sections are likewise spaced or separated
 95 at varying distances directly over the troughs which they overlie, as shown at 31 and 32. Opposite the section 9 is located still another interrupted conveyer, comprising the separated sections 33, 34, 35, 36, etc.,
 100 designed to handle still longer lengths of lumber that travel unaffected over the sorting section previously described. The first section 33 of this series may begin at a point opposite the forward end of the first section
 105 27 of the preceding series, but preferably I extend it continuously inward to the entrance end of the machine, as shown, it being actuated from a sprocket 37 on the driving shaft, in order that it may form a support and carrier for the longer lengths which
 110 are handled by sorting sections still more remote from the entrance end of the machine, the initial section of the next sorting series being indicated at 38 to the right of the sections 33, 34, 35 and 36. These last-named sections are, like those already described, spaced or separated at varying distances directly over the troughs which they overlie,
 115 as shown at 39, 40 and 41.

The conveyers 6, 7, 8 and 9 are all drivingly connected by counter-shafts 42 between the sprockets 10 at the overlapping ends of the conveyers. The individual sections of the several broken or interrupted
 125 conveyers are drivingly connected as by counter-shafts 43 and 44 suitably journaled in and between laterally adjacent bars 5, said counter-shafts at or near one end carrying the sprockets 10 of the conveyer sections, 120

and, at or near their opposite ends, being drivingly connected by sprockets 45 and 46 and sprocket chains 47. Those of the shafts 43 which are driven by the conveyer sections 21 and 33 carry sprockets 48 which constitute the driving means for the conveyers 27 and 38, respectively.

In order to insure the passage across the gaps between the sections of the interrupted conveyers of lumber too wide to drop through said gaps, I provide on the remote side of each gap, relatively to the direction in which the lumber is traveling, a device for catching a board or timber beneath its forward edge and by a combined lifting and pulling action carrying it across the gap. This device, as herein shown, comprises a drum or cylinder 49, shown in enlarged detail in Figs. 5 and 6, the surface of said cylinder being set with one or more annular rows of sharp pointed teeth 50, which may be conveniently screwed therein, as indicated in Fig. 5, the outer or pointed portions of said teeth preferably, and as shown, being inclined somewhat in the direction of rotation of the cylinder. This toothed cylinder is mounted on the opposite end of each counter-shaft 44 from that which carries the sprocket 46, and is, of course, rotated by the shaft 44 in a direction corresponding to the direction of rotation of the several sprockets on which the conveyer chains are mounted. Each toothed cylinder is so positioned as to lie directly opposite and just inwardly (toward the rail 1) of the receiving end of each section of the several broken or interrupted conveyers; and, in operation, when a plank or timber too wide to drop through the gap between any two of said sections reaches said gap, its advance edge is caught by the teeth of the cylinder, which both lift and draw it across the gap, insuring its safe passage thereover, as illustrated at the right in Fig. 4. Where, however, the timber is of the proper width to drop through the gap, it is unaffected by the rotation of the toothed cylinder, as illustrated at the left in Fig. 4.

The several troughs 2 which underlie at right angles the several conveyers above described, are grooved longitudinally of their bottoms, as shown at 51, to receive endless conveyer chains 52, the upper or working sections of said conveyer chains traveling in a direction away from the guard-rail 1. As each piece of lumber falls through a gap in the broken or interrupted conveyer, one end thereof drops down into and is caught and drawn off by the flights of the conveyer 52, and is thereby continued through the trough 2 to its point of destination.

The machine as thus far described is complete for effecting a sorting of the lumber both according to length and according to width. In the most complete and preferred form of the apparatus, I employ, in connection

with each of the several delivery troughs, a device which further sorts the lumber delivered by each trough according to thickness. This device is illustrated in Figs. 7, 8 and 9, which will now be described. At a point on each delivery chute 2 remote from the guide-rail 1 by a distance at least equal to the length of the longest lumber to be handled, is located the tapered receiving end 53 of a superposed similar trough or chute 54, which latter is provided with an endless conveyer 55, similar in all respects to the conveyer 52; and at an equal or greater distance from the receiving end 53 of the trough 54 may be located (according to the extent of the sorting desired) the tapered receiving end 56 of still another superposed delivery trough or chute 57 similarly equipped with an endless conveyer 58. Just in advance of each of the tapered receiving ends 53 and 56 is located a selective device which, in the form herein shown, comprises a bail-shaped member 59 that, as shown in Fig. 7, straddles the trough 2, the arms of said bail being pivoted to the under side of said trough as at 60, and provided with a suitable spring such as 61, adapted to maintain the transverse member or gage-bar of the bail elevated a certain distance above the bottom of the trough, according to the thickness of the lumber designed to be passed thereby. To the lower ends of the arms of the bail are pivoted at 62 a pair of substantially vertical arms 63 which extend up alongside the inner faces of the side walls of the trough, which latter may be transversely grooved, as shown at 64, to guide said arms, and the latter are formed with inwardly bent horizontal end portions 65 which normally lie in transverse grooves 66 formed in the upper face of the bottom wall of the trough so as not to interfere with the travel of lumber over the latter, said horizontal end portions 65 extending approximately to the sides of the conveyer. The arms 63 with their transverse extensions 65 together constitute a lifter to elevate all pieces of lumber exceeding a certain thickness onto the next superposed chute or trough. Where a second selective device is employed, as shown in Fig. 8, the same form and arrangement may be employed, the bail 59^a being in this instance pivoted to the bottom of the uppermost trough or chute with its gage-bar at a greater height above the bottom of chute 54 and its depending arms embracing both chutes 54 and 2.

In operation, as the planks or timbers are carried along the chute 2, if it is of such a thickness that it will pass beneath the gage-bar of the bail 59 and beneath the superposed trough 54 (which is substantially the same distance above the bottom of the trough 2 as the gage-bar of the bail 59) it will pass on without affecting or disturbing the selective

device; and the same is true in the case of a plank or timber that reaches the selective device applied to the trough 54 (Fig. 8). If, however, the piece is too thick to pass beneath the gage-bar of the bail 59, it will strike the same and rock it on its pivot, thereby raising the lifter, which will elevate the piece sufficiently to cause its nose to enter upon the inclined receiving end 53 of the trough 54, and the conveyer of the trough 2 will move it thereover until the conveyer 55 of the trough 54 has taken hold of it. As soon as the piece has passed, the selective device is automatically returned to normal position by the spring 61. Precisely the same action takes place in the case of the selective device applied to the trough 54 in Fig. 8, said selective device handling the thicker pieces that have passed the smaller selective device of Fig. 7. Of course, any number of delivery troughs equipped with selective devices as above described may be employed, according to the fineness and extent of the sorting desired.

From the above it will be seen that my invention, in its complete form, enables sticks, logs, planks, timbers, and other like pieces of lumber of varying lengths, widths and thickness, to all be fed in at the receiving end of the machine, and the latter first sorts them according to length, at the same time sorting the several groups of like length according to width; and, finally, sorts each of the selected groups which are of like length and width according to thickness. So far as I am aware, my present invention presents the first instance of an apparatus capable of automatically effecting the sorting of lumber according to length, width or thickness, or according to any two or all of these dimensions; and hence it should be understood that the apparatus as disclosed may be considerably modified in respect to details without involving any departure from the broad principle of the invention or sacrificing any of the advantages thereof. For instance, it may not be necessary in all cases to extend that section of each of the interrupted or broken conveyers to the receiving end of the machine, a mere blank supporting rail being sometimes sufficient. The only essential in this regard is that the apparatus shall present a pair of conveyer chains or other carriers which respectively engage each piece, irrespective of its length, on opposite sides of its longitudinal center, to thereby avoid the danger of the pieces becoming canted or out of substantial parallelism with the underlying delivery troughs or chutes during their passage through the machine.

I claim:

1. In a lumber sorter, the combination with a suitable supporting frame, of means for carrying lumber sidewise thereover, and

means for automatically sorting the lumber according to width during its travel, substantially as described.

2. In an apparatus for automatically sorting lumber, the combination with a suitable frame, of a pair of conveyers mounted thereon adapted to advance the lumber sidewise, one of said conveyers being formed in a plurality of spaced sections whereby to permit lumber narrower than the space or spaces between said sections to drop therethrough, substantially as described.

3. In an apparatus for automatically sorting lumber, the combination with a suitable frame, of a pair of conveyers mounted thereon adapted to advance the lumber sidewise, one of said conveyers being formed in a plurality of sections spaced apart varying distances, substantially as described.

4. In an apparatus for automatically sorting lumber, the combination with a suitable frame, of a pair of conveyers mounted thereon adapted to advance the lumber sidewise, one of said conveyers being formed in a plurality of sections spaced apart varying distances, and means located adjacent to the spaces between said sections for facilitating the passage thereover of lumber too wide to drop therethrough, substantially as described.

5. In an apparatus for automatically sorting lumber, the combination with a suitable frame, of a pair of conveyers mounted thereon adapted to advance the lumber sidewise, one of said conveyers being formed in a plurality of sections spaced apart varying distances, and a rotary peripherally toothed device journaled adjacent to the remote end of each of said spaces to catch and draw over said spaces lumber too wide to drop therethrough, substantially as described.

6. In a lumber sorter, the combination with a suitable supporting frame, of means for carrying lumber sidewise thereover, a guide-rail at one side of said frame constituting an abutment guide for one end of lumber of varying lengths and means for automatically sorting the lumber according to length during its travel, substantially as described.

7. In an apparatus for automatically sorting lumber, the combination with a suitable frame, of a guide-rail at one side thereof constituting an abutment guide for one end of lumber of varying lengths, a conveyer disposed parallel with said guide-rail adapted to support and carry the lumber at one end, and a plurality of conveyers laterally offset at their contiguous ends disposed parallel with said guide-rail and adapted to support and carry the lumber at the other end, substantially as described.

8. In an apparatus for automatically sorting lumber, the combination with a suitable frame, of a guide-rail at one side thereof

constituting an abutment guide for one end of lumber of varying lengths, a conveyer formed in a plurality of laterally offset sections disposed parallel with and contiguous to said guide-rail and adapted to support and carry the lumber at one end, and a plurality of other conveyers laterally offset at their contiguous ends disposed parallel with said guide-rail and adapted to support and carry the lumber at the other end, substantially as described.

9. In a lumber sorter, the combination with a suitable support, of means for conveying the lumber thereover, and means for automatically sorting the lumber according to thickness during its travel, substantially as described.

10. In a lumber sorter, the combination with a suitable support, of means for carrying lumber lengthwise thereover, and means for automatically sorting the lumber according to thickness during its travel, substantially as described.

11. In a lumber sorter, the combination with a chute, of a conveyer mounted in and traveling longitudinally of the bottom of said chute, and a selective device mounted across the path of the lumber adapted to separate the same according to thickness, substantially as described.

12. In a lumber sorter, the combination with a pair of chutes one located above and parallel with the other, of conveyers mounted in and traveling longitudinally of the bottoms of said chutes, respectively, and a selective device mounted across the path of the lower chute directly in advance of the entrance end of the upper chute, said selective device permitting the passage thereby in the lower chute of all lumber not exceeding a certain width and automatically deflecting into said upper chute all lumber exceeding said width, substantially as described.

13. In a lumber sorter, the combination with a pair of chutes one located above and parallel with the other, of conveyers mounted in and traveling longitudinally of the bottoms of said chutes, respectively, and a selective device mounted across the path of the lower chute directly in advance of the entrance end of the upper chute, said selective device comprising a lever pivoted intermediate its ends to said lower chute, the upper arm of said lever carrying a transverse gage-bar overlying said chute, a

spring normally maintaining said gage-bar in its elevated position, and a lifter connected to the other arm of said lever and also extending transversely of the bottom of said chute in advance of said gage-bar, substantially as described.

14. In a machine for sorting lumber according to a plurality of dimensions, the combination with means for automatically separating the lumber into a plurality of groups according to length, of means for automatically sorting the lumber in each of said groups according to width, substantially as described.

15. In a machine for sorting lumber according to a plurality of dimensions, the combination with means for automatically separating the lumber into a plurality of groups according to width, of means for automatically sorting the lumber in each of said groups according to thickness, substantially as described.

16. In a machine for sorting lumber according to a plurality of dimensions, the combination with means for automatically separating the lumber into a plurality of groups according to length, of means for automatically sorting the lumber in each of said groups according to thickness, substantially as described.

17. In a machine for sorting lumber according to a plurality of dimensions, the combination with means for automatically separating the lumber into a plurality of groups according to length, of means for automatically separating the lumber in each of said groups into a plurality of other groups according to width, and means for automatically sorting the lumber in each of said last-named groups according to thickness, substantially as described.

18. In an apparatus for automatically sorting lumber, the combination with a suitable support of means for carrying lumber lengthwise thereof, means adapted to be engaged by a piece of lumber exceeding a predetermined width whereby the piece of lumber is raised and directed from the lumber carrying means, and a second lumber carrying means positioned to receive the lumber which has been deflected from the first means, substantially as described.

MALCOLM MONCREIFFE.

Witnesses:

**GEORGE HUTTON,
WILLIAM PAUL.**