No. 790,182. PATENTED MAY 16, 1905.

J. H. BUTTERWORTH.

SAWING MACHINE.

APPLICATION FILED JUNE 3, 1904.

3 SHEETS—SHEET 1.

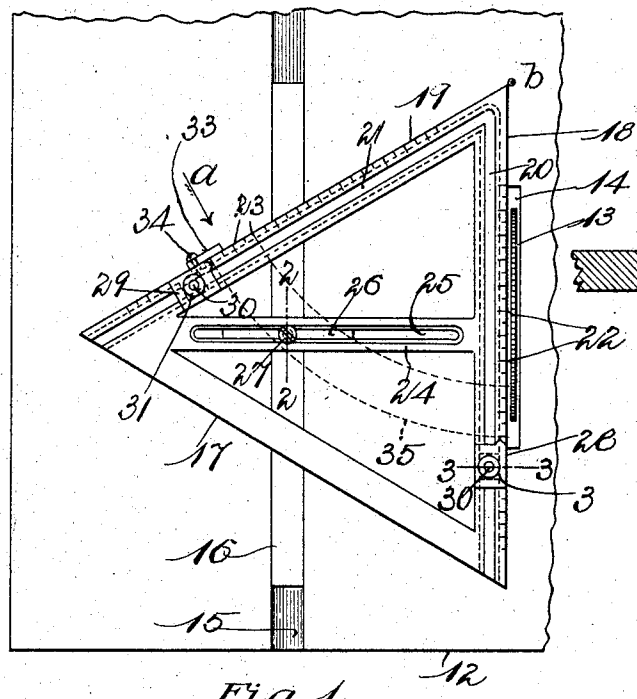


Fig. 1.

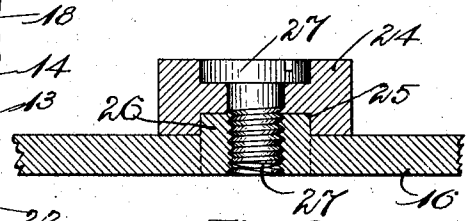


Fig. 2.

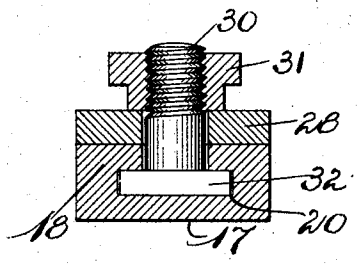


Fig. 3.

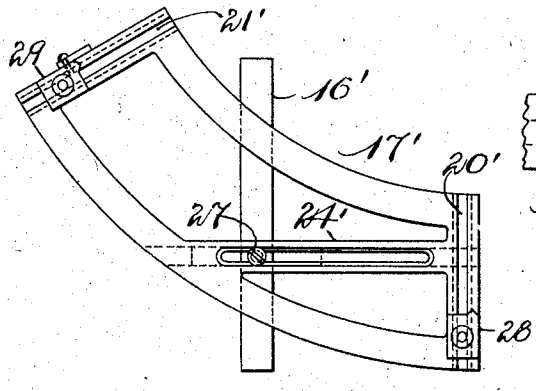


Fig. 5.

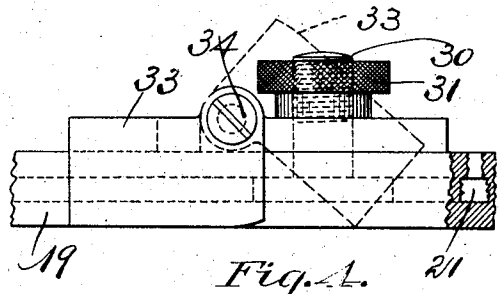


Fig. 4.

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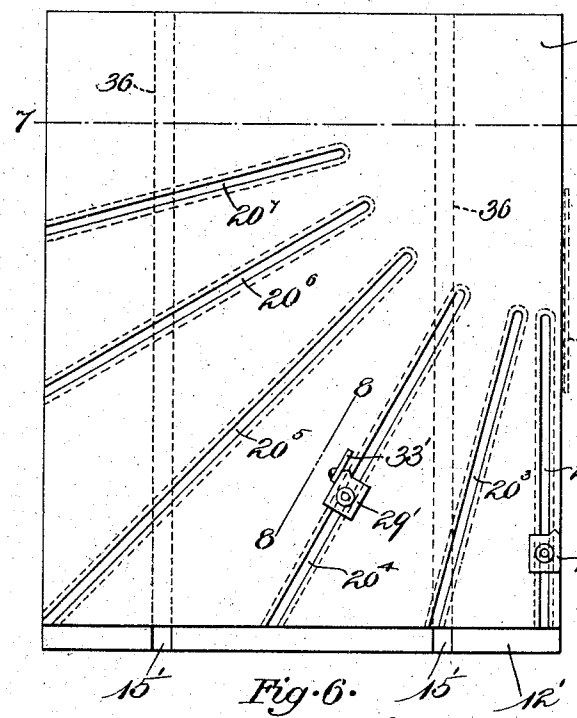
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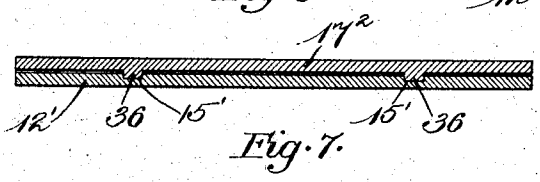
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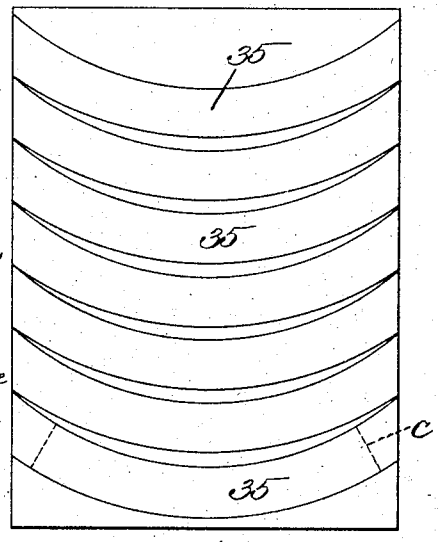
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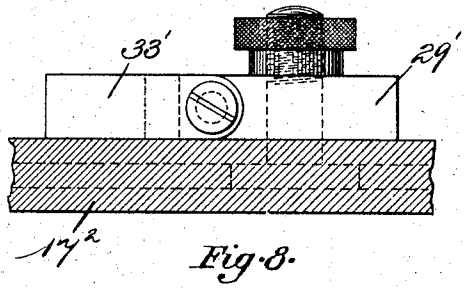
Fig·6.



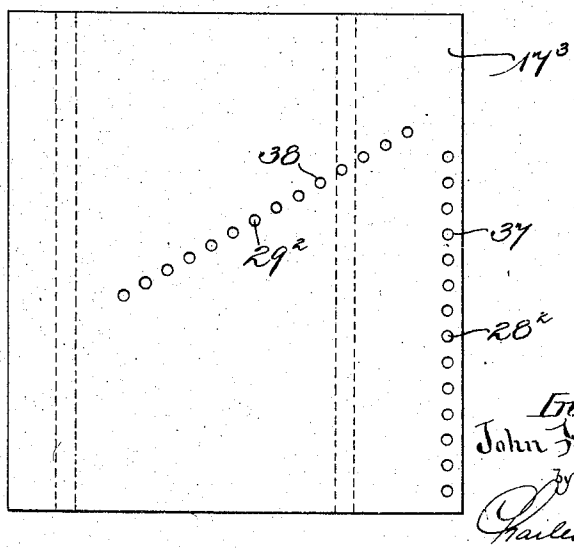
Fig·7.



Fig·9.



Fig·8.



Fig·10.

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SAWING MACHINE.

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3 SHEETS—SHEET 3.

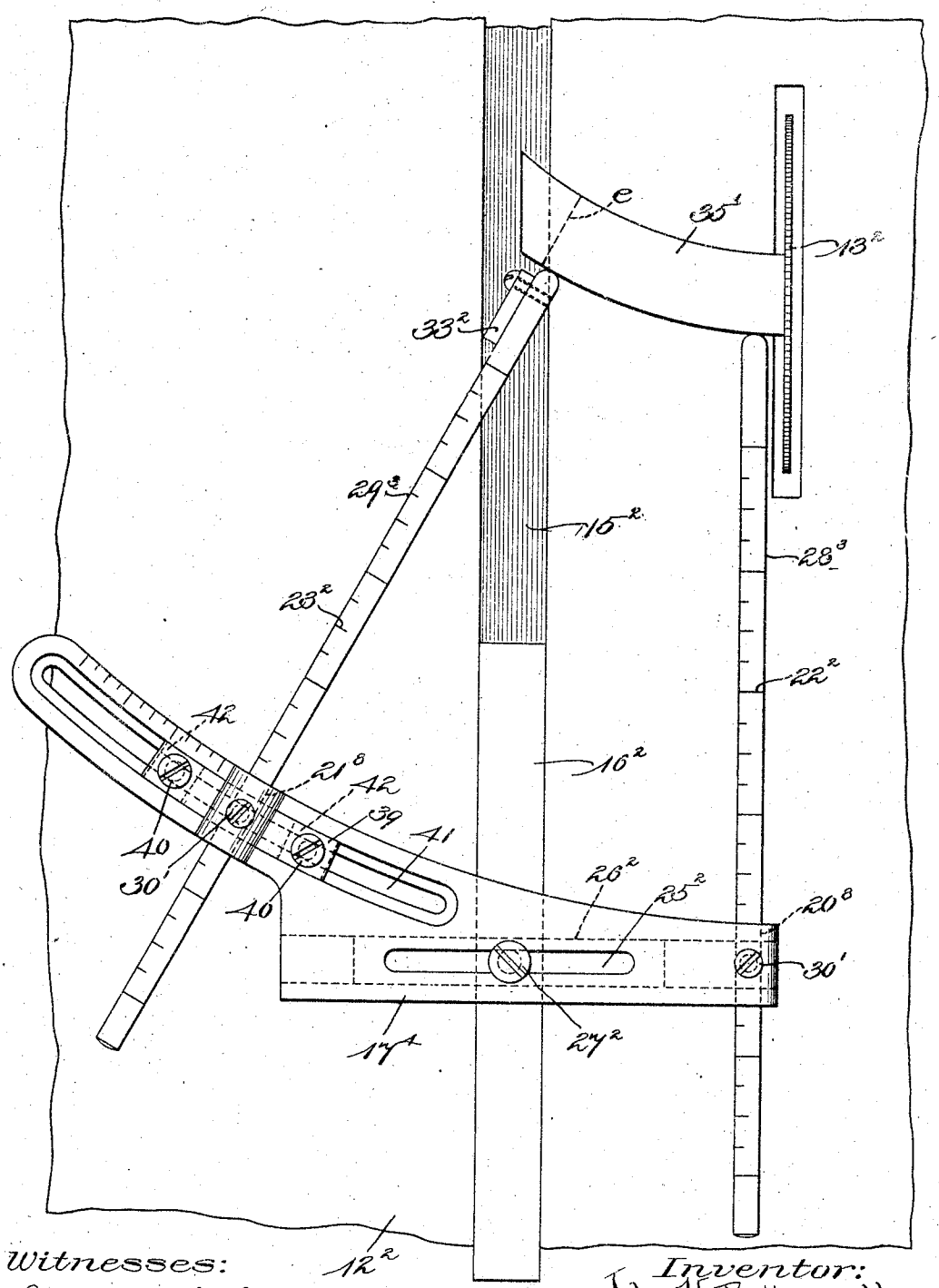


Fig. 11.

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UNITED STATES PATENT OFFICE.

JOHN H. BUTTERWORTH, OF LYNN, MASSACHUSETTS.

SAWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 790,182, dated May 16, 1905.

Application filed June 3, 1904. Serial No. 210,937.

To all whom it may concern:

Be it known that I, JOHN H. BUTTERWORTH, a subject of the King of England, residing at Lynn, in the county of Essex and State of Massachusetts, have invented new and useful Improvements in Sawing-Machines, of which the following is a specification.

This invention relates to machines for sawing wood in which either a circular or a band saw may be used in conjunction with a table upon which the wood to be sawed rests while being cut by the saw.

The object of this invention is to supply in a machine of the character described means whereby sections of a ring of a given diameter may be sawed accurately at the ends thereof, so that when the ends of a certain number of ring-sections are butted and glued together they will form as a whole a ring of the diameter desired with the meeting ends of said segments forming accurate joints with each other.

The invention consists in the combination and arrangement of parts set forth in the following specification, and particularly pointed out in the claims thereof.

Referring to the drawings, Figure 1 is a plan view of a portion of a circular saw-table with my improved reciprocatory segment-table attached thereto. Fig. 2 is a section taken on line 2 2 of Fig. 1. Fig. 3 is a section taken on line 3 3 of Fig. 1. Fig. 4 is a detail side elevation of a portion of my improved segment-table, together with the segment end gage attached thereto as viewed in the direction of the arrow *a*, Fig. 1. Fig. 5 is a plan view of a modified form of segment-table. Fig. 6 is a plan view of a modified form of my invention. Fig. 7 is a section taken on line 7 7, Fig. 6. Fig. 8 is an enlarged side elevation, partly in section, taken on line 8 8 of Fig. 6. Fig. 9 is a diagram view illustrating a number of ring-sections as they are cut from a board by a band-saw before the ends are trimmed by my improved segment-cutting machine. Fig. 10 is a plan view of another modified form of my invention. Fig. 11 is a plan view of another modified form of my invention.

Like characters refer to like parts throughout the several views of the drawings.

In the drawings, Figs. 1, 2, 3, and 4, 12 is a stationary table such as is ordinarily used in connection with a circular sawing machine. 13 is a circular saw located in a slot 14 in said table 12. A slot 15 extends longitudinally of the table 12 in the upper surface thereof and parallel to the saw 13. A slide 16 is adapted to be reciprocated in the slot or ways 15 and has fastened thereto a reciprocatory segment-table 17. Said table 17 may be of various shapes or sizes, but in the present instance, as illustrated in Fig. 1, is formed in the shape of an equilateral triangle the adjacent sides of which form angles of sixty degrees one with the other. The side 18 of said triangular table is parallel with the circular saw 13 and also with the ways 15. The side 19 of said segment-table converges toward the side 18 and forms an angle of sixty degrees therewith. Slots 20 and 21 are formed in the sides 18 and 19, respectively, and extend lengthwise thereof and parallel thereto. Graduations 22 and 23 are provided upon the sides 18 and 19 for a purpose hereinafter set forth. A brace 24 extends from the side 18 to the apex of the opposite angle of said segment-table and has a slot 25 therein, the under side of said slot fitting a guide-piece 26, fast to or integral with the slide 16 and extending transversely of said slide at right angles thereto. A screw 27, projecting through the slot 25 and into the guide-piece 26, securely fastens the segment-table 17 to the slide 16. In the slots 20 and 21 adjustable stops 28 and 29, respectively, are provided, and these stops are securely fastened to the reciprocatory segment-table 17 by clamp-bolts 30 and clamp-nuts 31 31, said clamp-bolts 30 being provided with square heads 32, which project into the slots 20 and 21, respectively, so that when the stops are brought to the desired location they are held firmly in position upon the segment-table by tightening the clamp-nuts 31. The stop 29 has a segment end gage 33, pivotally attached thereto by means of a screw 34.

The operation of my improved machine for

sawing segments (illustrated in Figs. 1 to 4, inclusive) is as follows: Segments of wood 35 35, Fig. 9, are cut from a board by means of a band-saw in a manner well known to those skilled in this art and upon any curve which may be desired, according to the diameter of the ring which it is desired to construct. One of said segments at a time is then placed upon the segment-table 17 in the position indicated by dotted lines, Fig. 1, with the outer curve of the segment resting against the two stops 28 and 29. At this point in the operation of the machine the segment end gage 33 is thrown back into the position indicated in Fig. 4, so that the left-hand end of the segment, Fig. 1, before said end has been trimmed extends beyond the segment-table, as well as the right-hand end of said segment. The stops 28 and 29 are located in the proper position by means of the graduations 22 and 23, respectively, and these graduations are laid off from the center *b*, which is the theoretical center of the arc of the segment which is to be trimmed, said center being formed by the intersection of two planes, one of which lies in the outer face of the side 19 or the inner face of the end gage 33 and the other of which lies in the inner surface of the saw 13. Having placed the segment-blank 35 in the position indicated by dotted lines upon the segment-table 17, said segment-table is pushed forward until the saw 13 has cut one end of said segment, as upon the dotted line *c*, Fig. 9. The end gage 33 is now thrown into the position indicated in full lines, Figs. 1 and 4, and the end *c* of the segment, which has previously been cut by the circular saw 13, as described, is placed against the inner surface of said gage by reversing the segment 35. The table having previously been drawn back to the proper position, said table is again pushed forward and the other end of the segment 35 trimmed by the circular saw. The proper number of segments having been trimmed in this manner (in this case six) they are placed upon a surface plate and are clamped thereto by clamp-dogs. When it is seen that they are correctly placed to form a circle, three of said segments alternately are withdrawn, the ends covered with glue, placed back upon the surface plate in their former position with their ends abutting against the ends of the adjacent segments, and are again clamped firmly in position, thus making a perfect ring with the joints meeting and forming perfect fits. It will be understood that in making a number of rings all of said segments have one end trimmed first, and then after the surface-gage has been placed in the position indicated in Figs. 1 and 4 the other ends of said segments are trimmed.

It is evident that, if desired, the graduations 22 and 23 may be omitted and the stops 28 and 29 located by measurement from the center *b*. It is also evident that the segments for rings of different diameters may be accurately trimmed by setting the stops 28 and 29 at the proper distance from the center *b*.

In Fig. 5 I have illustrated a modified form of my invention, in which the segment-table 17′ is adapted for use in cutting segments for circles of large diameter and in which the slide 16′ is fastened to a cross-brace 24′ by means of a screw 27, the stop-plates 28 and 29 being adjustably fastened to said segment-table 17′ in slots 20′ and 21′, respectively. In the form of my invention illustrated in Figs. 1 and 5 the angles are of the right degree to cut segments six of which form a complete ring; but it is evident that, if desired, the angle formed by the slot 21 with the slot 20 may be forty-five degrees instead of sixty degrees, and then the segments would be trimmed at the proper angle so that eight of said segments would form a circle, and thus different numbers of segments may be used to form a circle, the ends of said segments being properly trimmed at the correct angle by changing the angle which the side 19 makes with the side 18, or, in other words, by using differently-designed segment-tables the ends of the segments may be trimmed at different angles, so that eight, six, four, or any desired number of segments may be used to form a complete ring.

In Figs. 6, 7, and 8 a modification of my invention is illustrated, in which a series of slots 20^2, 20^3, 20^4, 20^5, 20^6, and 20^7 for the reception of the stops 28 and 29′ is formed in a reciprocatory table 17^2, adapted to slide upon a stationary table 12′, having slots or ways 15′ 15′ in the upper surface thereof which act as guides for the tongues 36 36, formed upon the under side of the reciprocatory table 17^2. The end of the segment which is first trimmed is placed against the end gage 33′ and the other end of the segment trimmed by the saw 13′, as hereinbefore described in connection with the operation of the form of my device illustrated in Fig. 1. By the form of my invention illustrated in Figs. 6, 7, and 8 it is evident that by the use of one table different segments may be trimmed whose ends are formed upon different angles.

It is evident that two series of holes 37 and 38 might be formed in a reciprocatory table 17^3, said holes made at different distances from a common center and along two converging lines intersecting at said center with pins 28^2 and 29^2 inserted in said holes 37 and 38, respectively, for stops without departing from the spirit of my invention, and in Fig. 10 I have illustrated by a plan view such a construction of reciprocatory table.

In Fig. 11 a modification of my invention is illustrated, in which 12^2 is a stationary table provided with a slot or way 15^2 for the recep-

tion of a slide 16^2, to which a segment-table 17^4 is adjustably attached by means of the screw 27^2, which projects through a slot 25^2 in said segment-table and into a guide-piece 26^2 integral with the slide 16^2. The stops 28^3 and 29^3 in this form consist of cylindrical rods provided with graduations 22^2 and 23^2, respectively. The stop 28^3 projects through a slot or hole 20^8, provided in the segment-table 17^4, and the stop 29^3 projects through a slot or hole 21^8 in a holder 39, said holder being adjustably fastened to the segment-table 17^4 by screws 40, which project through a slot 41 in said holder and have screw-threaded engagement with nuts 42 upon the under side of said segment-table.

In operating the form of my invention illustrated in Fig. 11 the segment $35'$ is placed with the convexly-curved side thereof against the ends of the stops 28^3 and 29^3, as illustrated in Fig. 11. The ends are trimmed by the circular saw 13^2, as hereinbefore described in relation to the trimming of the ends of the segments 35. The segment is illustrated in Fig. 11 as having the first end thereof trimmed, said end being placed against the inner surface of the end gage 33^2 when the other end of said segment is trimmed on the dotted line *z*. It will be seen that the stop 29^3 can be adjusted to different angles with the stop 28^3, so that different numbers of segments can be cut to form a single ring and also that the stops 28^3 and 29^3 can be adjusted longitudinally thereof in the slots 20^8 and 21^8, respectively, said stops being locked in the required position by means of the clamp-screws 30′. The median lines of the stops 28^3 and 29^3 converge toward one another and intersect each other at a common center, so that as said stops are adjusted longitudinally thereof their ends may always be brought to contact with the outer edge of the segment the ends of which it is desired to trim.

Having thus described my invention, what I claim, and desire by Letters Patent to secure, is—

1. In a machine of the character described, a saw, a reciprocatory table provided with two slots in the upper surface thereof converging toward a center, one of said slots parallel to the direction in which said table is adapted to be reciprocated, a stop adjustably secured to said table in each of said slots, respectively, and an end gage fast to one of said stops and projecting therefrom toward said center.

2. In a machine of the character described, a saw, a reciprocatory table provided with two slots in the upper surface thereof converging toward a center, one of said slots parallel to the direction in which said table is adapted to be reciprocated, a stop adjustably secured to said table in each of said slots, respectively, and an end gage supported upon one of said stops and movable thereon toward and away from said center.

3. In a machine of the character described, a saw, a reciprocatory table provided with two converging slots in the upper surface thereof, one of said slots parallel to the direction in which said table is adapted to be reciprocated, a stop adjustably secured to said table in each of said slots, respectively, and an end gage pivoted to one of said stops.

4. In a machine of the character described, a saw, a slide adapted to be reciprocated in ways parallel to the face of said saw, a segment-table fast to said slide adjustable laterally thereon toward and away from said saw, said table provided with two converging slots, and a stop adjustably secured to said table in each of said slots, respectively, one side of said table parallel to and adapted by said adjustment to be brought into sliding contact with the inner face of said saw.

5. In a machine of the character described, a saw, a slide adapted to be reciprocated in ways parallel to the face of said saw, a segment-table fast to said slide and adjustable laterally thereon toward and away from said saw, said table provided with two slots converging toward a common center, a stop adjustably secured to said table in each of said slots, respectively, and an end gage fast to one of said stops and projecting therefrom toward said common center, one side of said table parallel to and adapted by said adjustment to be brought into sliding contact with the inner face of said saw.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JOHN H. BUTTERWORTH.

Witnesses:
CHARLES S. GOODING,
ANNIE J. DAILEY.