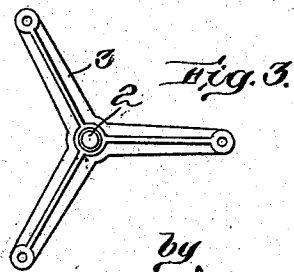
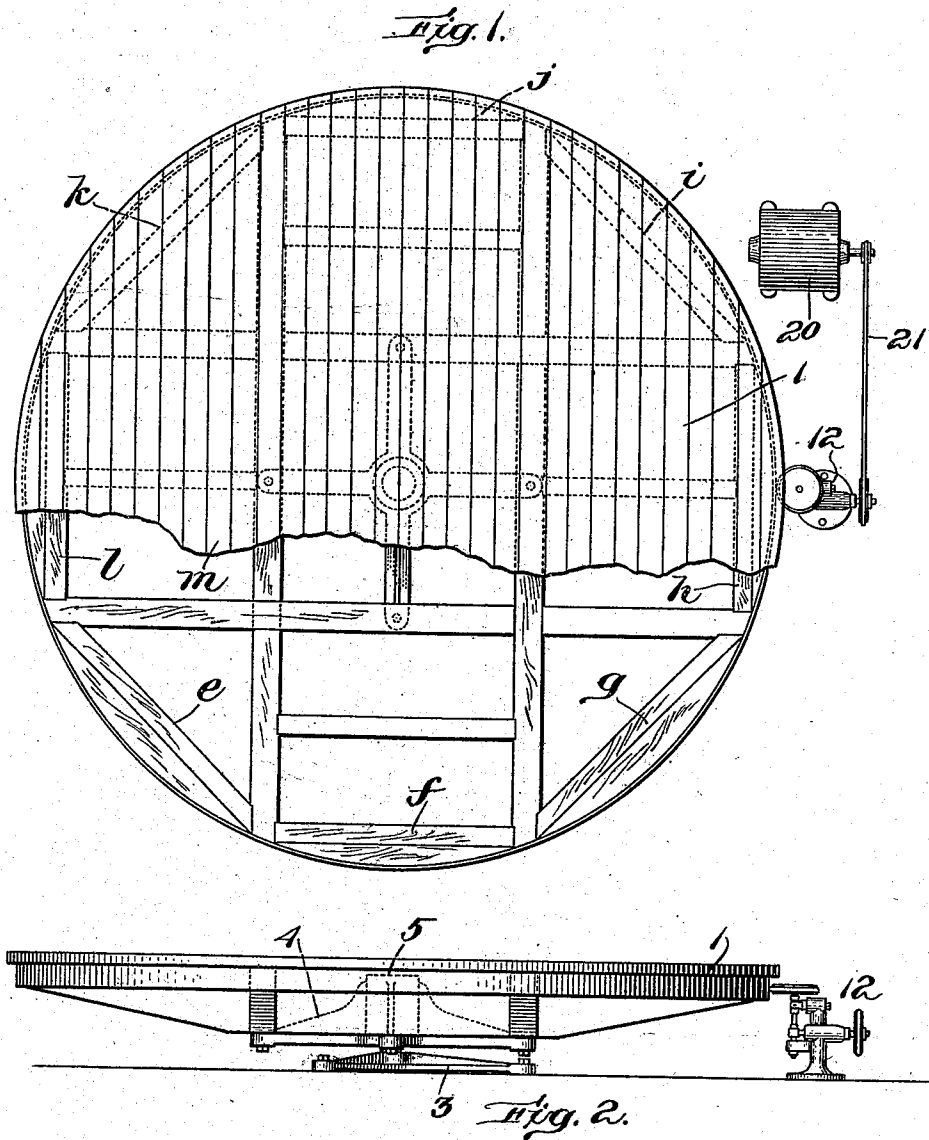


J. J. SULLIVAN & D. J. RING.
PIANO TURN TABLE.
APPLICATION FILED NOV. 6, 1907.

905,018.

Patented Nov. 24, 1908.
3 SHEETS—SHEET 1.



Witnesses:
A. C. Ratigan
B. W. Glover

Inventors:
J. J. Sullivan
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J. J. SULLIVAN & D. J. RING.

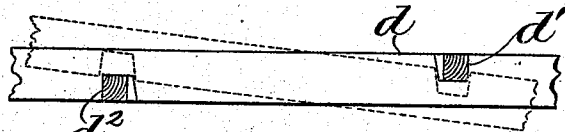
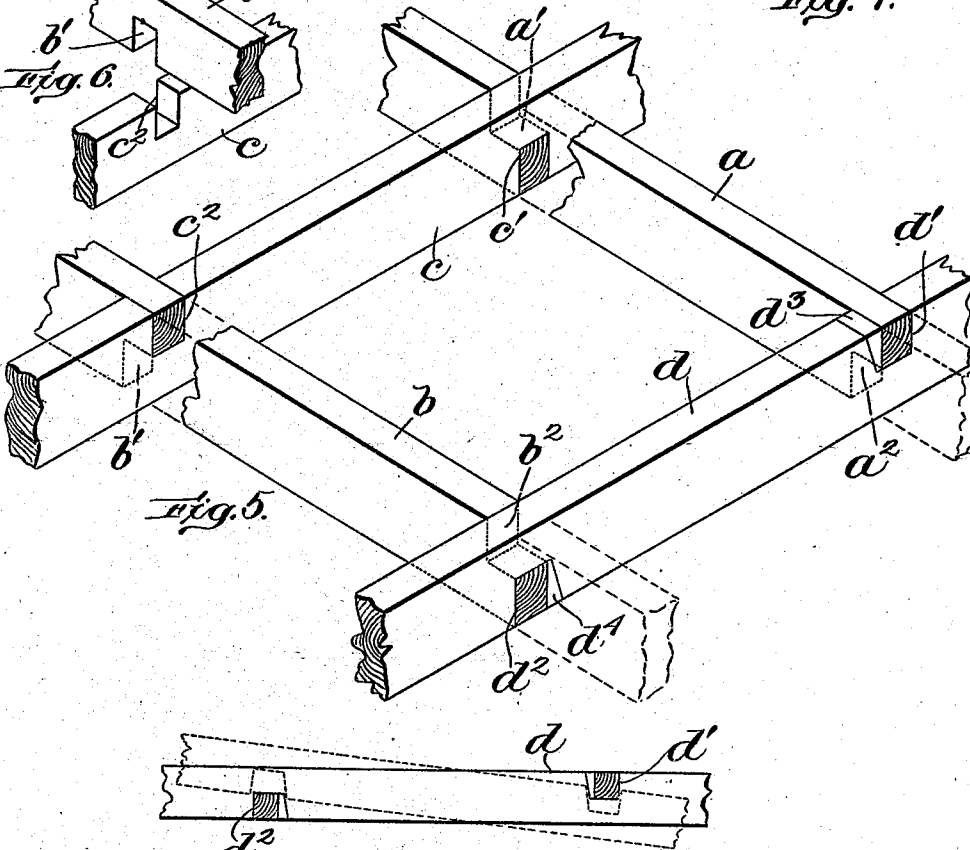
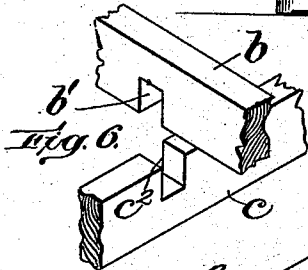
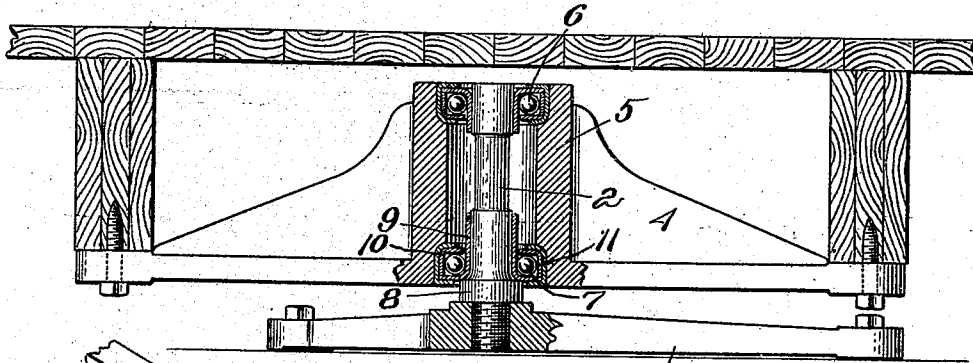
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3 SHEETS—SHEET 2.



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Fig. 7.

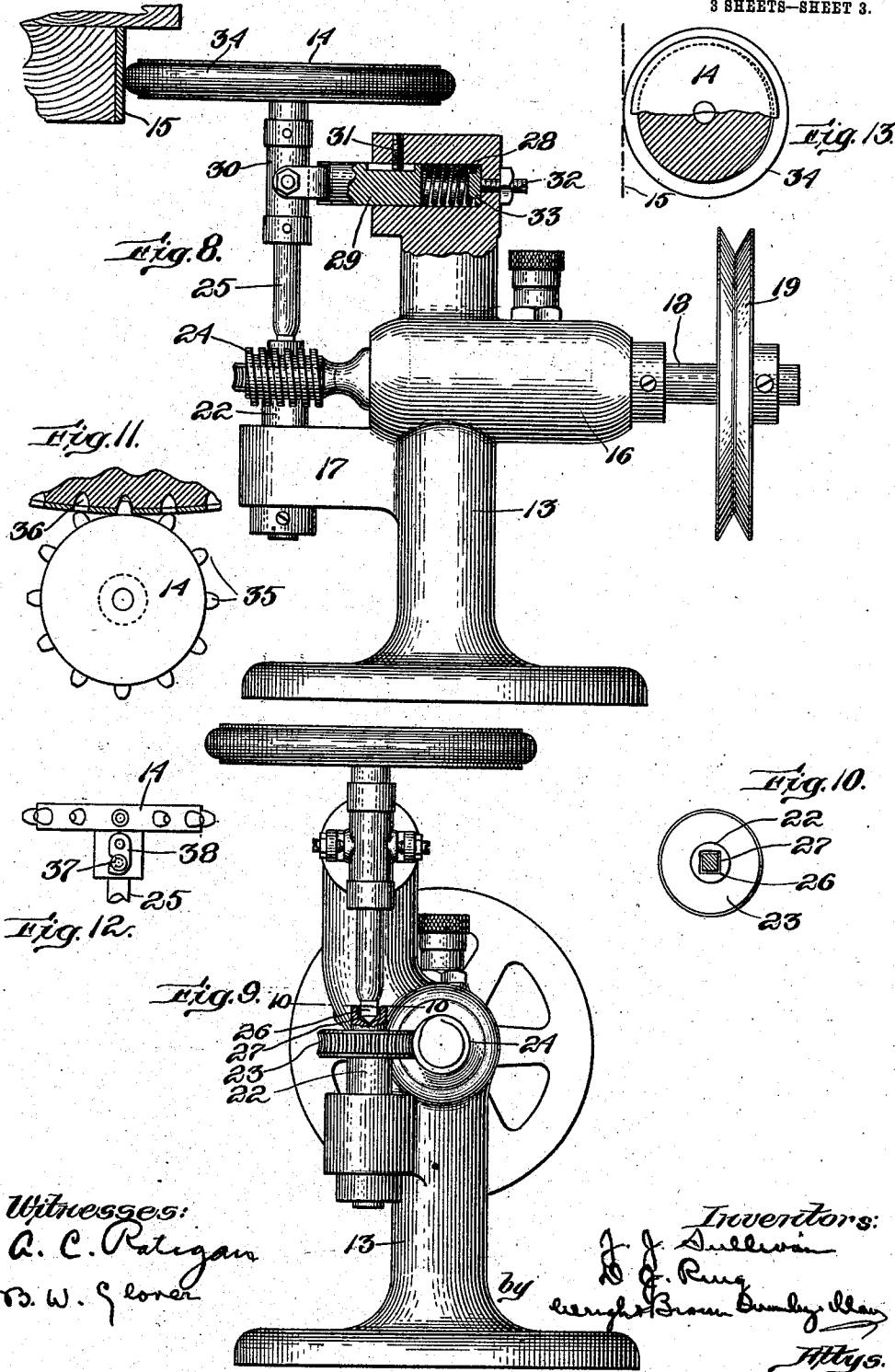
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J. J. Sullivan
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J. J. SULLIVAN & D. J. RING.
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3 SHEETS—SHEET 3.

905,018.



UNITED STATES PATENT OFFICE.

JOHN J. SULLIVAN AND DENNIS J. RING, OF LOWELL, MASSACHUSETTS.

PIANO TURN-TABLE.

No. 905,018.

Specification of Letters Patent.

Patented Nov. 24, 1908.

Application filed November 6, 1907. Serial No. 400,981.

To all whom it may concern:

Be it known that we, JOHN J. SULLIVAN and DENNIS J. RING, of Lowell, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Piano Turn-Tables, of which the following is a specification.

This invention relates to tables by which ponderous articles may be displayed in shop windows, and has particular reference to rotary tables for supporting pianos, and slowly turning them so that all sides can be seen from without.

The invention here consists in the construction and manner of supporting the table, and in the device for driving it so as to display the wares.

Of the accompanying drawings,—Figure 1 represents a plan view of a display table embodying the preferred form of our invention. Fig. 2 represents an elevation of the same. Fig. 3 represents a plan view of the base or standard by which the table is supported. Fig. 4 represents a sectional view on an enlarged scale, of the table and its support, showing the construction and arrangement of the bearings. Fig. 5 represents a perspective view of the framing of the table. Fig. 6 represents a fragmentary view of one of the joints of the framing. Fig. 7 represents a constructional detail, showing the manner of putting the framing beams together. Fig. 8 represents an elevation of the driving means for the table. Fig. 9 represents an elevation of the same driving device, as seen from the left of Fig. 8. Fig. 10 represents a fragmentary plan view on line 10—10 of Fig. 9, illustrating the connection between the two parts of a sectional shaft used in the driving device. Figs. 11 and 12 represent a modification of part of the driving means. Fig. 13 represents a sectional plan view of the driving disk and intermediate friction means.

The same reference characters indicate the same parts in all the figures.

The display table consists of a rotary platform 1 centrally supported by a pin 2 which rises from a base 3. The latter rests directly upon the upper surface of the floor and is suitably secured thereto, having arms or a continuous periphery, as may be most convenient, extending sufficiently far to give stability to the supporting pin.

The table proper is constructed of a frame consisting of the main beams *a b c* and *d*.

These beams cross each other and extend at their ends a considerable distance beyond the junctions, being connected by the transverse members *e f g h i j k* and *l* which stiffen the frame and define the periphery of the table. This periphery is made continuously circular by segmental filling pieces applied externally to the transverse members. In addition, there are internal transverse joists between the beams to which, as well as to the beams themselves, are nailed the boards *m* of the flooring. The latter constitutes a level platform on which pianos or other ponderous wares or articles are placed.

In order to increase the strength and stiffness of the platform to the maximum, the main beams are so fitted together as to pass alternately over and under each other, and are mortised so that their upper surfaces lie in one plane, but in such a way that the notches are on opposite sides of each beam. Thus, referring to Fig. 5, it will be seen that the beam *a* is notched at *a'* downward from its upper edge, and at *a²* upward from its lower edge, while the beam *b* which extends parallel to it has notches reversely arranged at *b'* in its bottom, and *b²* in its top. The beam *c* which extends transversely of *a* and *b*, and at right angles thereto, is correspondingly notched so as to fit into the mortises of the other beams. Thus at *c'* it has a notch extending half way from its lower edge to its upper edge, and at *c²* a similar notch in its upper edge. In assembling the beams, the beam *c* is laid across the beam *a* so that the complementary portions of each beam will enter the notches of the other, and both will occupy the same plane. The beam *b* is then laid across beam *c* to enter the notch *c²* and embrace the lower portion of this beam by the walls of its notch *b'*. The fourth beam *d*, which has an upper notch *d'* and a lower notch *d²*, is then placed transversely of the beams *a* and *b* parallel with the beam *c*. In assembling, it is passed endwise above the top of beam *b* and below the beam *a*, as indicated by the dotted lines in Fig. 7, and is then swung so as to lie in the same plane with the others. In order to permit the beams *a* and *b* to enter the notches *d'* and *d²*, while *d* is in its inclined position, these latter notches are made of greater width than the thickness of the beams, as otherwise they would cramp and be prevented from fitting together. After the beam *d* has been swung into its final position, the excess spaces of the

notches are filled by wedges d^3 and d^4 . It will be seen that by this novel arrangement of joints, each beam is continuous in its upper portion where it crosses one of the transverse beams, and thus all are of equal strength and stiffness.

Preferably the main beams of the framing are composite, as shown in Fig. 4, being made of three or more strips laid side by side, and glued or bolted together for the purpose of preventing checking and warping.

The mounting of the table on the pivot pin is effected through a frame 4 having arms attached to the under edges of the main beams and converging at the center where a sleeve 5 is formed which loosely surrounds the pin 4. This sleeve incloses at its upper and lower ends the anti-friction bearings 6 and 7. Both these bearings are contained in cup-shaped grooves in the sleeve, while the latter rest against an enlarged shoulder 8 of the pin and support the weight of the table. The upper bearing simply resists lateral thrust and serves to maintain the floor surface of the table in a horizontal plane.

The bearings are self-contained, and removable as a unit. Each consists of a sleeve 9 having a flange which serves to form a ball-race and an outer ring 10 having also a flange. The rings are prevented from separating by a holder 11 which has lips embracing the flanges of the sleeve and ring. Between the latter members is a space forming a ball groove, in which the balls are contained. These bearings are adapted to be slipped endwise on the pin and into the cup-shaped recesses of the sleeve.

In order to rotate the table so as to display all sides of the wares supported thereon, we provide a driving device 12. The latter consists of a standard 13 adapted to be secured to the floor in any position, at the necessary distance from the table, a driving disk 14 supported by the standard, and actuating mechanism. At or near the periphery of the table is a cylindrical flange or surface 15 against which the rim of the wheel 14 or an intermediate engaging member bears for turning the table.

Forming part of the standard 13 are bearings 16 and 17, in the former of which is contained a horizontal shaft 18 driven by pulley 19 which receives power from a motor 20 through a belt 21 or other suitable power-transmitting device. In the bearings 17 is supported one member 22 of a sectional vertical shaft. This member carries a worm gear 23 with which is engaged a worm 24 on the end of shaft 18. This form of gearing is the preferred one, but any other speed-reducing mechanism or gearing suitable for the purpose may be employed. The other member of the sectional shaft is represented

at 25, it being this member upon which the driving disk or wheel 14 is directly mounted. These sections are flexibly connected together so that both are compelled to rotate in unison, but which permits one of the sections to be inclined relatively to the other a limited amount in any direction. This section is shown in Figs. 9 and 10, and consists of a non-circular end 26 on the section 25 entering a similarly shaped, but larger, socket 27 in the section 22. Preferably the shape of this non-circular portion is square, although it may have any other shape preferred. The extreme end of the shaft section 25 is pointed, and is thereby supported at a single point or at least over an area of extremely limited extent, so that it may tilt in any direction, the amount of tilting being only limited by the size of the socket 27. This flexibility is provided for the purpose of enabling the disk 14 to bear with uniform pressure against the surface 15. This pressure is secured by a spring 28 contained in a socket in the upper part of the standard 13 and bearing against a sliding plunger or bar 29 having a forked end which is pivotally connected with a sleeve 30 surrounding the shaft section 25. The direction of thrust of this spring is such as to press the section 25 away from the standard and the disk toward the table. A screw 31 entering a slot in the bar 29 limits the movement of the latter, while another screw 32 acting on a block 33, regulates the pressure of the spring.

In the preferred form of the driving device shown in Figs. 8 and 9, the frictional contact between the disk and table is made by means of a band 34 of leather, rubber or the like, surrounding the periphery of the disk and contained in a groove therein. It is pressed by the spring 28 tightly between the disk and platform, but is of greater diameter than the groove in the disk so as not to make contact with the latter except at points near its point of contact with the table. On account of this looseness, the band may be slipped about the rim of the disk. This enables the table to be turned by hand or other means, independent of the driving device, so that in case it is desired to turn the table when the motor is not running, or to hold it still without stopping the motor, or to accelerate or retard its speed, this can be done without causing the band 34 to wear flat at any point, or to be torn or broken. When the table is independently turned, the band simply slips around the disk 4.

In place of the frictional drive, a positive connection, as shown in Figs. 11 and 12, may be made between the disk 14 and the table. In this case the disk has a number of pins or teeth 35 which enter peripheral sockets 36 in the table. The same possibility of rotating the table independently of the

driving device is, however, permitted by having the disk disconnectible from the shaft. To this end the disk is loose on the shaft and carries a pin 37 which may project into a socket in the shaft or be withdrawn therefrom. Upon withdrawal of the pin, the disk is of course left free to rotate independently on the shaft. A lock 38 is provided to retain the pin.

10 A display table constructed as above described, gives the maximum strength, greatest possible mobility, and the minimum of effort required to operate it, together with
15 particular method of construction previously described in detail, while the ease of operation arises from the particular construction of the driving device and its engagement with the periphery of the table. By having
20 all the parts including the base, entirely above the floor, it can be set in any location where there is a clear space, without necessitating a special construction or alteration of the floor, and it can be readily removed
25 into another location.

We claim:—

1. A display table comprising a standard, a platform, a swivel consisting of a central pin or spindle and a sleeve surrounding the same, one of which is connected to the standard and the other to the under side of the platform, and anti-friction rolling bearings, each of which is a unit, self-sufficient to retain the rolling elements, surrounding the pin and inside sleeve, the pin having an external annular shoulder and the sleeve an internal shoulder, between which one of the bearings is contained and by which it and the platform are supported.

40 2. A display table comprising a standard, a platform, a rotary support for the table consisting of a pin or spindle and a sleeve, one of which is fast to the support and the other to the platform, and rolling ball bearings, each consisting of complemental ball races and a series of balls held together and separately removable as a unit, between the spindle and sleeve, one of said bearings, by coöperation with a shoulder on the pin,
45 serving to support the weight of the platform and the other to prevent tipping thereof.

3. A display table comprising a standard, consisting of a base and a central pin or spindle having a shoulder near its lower end, a platform, a bearing holder connected to the under part of the platform surrounding the pin, and detachable self-contained anti-friction bearings surrounding said pin and confined by said holder, one of the bearings resting upon the shoulder of the pin and supporting the weight of the platform.

4. A display table comprising a standard, consisting of a base and a central pin or
65 spindle having a shoulder near its lower

end, a platform, a bearing holder connected to the under part of the platform surrounding the pin, and detachable anti-friction bearings, each consisting of inner and outer rings having complemental ball grooves and balls between them and a surrounding member provided with lips embracing said rings and preventing their separation, surrounding said pin and confined by said holder, one of the bearings resting upon the shoulder of the pin and supporting the weight of the platform.

5. A display table for ponderous articles, consisting of framing beams passing alternately over and under each other, flooring supported on said beams, and a central support on which the table is rotarily mounted.

6. In a display table, a rotary platform centrally supported and consisting of beams parallel and transverse to each other mortised together alternately on opposite sides so that the upper surfaces of the beams are all in substantially the same plane and each beam passes alternately above and beneath those extending transversely of its direction, and flooring laid on the beams.

7. In a display table, a rotary platform centrally supported and consisting of beams parallel and transverse to each other, each beam passing alternately above and beneath those which are transverse to it, connecting beams extending between adjacent ends of the first-named beams outlining the periphery of the platform, and flooring laid on the beams.

8. A rotary display table having a frame consisting of a beam having a notch or mortise in one edge and a similar notch or mortise in the other edge at a distance therefrom, a second beam entering the upper notch in the first beam and having a notch in its lower side embracing said beam and a second notch at a distance therefrom in its other side, a third beam provided with separated notches in its upper and lower sides entering at the point where the upper notch is formed, the lower notch of the first beam, and a fourth beam interlaced with the second and third beams entering the free notches thereof and having coöperating separated notches in its upper and lower sides to enable it to be in one plane therewith.

9. In a display table, a framed platform consisting of beams crossing each other, each notched or mortised at the junctions through half their depth to enable all to lie in the same plane, and the notches being alternately on opposite sides of each beam, whereby to make each beam continuous at its upper edge over one of the junctions and so increase the stiffness and strength of the framework, and flooring laid on the beams.

10. In a display table, a framed platform consisting of beams crossing each other, each notched or mortised at the junctions

through half their depth to enable all to lie in the same plane, and the notches being alternately on opposite sides of each beam, and those in one of the beams being of greater width than the thickness of the beams contained in them, whereby to permit insertion of the beam angularly into place, and filling pieces wedged into the last-named notches beside the beam sections contained therein.

11. A display table consisting of a rotary platform, a driving disk in engagement with the rim of said platform, and mechanism for rotating said disk, flexibly connected with said disk, whereby the latter is permitted to yield and become separated from the platform.

12. A display table consisting of a rotary platform, a driving wheel in engagement with said platform, a motor for actuating said wheel, a flexible shaft on which said wheel is mounted, and yielding means pressing said wheel against the platform.

13. In connection with a rotary display table, driving mechanism consisting of a main shaft, a secondary shaft in geared connection with the main shaft and driven thereby, said secondary shaft being made in two sections of which one is inclinable in any direction with respect to the other, a wheel on the inclinable shaft section, and yielding means acting on said latter section for holding the wheel against the table.

14. In connection with a rotary display table, driving mechanism consisting of a main shaft, a secondary shaft in geared connection with the main shaft and driven thereby, said secondary shaft being made in two sections, one of which has a non-circular end contained loosely in a correspondingly-shaped socket in the other so that the sections may be relatively inclined while held against relative rotation, a driving wheel on one of the sections near the periphery of the table, and spring-impelled means bearing on said last-named section and pressing the same toward the table so as to hold the driving wheel against the latter.

15. A driving device for a rotary display table, comprising a driven shaft, a shaft section geared to and driven by said shaft, a second section having a loose connection with said first section through which it may be driven thereby while extending at an inclination thereto, a driving wheel secured to said second section, and a spring bearing on the second section to incline it.

16. A driving device for a rotary display table, a standard comprising a driven shaft, a shaft section geared to and driven by said

shaft, both being contained in bearings in said standard, a second section having a loose connection with said first section through which it may be driven thereby while extending at an inclination thereto, a driving wheel secured to said second section, and a sleeve surrounding the second section, and a spring-actuated fork pivoted to said sleeve and guided by the standard so as to press the second section out of alinement with the first section.

17. A driving device for a rotary display table, a standard comprising a driven shaft, a shaft section geared to and driven by said shaft, both being contained in bearings in said standard, a second section having a loose connection with said first section through which it may be driven thereby while extending at an inclination thereto, a driving wheel secured to said second section, and a sleeve surrounding the second section, a bar contained in a guideway in said standard and having a forked end pivoted to said sleeve, and a spring tending to press said bar and shaft section away from the standard.

18. A display table consisting of a rotary platform having a concentric flange adjacent its periphery, a driving disk engaged with said flange, mechanism for rotating the disk including a shaft on which the disk is mounted, and means whereby the table-engaging portion of said disk may be released from said shaft to permit independent rotation of the table.

19. A display table consisting of a rotary platform having a concentric flange adjacent its periphery, and driving mechanism for the platform including a wheel carrying peripheral engaging means in contact with said flange and a shaft to which the wheel is connected, said engaging means being disconnectible from the shaft to permit independent rotation of the platform.

20. A display table consisting of a rotary platform having a concentric flange adjacent its periphery, a driving disk, a band surrounding the periphery thereof in frictional engagement with said flange, and mechanism for rotating the disk, said band being loose on the disk and capable of slipping thereon when the platform is independently turned.

In testimony whereof we have affixed our signatures, in presence of two witnesses.

JOHN J. SULLIVAN.
DENNIS J. RING.

Witnesses:

PETER W. PEZZETTI,
E. BATCHELDER.