TABLE WITH RETRACTABLE CASTERS

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This invention relates to an improvement in a table with retractable casters. More particularly, it deals with such a table in which a single manual lever means near the top of the table operates to extend and retract all of the casters at the lower ends of the table legs simultaneously. The table of this invention finds use, for example, as a typewriter table or stand which may rest level and steady on the floor when the machine on it is being used and may be readily raised on to its casters and rolled out of the way when not in use.

It is an object of this invention to produce a simple, efficient, effective and economic table with retractable casters.

Another object is to produce a retractable caster which is completely covered so that it cannot catch or snag the shoes or apparel of a user, and disappears from view when the table is in its steady rest position level on the floor.

Another object is to produce such a table in which all of the casters may be extended or retracted simultaneously by a single easily operated manual means located near the top of the table.

Another object is to produce such a table which is level, steady, light weight and durable and has relatively large adjustable leveling feet at the end of its legs for increasing its stability when in its rest position.

Generally speaking, the table of this invention comprises a flat top and a plurality of legs with retractable swivel casters at the lower ends of each of the legs, and a common manual means mounted under the top of the table for simultaneously extending and retracting all of said casters. The common manual means for operating the casters may comprise a lever pivoted under the top of the table which through a camming device, may rotate a plate from the periphery of which plate flexible tension means, such as wires or cables, extend along each of the table legs to the retractable casters.

The legs of the table may be hollow, such as metal tubes with the cables extending through their centers. At the outer end of each of the legs there may be provided an adjustable member for bridging the caster assembly and for leveling the support of the table when the casters are retracted, which member may comprise a bell shaped cover for the whole caster assembly screwed on the end of each leg, so that the table may be steadily and levelly supported by the lower edges of the bell covers when the casters are retracted up into them.

The caster assembly itself may comprise a hollow swivel socket member provided at the end of each of the legs of the table, which swivel member may be provided with a downwardly forked bracket in which are pivoted two separate arms or levers. One of said arms may have mounted on its outer free end the roller or wheel of the caster. The outer end of the other arm or lever may be connected by a link to said wheel, while its inner end is connected by a flexible joint to the outer end of the operating wire or cable, so that a pull on the cable will force the wheel below the lower edge of the bell cover, and release of the cable will cause the weight of the table to push the caster into the bell cover.

The above mentioned and other structures and objects of this invention and the manner of attaining them will become more apparent and the invention itself will be best understood by reference to the following description of embodiments of the invention taken in conjunction with the accompanying drawings, wherein:

Fig. 1 is a side elevation of a typewriter type table or stand having retractable casters according to this invention, with a portion of the legs of the table being broken away;

Fig. 2 is a plan view taken along line II—II of Fig. 1 showing the under side of the top of the table and in full lines the retractable caster operating means in caster retracted position;

Fig. 3 is an enlarged vertical section taken along line III—III of Fig. 1 of a retractable caster in its retracted position inside of the bell foot cover;

Fig. 4 is a view similar to Fig. 3 with the caster shown in its extended position raising the table leg from the position shown in Fig. 3;

Fig. 5 is an end view of the caster itself taken along V—V in Fig. 3;

Fig. 6 is an enlarged plan view of the rotating plate mounted under the top of the table shown in the center of Fig. 2;

Fig. 7 is a vertical section taken along line VII—VII of Fig. 6 showing the pivotal mountings for the manual lever and rotating plate; and

Fig. 8 is a modified form of connection for a cable to the rotating plate from that form of connection shown in Fig. 6.

Referring to Figs. 1 and 2, the specific embodiment of this invention adapted to an office machine table, such as a typewriter stand, comprises a top 10 which may be made of a flat substantially square piece of material, such as wood, plywood, plastic, metal or the like, to which top may be fastened near opposite edges of the under side of the top 10 a pair of inverted U-shaped tubular members in which the legs of each member form the four legs 11, 12, 13 and 14 of the table. The connecting portions 15 and 16 of these U-shaped members may be fastened to the table top 10 by means of bolts 17 or any other suitable means.

On the under side of the table top 10 between the portions 15 and 16 there may be mounted a plate or pan 20 which may have parallel flanged edges 21 which may be fastened by means of screws 22 or the like to the under side of the table top 10. This pan 20 may be spaced from the under side of the table top 10 so that the mechanism for operating the retractable casters may readily be mounted thereon without interference or change in top 10 or portions 15 and 16.

The common operating or controlling mechanism for the retractable casters comprises a manual lever 25 here-in shown to have a flattened inner end portion 26 through which it is pivotally mounted by means of a nut and bolt 27 to the tray 20 (see also Figs. 6 and 7). On one side of this pivot 27 the flattened portion 26 is offset by a portion 25 to the major portion of the lever 25 which may be bent to extend (when in the caster retracted position as shown in full-lines in Fig. 2) partly beyond the outer front edge of the table 10 as a handle 29. This handle 29 and lever 25 may be moved from the full-line position shown in Fig. 2 through an angle of about 90° into the dotted line position 30 shown in the same figure where the handle 29 is out of view and within the edges of the table top 10, so as to be out of the way when the table is to be moved and the casters are in their extended positions. The other and shorter flattened end
2. The lever member 25 is shown in Figs. 6 and 7 to be provided with a camming slot 30 which extends gradually away from the pivot 27 until near its end 31 it is best to form a locking position at its limit in the caster extending position. This slot controls oscillations of a rotating plate 35 pivoted at substantially the center of the tray 20 by means of a bolt and nut pivot pin 36 and provided near its periphery with a roller washer 37 mounted on pin 38 fixed to the plate 35 which was shown as a cam follower in Fig. 5. Two holes may be provided in the plate 35 an arcuate slot 40 into which may extend a pin 41 fixed to the tray 20, which may limit the angular movement of the plate 35. At the periphery of the plate 35 there may be provided a plurality of upstanding ears 45, one corresponding to each of the legs of the table, namely four. Each of these ears 45 is provided with an enlarged central hole through which a threaded end 50 (see Fig. 6) of each of the separate four cables 51 extends with a nut 52 abutting against one side of the ears 45 for adjusting the length of the cables 51. These ears 45 may be pushed out of the plane of the plate 35 as shown in Figs. 6 and 7 or they may be separate L-shaped members 46 pivoted by pins 47 to the rotating plate 48 (similar to plate 35) as shown in Fig. 8. In Fig. 8 the members 46 (corresponding to ears 45) are continuously perpendicular to the cables 51, while in Fig. 6 the holes in ears 45 are sufficiently large to permit adjustment for angular movement. In substantial alignment with the pull on each of the cables 51 there may be provided four supporting guide brackets 53 (see Fig. 2) fixedly mounted to the tray 20 to which brackets 53 may be fastened an end of a flexible shawling conduit member 55 through which the cables 51 are guided and may slide into each of the tubular legs 11, 12, 13 and 14 through holes 56 provided in the upper ends of the legs adjacent to the corners of the table top 10.

The caster assembly 60 which may be made of metal or reinforced plastic is shown substantially enclosed inside a bell shaped cover 61 and may be adjustable mounted, such as by screw thread 62, at the ends of the legs 11, 12, 13 and 14. This same adjustment of threads 62 permits accurate leveling of the table when it is in its rest position shown in Fig. 1. Since all of the legs, caster and bell shaped feet covers are the same, only one foot and caster assembly for leg 11 will be described in detail.

Referring now to Figs. 3, 4 and 5, the bearing for the caster assembly 60 comprises a rocker member 63 which may be inserted in the open lower end of the leg 11 and may be provided with top and bottom flanges 64 and 65 for journaling a hollow vertical sleeve or swivel pin 66 to the lower end of which is fastened a forked member having parallel spaced sides 67 (see Fig. 5) between which sides the remaining portion of the caster assembly is mounted. These side portions 67 are herein shown each to have two spaced holes for pivot pins 68 and 69, respectively. On the lower pivot pin 68 there is freely pivoted an arm member 70 which is shown herein to bridge the space between the sides 67 and provide a pair of parallel extensions between the outer free ends of which the caster wheel 71 may be freely pivoted on an axle 72. The length of the lever 70 and the location of the pivot pin 68 are such that the axle 72 is out of vertical alignment with the vertical axis of the swivel pin 66 to permit dirigibility of the caster and swivel in accordance with the direction the table is pushed when the casters are in their extended position as shown in Fig. 4.

The extension and retraction of the wheel 71 and axis 72 at the outer end of the arm 70 is limited and controlled by the motion of a first class lever 75 pivoted to the other pivot pin 69 extending between the sides 67 of the caster assembly. This lever 75 has at one end on one side of its fulcrum axle 69 a pair of links 76 pivoted between the ends of the axle 72 of the wheel 71 and the pivot pin 77 at said one end of the lever 75. On the other side of the fulcrum pivot 69 at the other end of the lever 75 a pair of cam follower pins 38 which couple to the lower or outer end of the cable 51. This joint 78 may comprise a ball and socket combination with the ball 79 attached to the end of the cable 51 and its socket 80 formed in the end of the lever and provided with a slot 81 (see Fig. 4) through which the cable 51 may be moved as the lever 75 is moved by the position shown in Fig. 4 to that shown in Fig. 3. It is important that the connection to the end of the cable is such that the cable 51 will not wear or be cut at this joint 78 and accordingly the cable may be retracted at this joint by a tubular extension 82 from the ball 79 which extends through the slot 81 as shown in Figs. 3 and 4.

In comparing the positions of Figs. 3 and 4 which correspond to the retracted and extended positions of the retractable caster of this invention, respectively, it can be seen that a pull on the cable 51 extends the casters to lift the whole table, while when the tension in the cable 51 is released the weight of the table pushes the casters up into the bell foot cover 61 into the position as shown in Fig. 3. Correlating this with the action of the lever 25, the lever in the full line position shown in Figs. 2, 3 and 4 shows the cam roller 37 to be at the end of the slot 30 closest to the pivot 27, so that the plate has been pulled in its counter-clockwise direction to release the tension in each of the cables 51 which causes the outer end of the lever 75 to drop and the caster wheel 71 to retract into the position shown in Fig. 3.

Now if all four cables 51 are simultaneously pulled by the movement of the lever arm 25 into its dotted line position 29 shown in Fig. 2, the cam roller washer 37 guided by the slot 30 pushes the pin 38 on which the roller 37 is mounted away from the pivot pin 27 into the dotted position 38 (see Fig. 6) to rotate the plate 35 in a clockwise direction until the roller washer 37 is at the opposite end and locking end 31 of the slot 30. The end 31 of the slot 30 is shown to be a true arc of constant radial distance from the pivot 27 so as to maintain or lock the lever 25 in its extended position, and thereby prevent the weight of the table from causing the casters to retract and lower the table on the floor again as shown in Figs. 1 and 3.

Although the specific embodiment of this invention has been directed to a typewriter type stand or table with hollow metal legs of tubular metal stock, the principles of this invention may be applied to other tables which may not have hollow legs and may be provided with sheaths 55 extending along the outside of the legs for operating the retractable caster assemblies 60. Furthermore, the bell type foot for covering the caster assembly may be replaced by other kinds of bridging members at the lower ends of the table legs without departing from the scope of this invention.

While there is described above the principles of this invention in connection with specific apparatus, it is to be clearly understood that this description is made only by way of illustration and not as a limitation to the scope of this invention.

What is claimed is:

1. In a table having a top, a plurality of legs, and retractable casters having wheels and mounted at the lower end of each leg, the improvement comprising: an arm at the lower end of each leg for mounting the wheel of its corresponding caster, a foot at the lower end of each leg covering its correspondingly retractable caster and supporting said table when said casters are retracted, a single manual means pivotally mounted on a vertical axis under the top of said table for simultaneously extending and retracting all of said casters, pivoted means mounted in each said foot and connected to said arm supporting the wheel of said caster for controlling the
extension and retraction of its corresponding caster, and flexible tension means connected from said pivoted means in said foot along said legs to said manual means to extend said casters when said flexible means is tensioned.

2. A table according to claim 1 wherein said legs are hollow and said flexible tension means extend through said hollow legs.

3. A table according to claim 1 including means for adjusting said feet relative to said table legs for leveling said table when said casters are retracted.

4. A table according to claim 1 wherein said feet comprise bell shaped covers over said casters.

5. A table according to claim 1 wherein said manual means comprises a pivoted lever, a pivoted plate, and cam means between said lever and said plate for rotating said plate by movement of said lever, said flexible tension means being connected to said pivoted plate.

6. A table according to claim 1 wherein said casters include wheels on said arms and said pivoted means mounted in each of said feet comprises a lever and link which are controlled by said flexible tension means to extend and retract said wheel on said arm relative to the bottom edge of said foot.

7. In a table having a top and a plurality of legs and retractable casters at the bottom of said legs, the improvement comprising: means mounted adjacent said top for simultaneously retracting and extending all of said casters, said means comprising a lever pivoted on a vertical axis to the under side of said top and having a handle portion at one end thereof extending adjacent one edge of said top, a cam means attached to said lever, a plate pivotally mounted under said top adjacent said cam means, a cooperating cam follower means mounted on said plate for cooperating with said cam means, cable means extending from the periphery of said plate along said legs to said casters, and lever and link means mounting said casters at the outer end of said legs connected to and operated by said cable means.

8. A table according to claim 7 wherein said cam means comprises a slot and wherein said cam follower means comprises a roller washer.

9. A table according to claim 7, including a stop means mounted on said plate for limiting the angular rotation of said plate by said lever through said cam means.

10. A retractable caster for the end of a vertical support comprising: a hollow swivel socket having a pair of parallel downwardly extending sides, an arm pivoted between said sides, a caster wheel mounted on an axle at the outer free end of said arm, a first class lever pivoted between said sides spaced from said arm, a link connecting one end of said lever to said axle of said caster wheel, and means having a ball and socket connection to the other end of said lever and extending through said hollow swivel socket for controlling the extension and retraction of said caster wheel relative to said sides.

11. A caster according to claim 10 wherein said control means comprises a flexible tension means.

12. A caster according to claim 10 including means fastened to said support for bridging said caster and supporting said support when said caster is in its retracted position.

13. A caster according to claim 12 wherein said bridging means comprises a bell shaped means for covering said caster.

14. A caster according to claim 12 including means for adjusting the length of said bridging means around said caster relative to said support.

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