July 8, 1941. H. HOWE 2,248,871

FOLDING TABLE

Filed Nov 11, 1937 3 Sheets-Sheet 1

Fig. 1

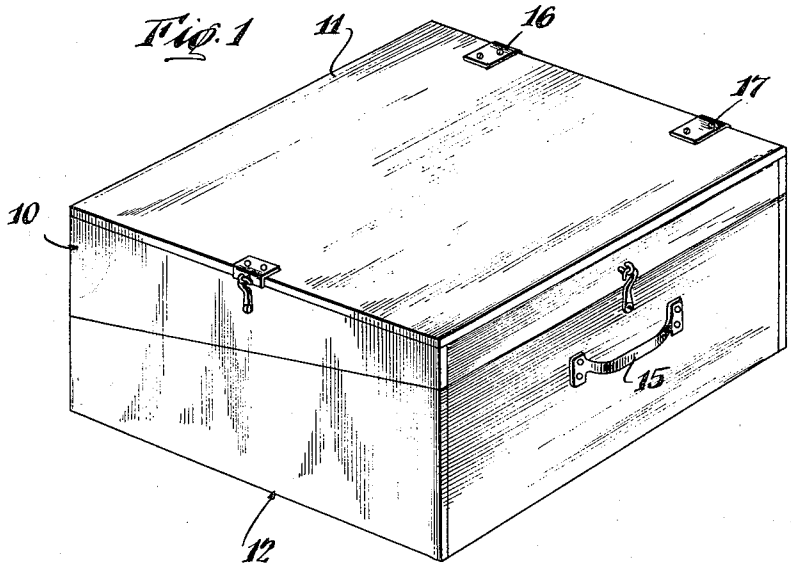
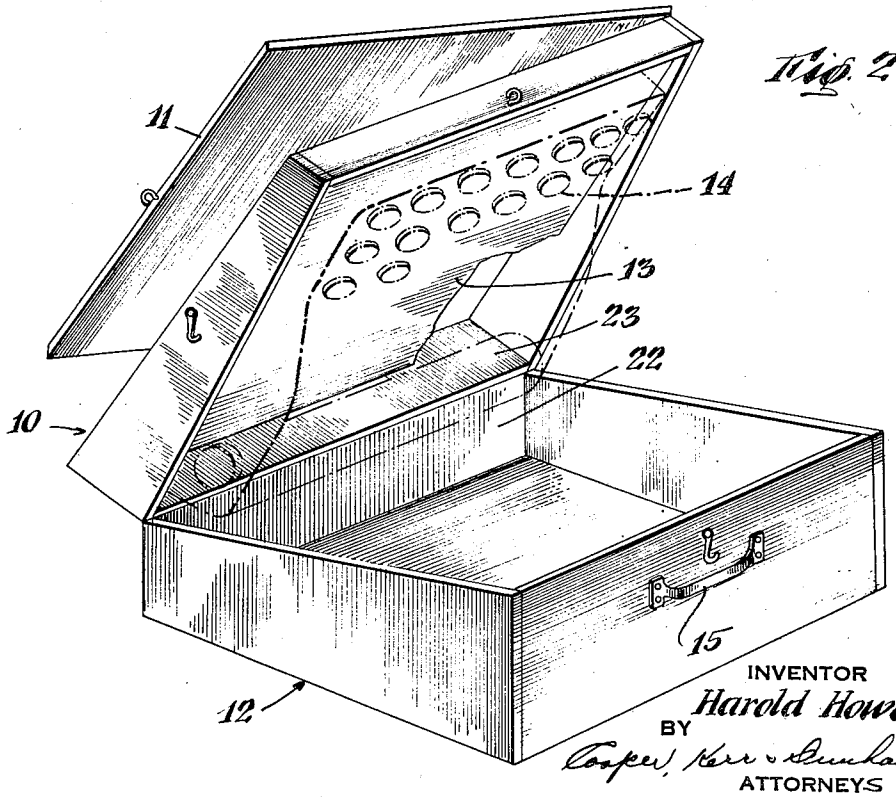


Fig. 2



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Fig. 3

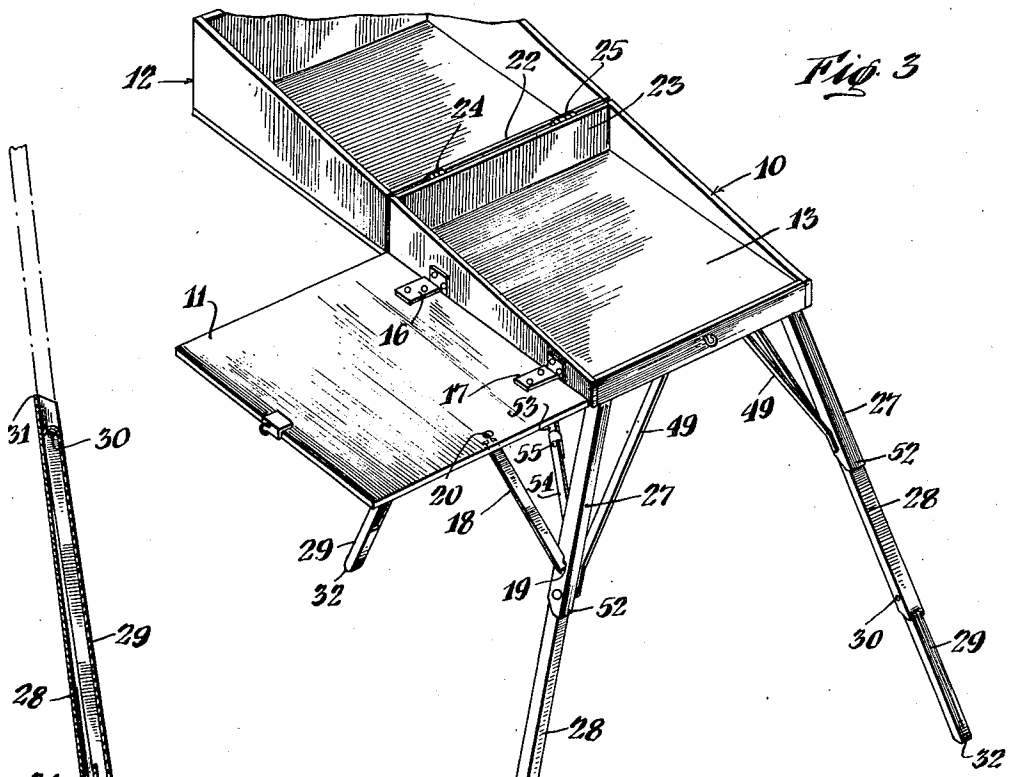
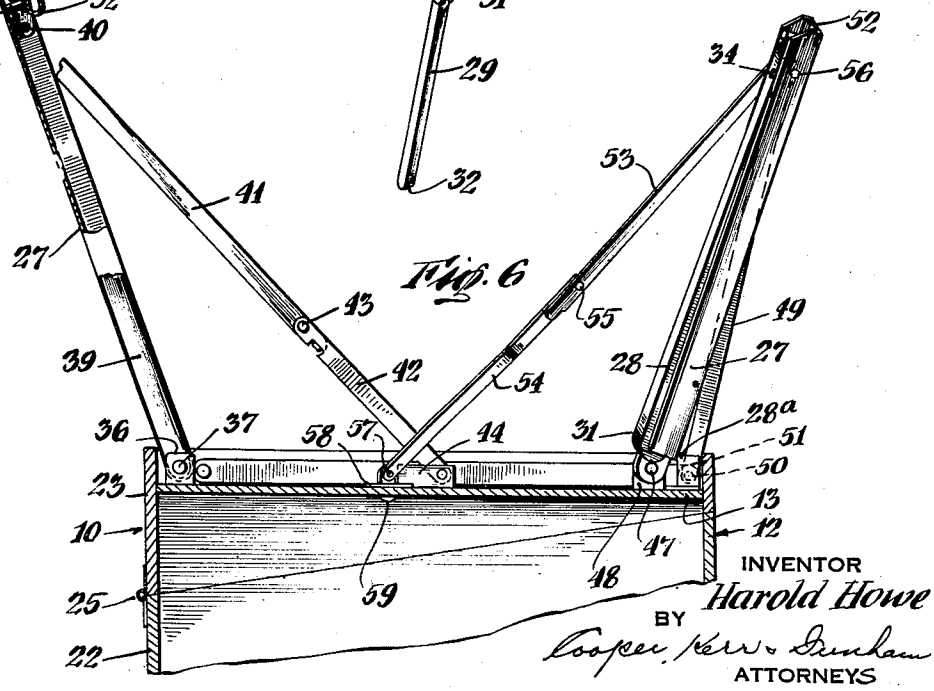


Fig. 6



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Fig. 4

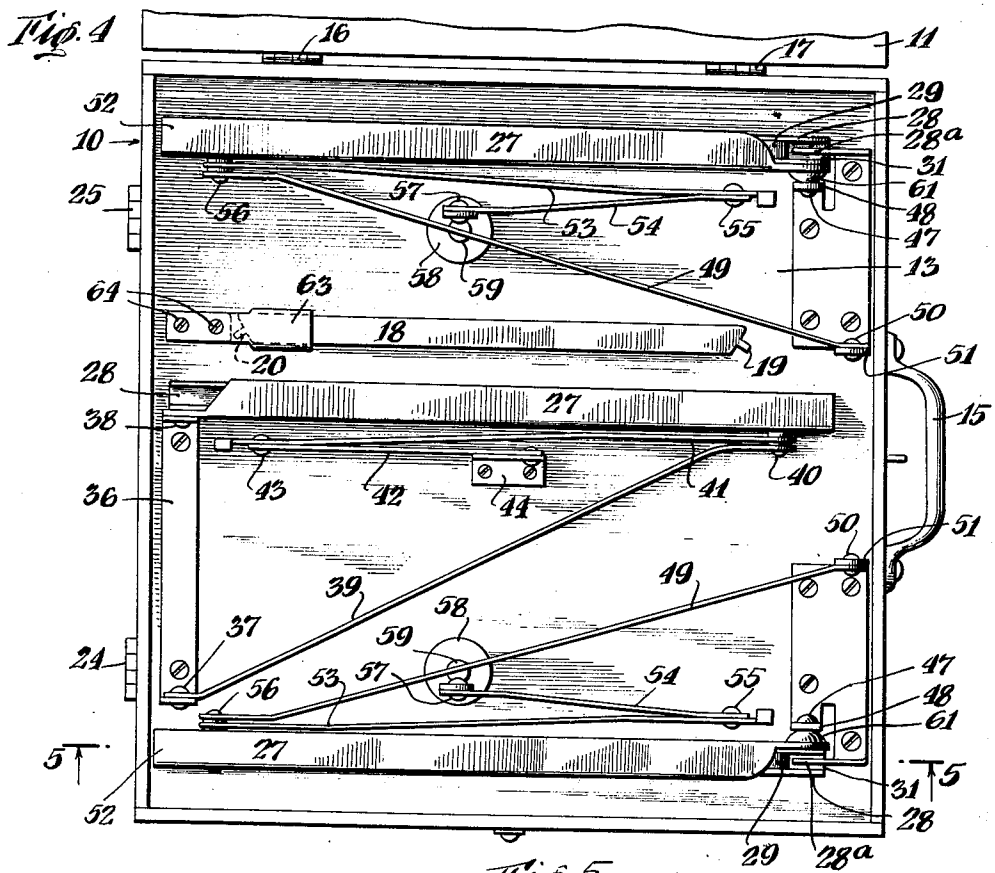
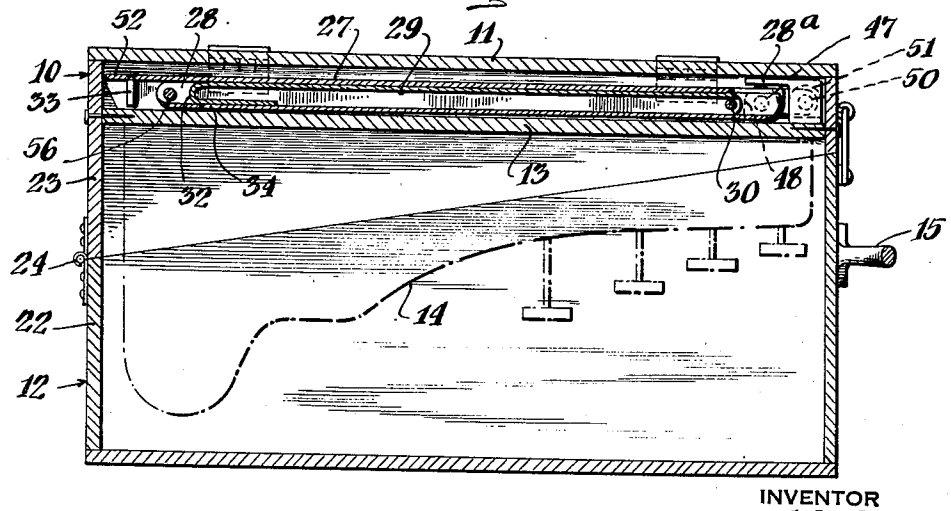


Fig. 5



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UNITED STATES PATENT OFFICE

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FOLDING TABLE

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Application November 11, 1937, Serial No. 173,973

5 Claims. (Cl. 311—77)

This invention relates to folding tables. An object of the invention is to provide a folding leg construction adapted to be folded within the area of a table, but capable of being extended to provide a base upon the floor greatly exceeding the area defined by the points of connection of the upper ends of the legs with the top of the table whereby stability of support is obtained.

Another object of the invention is to provide a folding leg structure for a table which is sufficiently staunch to provide a firm foundation for the table, even though made of relatively light material.

Another object of the invention is to provide a combined table and container for a business machine which is suitable for portage and which may be easily and quickly set up and made ready for use for supporting the machine.

Further and other objects of the present invention will be hereinafter set forth in the accompanying specification and demonstrated by the drawings which show by way of illustration the preferred embodiment and the principle of my invention and what I now consider the best mode in which I have contemplated applying that principle. Other embodiments of the invention employing the same principle may be used and structural changes made as desired by those skilled in the art within the spirit of the appended claims and without departing from the present invention.

In the drawings, Fig. 1 is a perspective view of a combined folding table and container ready for carrying.

Fig. 2 is a perspective view of the combined table and container illustrated in Fig. 1 with the covers partly open.

Fig. 3 is a perspective view of the apparatus set up as a table and ready for use.

Fig. 4 shows a plan of the leg compartment with the legs in their folded positions.

Fig. 5 is a section on line 5—5 of Fig. 4.

Fig. 6 is a section similar to Fig. 5 with one leg folded and two legs partly unfolded.

Because the folding leg structure is of such sturdy construction as to support machines which subject their supports to vibration when in use, I have chosen to illustrate a folding leg structure applied to a table designed for supporting such a machine. Such machines include, for example, typewriters, adding machines, sewing machines and dictaphones. In the drawings I have illustrated a form of table for supporting a typewriter and which is also adapted to serve as a container and carrier for the machine. It is contemplated that the leg construction and the advantages attaching to such construction may be used with tables of different forms and having different purposes. An advantage of the leg construction is that it is well suited to support a table top which is only so large as to accommodate the particular machine for which the table is designed to be used, the legs being so fashioned as to enable their folding within the area of the table top surface when not in use, notwithstanding that the legs are longer than any dimension of the table surface and are long enough to extend considerably outside of the horizontal projection of the table top.

A suggested form of the combined table and container when ready for carrying is illustrated in Fig. 1. This consists of a double compartment container having a main section 10 to which two covers 11 and 12 are hinged. The bottom of the two compartments is a common partition 13 which constitutes the table top to which a typewriter 14 or other machine is attached (Figs. 2 and 3). The table top can, if desired, consist of an open partition or frame designed to support the base of a machine and to secure the legs of the table. The machine compartment is closed by the cover 12.

The other side of the partition constitutes the under side of the table top to which the folding legs are secured. A section through the container is illustrated in Fig. 5, which shows the folding legs folded into their carrying positions and the cover 11 closed.

When the two covers are closed the container may be finished to look like any other container of the type designed for carrying purposes. It is provided with a handle 15 and none of the contents, including the folding legs, is open to view.

When the apparatus is ready for use as a table it has the appearance illustrated in Fig. 3. The cover 12 is useful as a tray or holder for papers and the cover 11 is available as a shelf for supporting such materials as work being copied. It is to be noted that the hinges 16, 17, of cover 11 are preferably designed for a swing of 180° so that the cover can be swung from its closed position to the position illustrated in Fig. 3. If the cover is to be used as a shelf a bracket may be provided. This may be in the form of a rod 18 having lugs 19, 20 projecting from its ends and which are adapted to engage holes in a side leg of the table and in the cover. The ends of the rod serve as shoulders bearing against the cover and leg.

The cover 12 for the typewriter compartment is preferably in the form of a five-sided box having a wall 22 similar to wall 23 at the rear edge of the table top, and the cover is supported by the hinges 24, 25, with the two walls 22 and 23 bearing against each other, as illustrated in Fig. 3. While the walls surrounding the table top may be fashioned in other manners and even omitted, I have found that the use of four upstanding walls, proportioned as illustrated with the rear wall high and the front wall low and connecting sloping side walls, is well suited for a combined table and container for a typewriter.

It is an essential requirement of a table for typewriter purposes that the table be provided with a base sufficiently strong to provide stability to the table and typewriter, and when the table is to be used for portable purposes, the supporting structure must also be as light as it is practicable to obtain without introducing unsteadiness in the construction.

In its most convenient form, the table top to which the typewriter is secured, should be but little larger than the base of the typewriter. This is relatively small so far as tables are concerned, especially so for portable typewriters. It is apparent, therefore, that for a table designed to stand about twenty-six inches from the floor it would take relatively heavy construction to provide sufficient stability if the legs extended straight downward from the table top. The table of my invention is provided with three legs which, when open, extend outwardly as well as downwardly so that the feet of the legs cover a floor area very much larger than the area of the table. The two front legs extend at an angle to both the width and depth directions of the table and are sufficiently away from either side of the table to enable a person using a typewriter to sit close to the table the same as is the case in the normal use of a typewriter supported on a desk.

Fig. 4 illustrates the compartment in which the legs of the table are folded, the cover 11 being open. Each leg is formed in three sections collapsible in respect to each other. As illustrated in the drawings, the three sections of each leg, 27, 28 and 29 have a hollow cross-section, each lower section being of lesser cross-section than its adjacent upper section so as to fit within its adjacent upper section when folded. While other forms of collapsible legs may be used, such as legs having telescoping sections, I prefer channel-shaped or U-shaped legs. Because of their inclination and the manner of pivotal support they tend to lock themselves open when in extended position. L-shaped sections are also suitable. As is illustrated in Fig. 6, the lower section 29 is hinged at a short distance from the lower end of the middle section 28 by a pin 30, which is supported at its ends by the flanges of the channel members. When section 29 is open and the table is in use its tendency to collapse is prevented by the web or middle portion 31 of the lower end of channel member 28. Since the legs extend outwardly at an angle, the weight of the table and the machine supported has a tendency to lock the legs open with the web or middle portion of the lower leg section 29 bearing against the web or section 28. No locking devices are needed at the joints.

For unfolding the legs the lower end of section 27 may be easily raised from the bottom of the table and extended to the position of the right hand leg as illustrated in Fig. 6. For facilitating the extraction of the middle section 28 from section 27, I preferably provide a projection 28a (Figs. 4 and 6) which starts section 28 from its groove in section 27 as both sections are lifted away from the bottom of the table. Then the free end of the channel of the middle section 28 can be readily grasped at 31 and lifted from within the channel of the upper section 27 and swung to its extended position. (Like left hand leg in Fig. 6.)

As the middle section is extended to its fully opened position, the lower end or foot 32 of the lower section is automatically raised from the channel of the middle section by a pin 33 provided for that purpose. Pin 33 is mounted upon the web at the lower end of section 27, Fig. 6, and is so positioned as to pass through a hole 34 at the upper end of middle section 28. As middle section 28 is being fully extended, the pin is brought to bear against the lower end 32 of the lower section 29, with the result that the lower section is raised from its position in the channel of section 28, in the manner illustrated by the left hand leg in Fig. 6.

The lower end of the lower section 29 is preferably fashioned with a turned over portion to provide a bearing surface. Each of the three legs has the same construction and may be made of suitable metal such as steel, brass or aluminum with the hollow cross-sections fitting snugly, one within the other.

The middle leg which extends rearwardly of the table, is mounted upon a bracket 36 which has two pivot pins 37, 38, in a line parallel to the rear edge of the table. Pivot pin 38 is in engagement with a flange of the upper section of the leg. Pivot 37 forms a hinge for a brace 39 which has its other end pivotally connected to the leg, as at pin 40 which can serve also as the hinge pin between the upper and middle sections of the leg. The three pivot points 37, 38 and 40 define a rigid frame including the leg and when the leg is lifted away from the under surface of the table, it travels in a plane normal to the table. Its limit of extension is determined by a folding brace consisting of two members 41, 42 pivotally connected together at 43. Member 42 is pivotally connected to a bracket 44 which is secured to the bottom of the table, and member 41 is pivotally connected to the leg at 40. The combined length of members 41 and 42 is such that when the leg is fully extended, its lower end or footing will rest upon the floor at a point considerably outside of the rear edge of the table top.

The mountings for the side legs differ from the mounting for the rear leg, because the side legs extend at an angle to both the depth and width directions of the table top. When folded, the side legs are substantially parallel to each other and to the back leg, as illustrated in Fig. 4. Each side leg is supported by a pivot pin 47 which engages the upper end of the leg and the ear 48 of a bracket which is attached to the bottom of the table.

The two braces which are provided for each side leg are so designed as to cause the side leg to swing outwardly from parallel relationship to the side of the table top as well as to permit the leg to be extended beyond the front edge of the table as the leg is unfolded. The upper end of one of the braces 49 is connected to a pivot pin 50 supported by an ear 51 turned up from a bracket secured to the bottom of the table top. Pin 50 and pin 47 are in a line at an angle to the front edge of the table, so that pin 56 and

the lower end of section 27 follows a path, when the leg is being unfolded, which finishes with the end of the section in a position outside of the front and side edges of the table.

The collapsible brace is formed of two members 53, 54 pivotally connected together at 55. The lower end of this brace is hinged to the lower end of the upper section of the leg at 56, and the upper end of the collapsible brace is hinged to a pin 57 carried by an upturned ear on a bracket 58. Because of the outward and sideward movement of the end 52 of the upper section, it is necessary that pin 57 be so mounted as to permit free motion or motion in at least two planes, and in order to provide for this motion bracket 58 is designed as a floating bracket pivotally connected to the table by a pivot 59.

Referring to the lower leg in Fig. 4, as the leg is lifted from the bottom of the table, bracket 58 moves slightly in a clockwise direction about pivot 59, and contrary motion ensues when the leg is folded back against the bottom of the table top. Further provision is made for the compound movement of the leg by the provision of a flexible connection at pin 47. This is in the form of a resilient washer 61 between the supporting ear 48 and the side of the leg section 27. This washer may be made of medium hard rubber or of other composition material which will give as the angle of the leg is changed during its movement. I have found that a dome-shaped block of rubber assembled in place under pressure gives satisfactory results. This forms a sort of universal pivot which may take other forms, such for example, as may be obtained by the use of a metallic spring or a flexible pivot pin.

The under surface of the table top forms the bottom of a compartment into which the legs are folded. It also provides a convenient place for storing the shelf supporting rod 18 when this member is not in use. For holding the rod in place there may be provided a simple form of support 63 which is attached by means of screws 64 to the under side of the table top. This support provides a channel by which the bracket is engaged. When cover 11 is closed, the folding legs and contents of the compartment are entirely encased and concealed.

In describing the relationship of the legs and table top I have referred to the front edge of the table as being parallel to the line of support of the two legs which have compound motion, so that the table is described as having two legs extending forwardly and to each side and one leg extending rearwardly. It is to be understood, however, that the directional terms, front, back, side, depth and width, are merely used as convenient nomenclature and are to be considered as such when present in the claims. That is to say that the table top may be displaced with reference to the legs a quarter or half turn from that illustrated in the drawings (Fig. 3), if desired, and further that the machine which is used upon the table need not necessarily correspond with the orientation assumed in describing the invention.

What is claimed is:

1. A folding table for supporting a portable machine, comprising a top and legs and braces for supporting the top, two of said legs being attached at their upper ends to pivots carried by the top, said two pivots and legs being located in adjacent corners of the top, braces connected to said two last named legs and to the top, two of said braces being pivotally connected to the top between the legs and on an axis which is offset and parallel to the horizontal axis passing through the leg pivots, said braces also being pivoted at their lower ends about axes fixed relatively to their respective legs, each of said two legs having an elbow brace pivotally connected to the top at a point spaced inward of the top from the upper pivot of its associated leg and pivotally connected at its lower end to its associated leg, said elbow brace being of a length to enable the leg to be swung on its own pivot through an angle of more than 90° measured from folded position against the top to its extended position for use as a footing outside the triangular area defined by the three upper pivots of the leg and associated braces, the direction of movement of the leg and the angle of inclination of the leg in extended position being determined by the associated braces and their pivots with reference to the leg and its pivot.

2. The combination set forth in claim 1 in which each leg comprises channel sections and a hinge pin is provided between the upper channel section and the next lower channel section, which hinge pin also serves as a pivot to which the lower ends of the leg braces are fixed relatively to the leg.

3. A folding table for supporting a portable machine comprising a top and legs and braces for supporting the top, two of said legs having universal pivots for their attachment to the top, said two pivots being located in adjacent corners of the top and enabling movement of the legs to extend them outward of their respective corner edges of the top, braces connected to said two last named legs and to the top, two of said braces being pivotally connected to the top between the legs and on an axis which is offset and parallel to the horizontal axis passing through the leg pivots, said braces also being pivoted at their lower ends about axes fixed relatively to their respective legs, each of said two legs having an elbow brace pivotally connected to the top at a point spaced inward of the top from the universal pivot of its associated leg and pivotally connected at its lower end to its associated leg, the lengths of the two braces connected to each leg and the distances between each leg pivot and the top pivots of its associated braces being so proportioned as to cause the legs to lie within opposite edges of the table top when they are folded adjacent the top and to cause the two legs to diverge from each other and outward of their respective corner edges of the top when fully extended.

4. In combination, a table having a table top and three legs, each of said legs being made up of several sections comprising members having hollow cross-sections with the lower members foldable within the hollow of the member immediately above it, pivot pins hinging successive members to each other, said pivot pins being so placed as to limit the open positions of the members in respect to each other, means pivotally supporting the upper member upon the under side of the table top, means carried by the upper member for raising a third member from the hollow cross-section of a second member when the second member is being extended in respect to the upper member, and braces pivotally connected to the table top and to the upper members of the legs for bracing the legs in extended positions, said braces being of such length as to extend the legs so that they establish a footing outside of the horizontal projection

of the ends of the legs at their points of connection with the table top.

5. In combination, a table having a table top and three legs, each of said legs being made up of several sections comprising members having hollow cross-sections with the lower members foldable within the hollow of the member immediately above it, pivot pins hinging successive members to each other, said pivot pins being so placed as to limit the open positions of the members in respect to each other, means pivotally supporting the upper member upon the under side of the table top, means carried by the table top for starting a second member from the hollow cross-section of the upper member when the upper member is being extended, and braces pivotally connected to the table top and to the upper members of the legs for bracing the legs in extended positions.

HAROLD HOWE.