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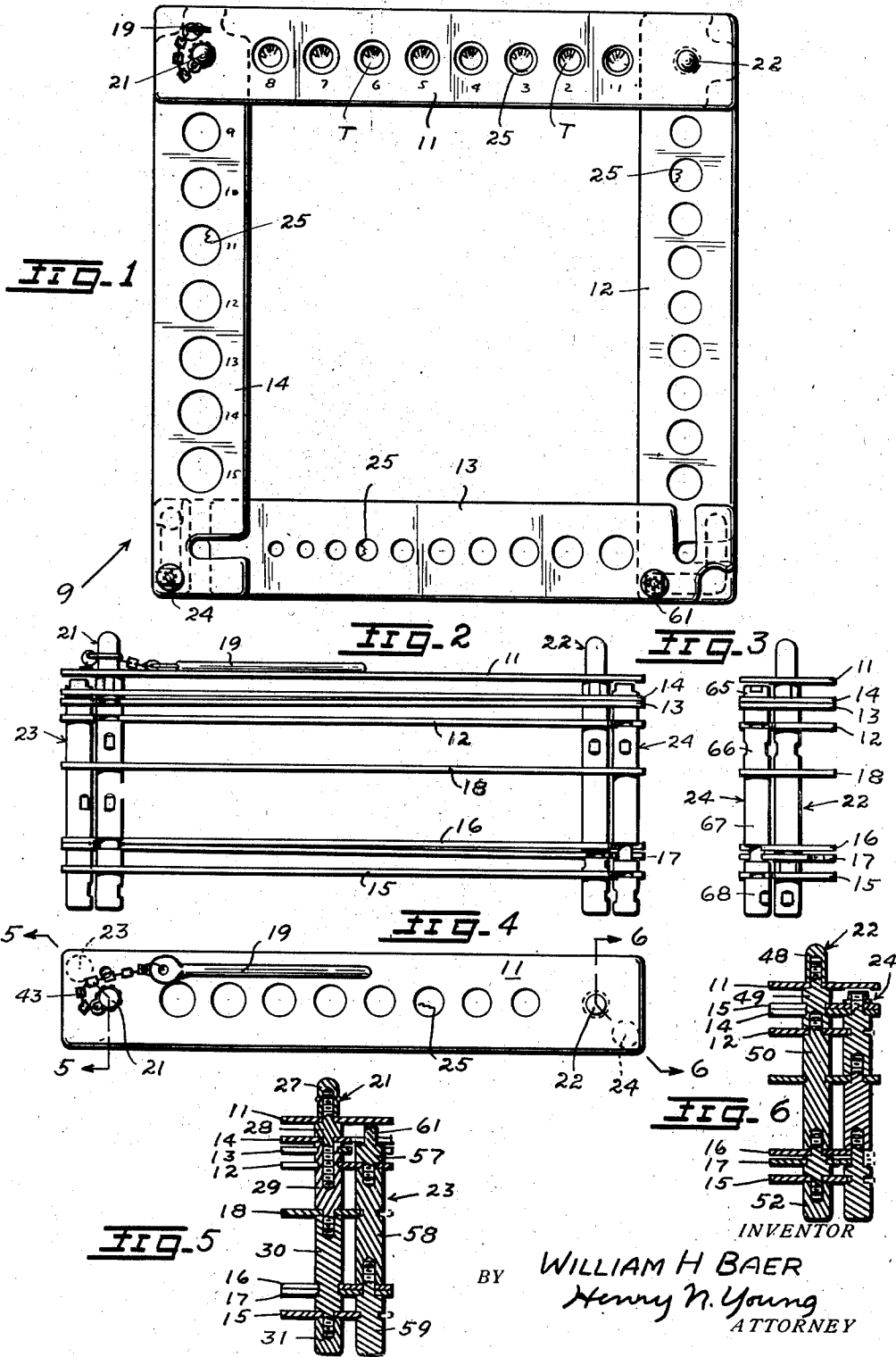
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FOLDABLE RACK FOR DRILLS AND THE LIKE

Filed July 24, 1940

2 Sheets-Sheet 1



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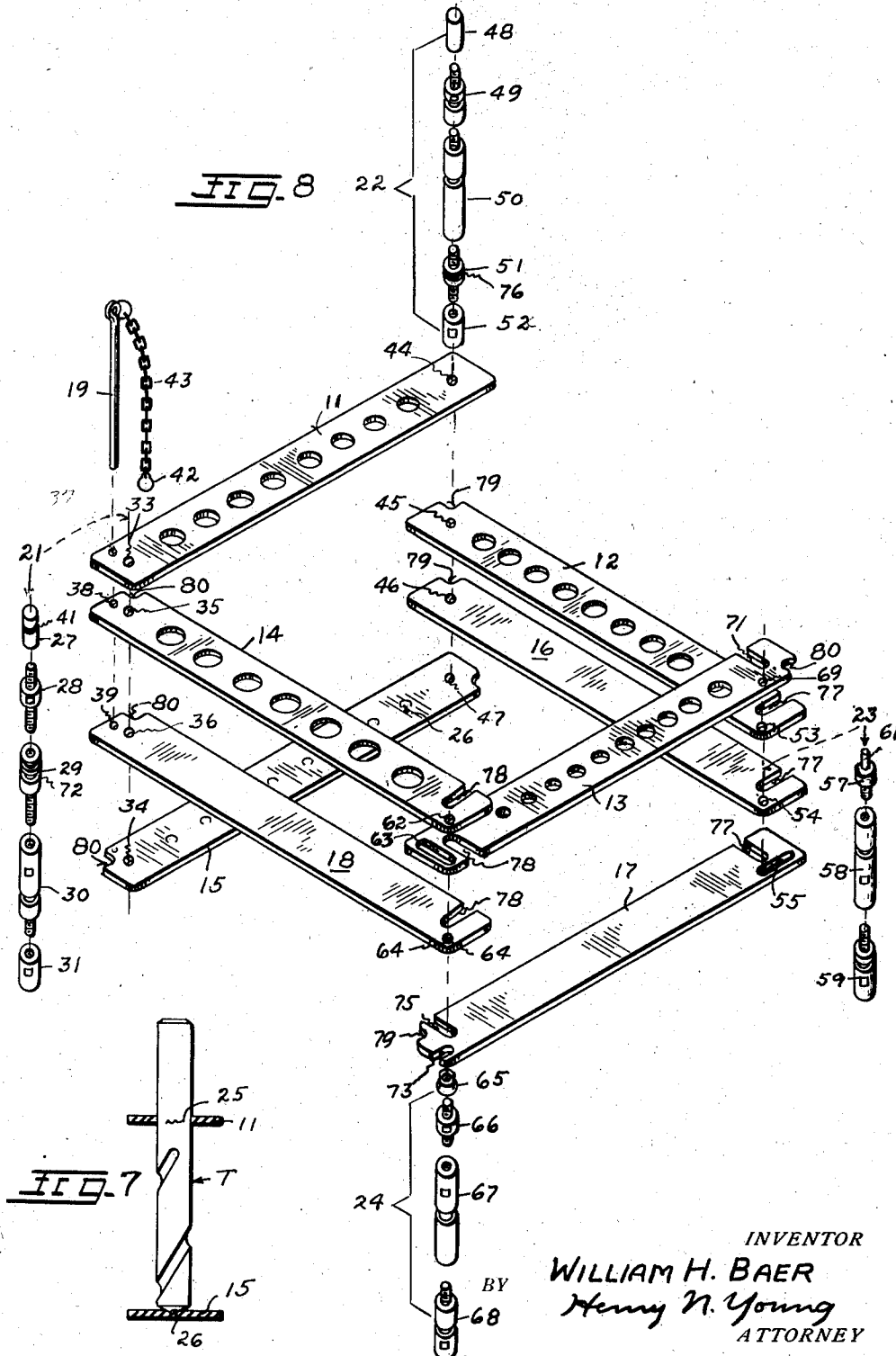
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UNITED STATES PATENT OFFICE

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FOLDABLE RACK FOR DRILLS AND THE
LIKE

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11 Claims. (Cl. 211—69)

The invention relates to a foldable gauge and support rack for a set of rotary drills and similarly shaped tools and articles.

An object of the invention is to provide an improved unitary rack for fully supporting cylindrical tools in openings thereof which are utilizable as a size-gauging means for the tools.

Another object is to provide for the particularly compact folding of the rack when the tools are removed therefrom.

A further object is to provide a support structure of the character described having its parts unitarily attached at all times.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth or be apparent in the following description of a typical embodiment thereof, and in the accompanying drawings, in which,

Figure 1 is a plan view of an unfolded rack of my invention.

Figures 2 and 3 are side and end views of the folded rack.

Figure 4 is a plan view of the folded rack.

Figures 5 and 6 are sections taken respectively on the broken lines 5—5 and 6—6 in Figure 4.

Figure 7 is a fragmentary sectional elevation taken at a drill mounted in the rack.

Figure 8 shows the various elements of the unfolded rack in mutually separated relations.

As particularly illustrated, a rack embodying my invention comprises a set of four rectangular gauge plates 11 and 12 and 13 and 14, corresponding support plates 15 and 16 and 17 and 18, post assemblies 21 and 22 and 23 and 24 at the plate extremities, and a locking pin 19 for securing the rack in unfolded condition. The plates 11 to 14 inclusive are provided with graduated sets of gauging openings 25 for a gauging reception of drills and other cylindric tools T, and the plates 15 to 18 inclusive are arranged to have the lower ends of the mounted tools rest thereon for supporting the tools in the rack. If desired, depressions or sockets 26 may be provided in the upper faces of the support plates 15 to 18 inclusive to receive the lower tool ends in coaxial relation with the gauge openings 25 through which they extend. It will be understood that the number and arrangement and sizes of the gauging openings 25 in the gauge plate may be as required and that suitable indicia may be provided adjacent each opening.

Each of said support plates 15 and 16 and 17 is rigidly related to the corresponding gauge plates 11 and 12 and 14 respectively to provide rack

sections 12—16 and 14—18 which are hingedly related to the same section 11—15 at the posts 21 and 22 respectively, the latter section being referred to as the back rack section for descriptive convenience. The gauge plate 13 and the support plate 17 are respectively hinged at one end, to the posts 24 and 23 for swinging thereabout.

The post assembly 21 fixedly connects corresponding ends of the gauge 11 and the support plate 15, and hingedly mounts corresponding ends of the gauge plate 14 and the support plate 18 at fixed points on the post. As brought out in Figures 5 and 8, the post assembly 21 comprises sections 27 and 28 and 29 and 30 and 31 which are threadedly engaged in their order to provide the described connection of the members 11 and 14 and 18 and 15 thereto. When the assembly at the post 21 is completed, the post sections are permanently locked together whereby the combination thereof comprises a post unit and may be so referred to.

The terminal post sections 27 and 31 comprise clamping nuts, engaging reduced portions of the sections 28 and 30 respectively which extend through circular holes 33 and 34 provided in the ends of the plates 11 and 15 respectively. Threaded lower portions of the sections 28 and 29 engage through holes 35 and 36 of the plates 14 and 18 respectively for effecting the hinged connection of said plates to the post, it being understood that the unreduced portions of the post sections 28 and 29 and 30 are arranged to function as spacers for and between the plates 11 and 14 and 15 and 18 at the post.

When the plates 14 and 18 are at right angles to the plate 11, holes 33 and 39 and 37 provided in the respective plates are arranged to be disposed in mutual alignment for removably receiving the pin 19 to mutually lock the plates in said relation. It will be noted that the nut 27 is provided with a peripheral groove 41 which receives a ring 42 at the end of a chain 43 which is attached to the lock pin 19 for fastening the pin to the rack against its loss when not in use.

The post 22 is engaged through holes 44 and 45 and 46 and 47 respectively provided in the corresponding ends of the plates 11 and 12 and 16 and 15 respectively; the holes in the plates are circular and the plates 12 and 16 are differently spaced from the plate 11 than are the plates 14 and 18 which are hinged to its other end. This post is made up of an upper nut section 48 and intermediate sections 49 and 50 and 51 and a bottom nut section 52, and functions similarly to the

post 21. As shown, reduced portions of the post sections 49 and 50 respectively engage through the holes 44 and 45 of the gauge plates 11 and 12, and reduced portions of the sections 51 at its upper and lower ends respectively engage through the holes 46 and 47 of the support plates 16 and 15, the arrangement providing for a swinging of the plates 12 and 16 on and about the post assembly.

The post 23 is constantly engaged through circular holes 53 and 54 respectively provided at corresponding corners of the plates 12 and 16 and is also engaged through an elongated hole or slot 55 provided in an end of the plate 17. The slot 55 slidably receives a reduced post portion, and extends from a point of the corner of the plate 17 which underlies the holes 53 and 54 of the plates 12 and 16, the latter plates being constantly held in mutually fixed relation by the post 23. When the present rack is opened out for use, the plate 17 is arranged to be disposed at an angle to the assembly of the plates 12 and 16 with its corresponding end preferably in alignment with the plane of the outer side edges of the plates 12 and 16; accordingly, the slot 55 extends parallel to the outer edge of the plate 17 to permit this relation of the plates. This arrangement is such that the plate 17 may be swung about the post 23 and in its plane between folded and unfolded positions with respect to the assembly of the plates 12 and 16 of the post 23.

The post 23 essentially comprises sections 57 and 58 cooperative to secure the plates 12 and 16 and 17 in the required spacing of said plates along it and for the swinging of the plate 17 on and about it; when the post sections are assembled in association with the said plates, the post comprises a unit for its purposes. As shown, the upper post section 57 has a reduced portion comprising a pin 61 extending upwardly therefrom and also a reduced threaded lower portion for engagement through the holes 53 of the plate 12. The section 58 is provided with threaded axial bores at its upper and lower ends for complementarily receiving the reduced threaded portions of the post sections 57 below the plate 12 and an upwardly extending reduced threaded portion of the post section 59 which extends through the holes 54 and 55 of the plates 16 and 17 to mount said plates on the post. The plate-mounting arrangement is such that the plates 12 and 16 are rigidly fixed to the post 23 to provide a side section of the rack, and the plate 17 is hinged to the post for swinging in a plane perpendicular to the post axis.

The plates 14 and 13 and 18 are provided with holes 62 and 63 and 64 respectively for receiving the post 24. The holes 62 and 64 of the plates 14 and 18 are provided at corresponding points adjacent outer corners of the plates 14 and 18, and the hole 63 of the plate 13 is in the form of a slot extending across the end of the member 13 from a point thereof which is arranged to be in alignment with the holes 62 and 64 when the plate 13 is perpendicular to the assembly of the plates 14 and 18. The disposition and length of the slot 63 is preferably such that outer corners of the plates 14 and 13 and 18 may be aligned when the plate 13 is disposed in an unfolded position, and the folding of the plate 13 to lie fully between the fixedly related plates 14 and 18 is permitted.

The assembly of the post 24 comprises a nut section 65 and sections 66 and 67 and 68 which correspond generally to the sections 57 and 58

and 59 respectively of the post 23. In the post 24, the sections 65 and 66 receive the plates 14 and 13 between them for the swinging movement of the plate 13 about the post axis, and the sections 66 and 67 clamp the plate 18 between them. In this manner, the plates 14 and 18 and the post 24 comprise a unitary side section of the rack to which the plate 13 is pivoted for movement in its plane, it being recalled that the slot form of the hole 63 of the plate 13 is arranged to permit a folded disposal of the plate 13 in the confines of the space between the plates 14 and 18.

It will now be noted that the mutual spacing of the members 14 and 18 at the post 24 is the same as at the post 21, and that the mutual spacing of the plates 12 and 16 at the post 23 is the same as at the post 22. Also, the spacings of the plates 11 and 15, 12 and 16, and 14 and 18 are all different with respect to each other and the base plane of the assembly; this permits the various connections at the posts 21 and 22 and 23 and 24, and provides for the support of tools of different lengths. In the present instance, the plates 11 and 15 are furthest apart and the plates 14 and 18 closest in their respective assemblies.

When the present rack is opened for its use, the end of the plate 13 opposite the slot 63 is arranged to overlie the plate 12 with its extremity thereat disposed in the plane of the outer edges of the plates 12 and 16, and the plate 13 is releasably secured in the aforesaid position through the engagement of the pin extension 61 of the post 23 in a complementary hole 69 provided in it. While the pin 61 might mount a nut or other element for fixing the plate 13 to the post, such will not generally be essential and may be omitted, as in the present instance. To permit a folding of the plate 13 into position between the plates 14 and 18, the end of the plate 13 adjacent the hole 61 is provided with a notch 71 extending from the appropriate side edge thereof for receiving a reduced portion 72 of the post 21.

The plate 17, which is pivoted on the post 23 below the plate 16, has its unpivoted end provided with a notch 73 extending inwardly from its extremity and in such a position that it may receive a reduced portion 74 of the post 24 provided between unreduced portions of the post sections 67 and 68 for supporting said end on the post when the plate 13 connects the posts 23 and 24 in the described manner, a preferred positioning of the notch 73 providing for a mutual alignment of the outer corners of the plates 14 and 18 and 17 when the rack is unfolded. To permit a swinging of the plate 17 into alignment with the plates 12 and 16, the plate 17 is provided with an appropriately located notch 75 for receiving a reduced portion 76 of the post 22. While the plates 13 and 17 are arranged for cooperative use as the plates of the rack sections 11-15 and 12-16 and 14-18, it will be understood that they primarily comprise a releasable linkage between the posts 23 and 24 with and between which they are interlocked.

It will now be noted that the unitary assembly of gauge and support plates and corner posts is supported on the lower sections of the various posts whereby the lower ends of said post sections comprise supporting feet and are arranged to define a supporting plane which is shown as parallel to the planes of the various plates but is not necessarily so. It will also be understood that the posts 21 and 22 and 23 and 24 define

the corners of a parallelogram when the rack is arranged for its use, whereby the opened rack may, by omitting the application of the locking pin 19 in the pin holes 37 and 38 and 39 of the plates 11 and 14 and 18 respectively, be used while in some other form than a rectangle.

Assuming that the present foldable rack is in its fully unfolded condition, as in Figure 1, the folding thereof is arranged to be effected by a succession of relatively simple operations. Having the drills and other tools removed from the rack, the locking pin 19 is removed from the holes 37 and 38 and 39 of the plates 11 and 14 and 18 respectively. The unpivoted end of the member 13 is now lifted to free it from the pin 61 at the top of the post 23, and the side rack sections including the plates 12 and 14 are angularly separated to disengage the post 24 from the notch 75 of the plate 17. The plate 13 may now be swung about the post 24 to dispose this member fully opposite the plate 14 with its notch 71 receiving the post 21 at the post portion 72, the plate end at the slot 63 being appropriately shifted laterally of the post 24. The plate 17 is swung about its pivotal connection with the post 23 to align it with the plates 12 and 16 and is, through the freedom permitted it by reason of the engagement of the post 23 in its slot 55, shifted longitudinally for its full alignment with the plates 12 and 16.

The unitary assembly of the plates 12 and 16 and 17 is now swung about the post 22 through a 270 degree angle to dispose said assembly between the plates 11 and 15 of the rack, the plates 12 and 16 and 17 being provided with notches 77 which are mutually aligned and of a size to receive the post 21 for such a distance that the assembly may be disposed within the confines of the space defined between the plates 11 and 15. The plate assembly 14-18-17 is swung through a 90 degree angle to also engage it in the space between the plates 11 and 15, the plates 14 and 13 and 17 being provided with corresponding notches 78 for receiving the post 22 as required. To permit a complete folding of the rack to occupy a minimum of space, the plates 12 and 16 and 17 are provided with corresponding corner notches 79 for receiving the post 24 and the plates 14 and 13 and 18 and 15 are provided with corner notches 80 for receiving the post 23, it being noted that the tops of the posts 23 and 24 are arranged to lie beneath the plate 11 when the rack is folded. Having the various plates 11 to 18 inclusive all of like length and width, it will be noted that the folded rack occupies no more space than the back sections 11-15 thereof, and is therefore particularly compact.

From the foregoing description taken in connection with the accompanying drawings, the advantages of the construction and operation of the present rack will be readily understood by those skilled in the art to which this invention appertains. While I have described the features and principles of operation of an assembly which I now consider to comprise a preferred embodiment of my invention, I desire to have it understood that the showing is primarily illustrative, and that such changes may be made, when desired, as fall within the scope of the following claims.

I claim:

1. In a foldable rack for drills and the like, sections each comprising a gauge plate and a support plate of like outline underlying the

gauge plate in fixed spaced relation thereto, said sections being angularly related, and means hingedly connecting the sections for their relative swinging about a common upright axis, the plates of the sections all being movable in different planes to permit a folding of one section within the confines of the other section.

2. In a foldable rack for drills and the like, at least three sections cooperative to provide a rack of polygonal outline and each comprising a gauge plate and a support plate of like outline underlying the gauge plate in spaced relation thereto, and means hingedly connecting the sections for their relative swinging about mutually parallel upright axes, the said plates all being mutually parallel and disposed in different planes to permit their disposal within the confines of one of the sections.

3. In a foldable rack for drills and the like, at least three sections cooperative to provide a rack of polygonal outline and each comprising a gauge plate and a support plate of like outline underlying the gauge plate in spaced relation thereto, and post members hingedly connecting the sections for their relative swinging about upright axes and providing support legs for the rack, the said plates all being parallel to and differently spaced from the plane support provided by the legs to permit the folding within the confines of one section of the remaining sections.

4. A folding rack for drills and the like comprising three sections cooperative to provide a rack of polygonal outline and each comprising a gauge plate and a support plate of like outline underlying the gauge plate in spaced relation thereto, means hingedly connecting two of the sections to the third section for the relative swinging of the sections about upright axes to and from positions within the confines of the third section, and means releasably connecting the un-hinged ends of the said swingable sections and comprising mutually spaced gauge and support plates for cooperative use as the plates of a section.

5. A folding rack for drills and the like comprising three sections cooperative to provide a rack of polygonal outline and each comprising a gauge plate and a support plate of like outline underlying the gauge plate in spaced relation thereto, means hingedly connecting two of the sections to the third section for the relative swinging of the sections about upright axes to and from positions within the confines of the third section, and means releasably connecting the unhinged ends of the said swingable sections and comprising link members each hinged to a swingable section and disposable within the confines thereof for disposition therewith within the confines of the third section.

6. A folding rack for drills and the like comprising three sections cooperative to provide a rack of polygonal outline and each comprising a gauge plate and a support plate of like outline underlying the gauge plate in spaced relation thereto, means hingedly connecting two of the sections to the third section for the relative swinging of the sections about upright axes to and from positions within the confines of the third section, and means releasably connecting the unhinged ends of the said swingable sections and comprising a gauge plate and a support plate each hinged to a said swingable section and disposable within the confines thereof for disposition therewith within the confines of the third section.

7. In a foldable rack for drills and the like, sections each comprising a gauge plate and a support plate of like outline underlying the gauge plate in fixed spaced relation thereto, said sections being angularly related when the rack is open, and means hingedly connecting the sections for their relative swinging about a common upright axis, all of the plates of the sections being movable in different planes to permit a folding of the sections together with the plates of the sections in mutual alignment transversely thereof.

8. In a foldable rack for drills and the like, sections each comprising a gauge plate and a support plate of similar outline for cooperatively underlying the gauge plate, and a common pivot post connecting the plates at corresponding ends of the sections while fixing the plates in different and mutually parallel planes for swinging therein to provide for a folding of the rack for the mutually aligned relation of the plates transversely thereof.

9. In a foldable rack for drills and the like,

sections each comprising a plate having transverse perforations for receiving drills and the like therethrough and a support plate of similar outline for cooperatively underlying the first plate, a common pivot post connecting the plates at corresponding ends of the sections while fixing the plates in different mutually parallel planes for swinging therein to provide for a folding of the rack sections into a mutually aligned relation of the plates transversely thereof, and spacer posts unitarily connecting the plates of each section in such spaced relation along the pivot post as to permit said folding of the rack.

10. A structure in accordance with claim 9 having the pivot and spacer posts provided with corresponding leg extensions for cooperatively supporting the open rack.

11. A structure in accordance with claim 9 having a plate of one section notched from an edge thereof to receive the spacer post of the other section thereat when the rack is folded

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