

No. 678,018.

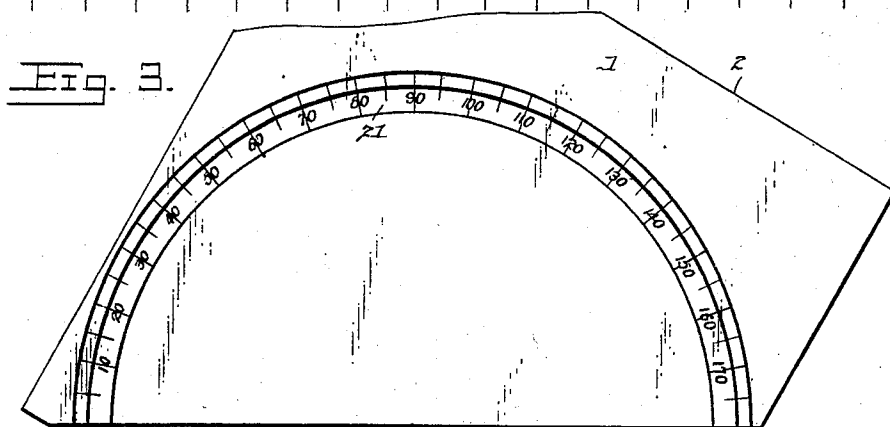
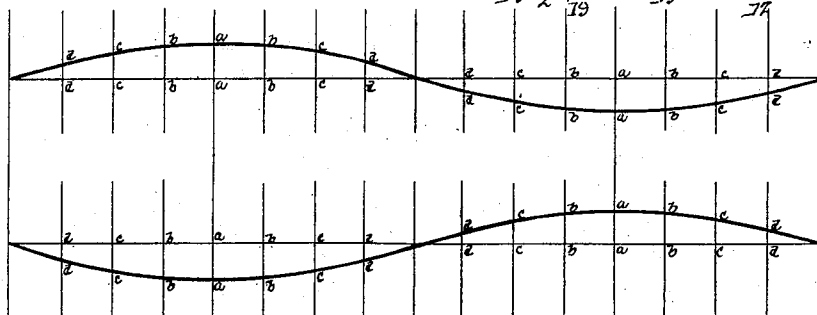
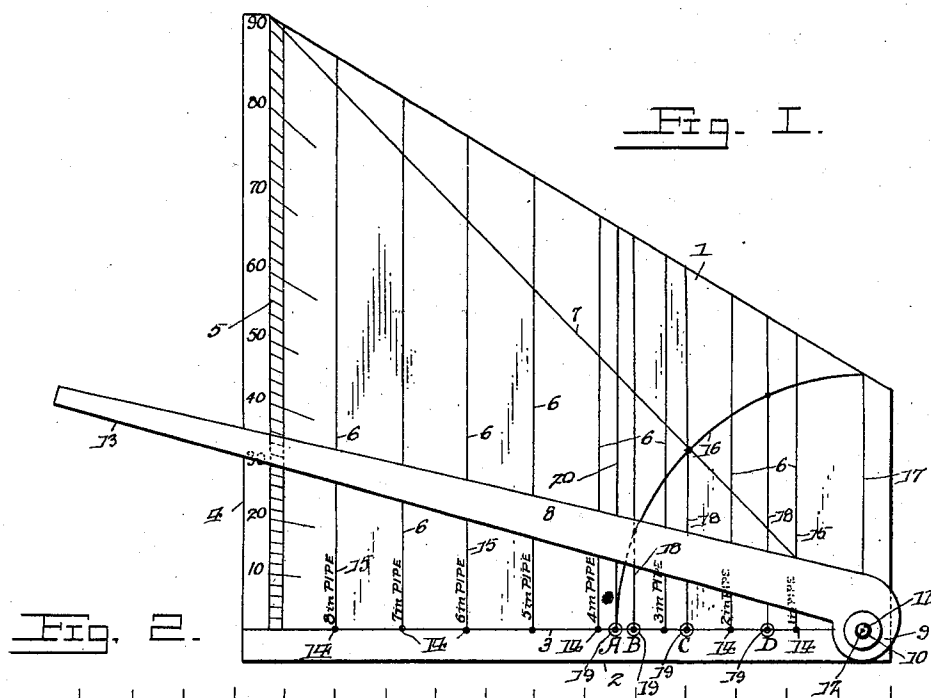
Patented July 9, 1901.

J. M. McFARLAND.

METAL WORKER'S PROTRACTOR PATTERN.

(Application filed Feb. 2, 1901.)

(No Model.)



Witnesses

F. & A. Allen
Chas. D. Hoyer.

J. M. McFarland, Inventor

by *J. M. McFarland, Inventor*
Chas. Knowlton
Attorneys

UNITED STATES PATENT OFFICE.

JAMES MAXEY MCFARLAND, OF LOS ANGELES, CALIFORNIA.

METAL-WORKER'S PROTRACTOR-PATTERN.

SPECIFICATION forming part of Letters Patent No. 678,018, dated July 9, 1901.

Application filed February 2, 1901. Serial No. 45,774. (No model.)

To all whom it may concern:

Be it known that I, JAMES MAXEY MCFARLAND, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Metal-Worker's Protractor-Pattern, of which the following is a specification.

This invention relates to a metal-worker's pattern-protractor; and the object of the same is to provide a simple and effective device for laying out patterns for pipe-elbows and the like and facilitate the accurate determination of edge curves in accordance with certain scales and measurements.

The invention consists in the construction and arrangement of the several parts, which will be more fully hereinafter described and claimed.

In the drawings, Figure 1 is a plan view of the improved protractor looking toward the side having the scale and particular measurement-marks thereon. Fig. 2 is a diagrammatic view of a pattern laid out by the use of the improved protractor. Fig. 3 is a plan view of the protractor looking toward the side opposite that shown by Fig. 1 and partially broken away.

Similar characters of reference are employed to indicate corresponding parts in the several views.

The improved protractor or scaling device consists of a body 1 of sheet metal or other suitable material and preferred dimension and formed with a lower straight edge 2, from which the measurements are taken as a base and capable of being moved at any angle on the material from which the elbow or like device is adapted to be cut from the pattern or diagram laid out, and thus economize in the use of such material. Parallel with the straight edge 2 is a base-line 3, from which all measurements on the improved device are calculated when using the same to produce the pattern or diagram, and extending from one extremity of the said line 3 close to the left edge 4 of the device, which is at a right angle to the edge 2, is a degree-scale 5, which is read from the said base-line upwardly. At intervals over the surface of the body from the right extremity to that having the scale

5 thereon pipe-measurement lines 6 are defined and designated by marks and letters, such as "1 in. pipe," "2 in. pipe," and so on. There is also a forty-five-degree line 7 on the body for convenience in measuring and following the angle over the plate, and on the plate is pivoted a flat blade or strip 8, having a terminal lateral projection 9, through which a pivot-pin or device 10 is passed into the right extremity of the body 1 near the lower right corner, and in the head 11 of the said pivot-pin or device at a central point is a small cavity 12 to receive the point of one leg of a compass in describing or obtaining the different arcs, the lower straight edge 13 of the blade or strip being in direct alinement with the said cavity. The strip or blade is long enough to extend beyond the right end edge of the body 1 for convenience in grasping the same to shift it over the body, and in its operation said blade is held down close to the latter.

As before indicated, the sizes of the pipes are measured on the base-line 3 from the cavity 12 of the head 11 of the pivot-pin or device by a scale of one-half inches, so that from said cavity to the nearest pipe size thereto and designated "one-in. pipe" the distance is equal to a half-inch, or one-half the diameter of the pipe scaled to said point. This scale is carried out regularly over the entire base-line, and indentations 14 are formed on the base-line where the points are laid off to receive the points of the compass-legs and serve as centers for the latter in taking the various measurements in accordance with the size of the pattern to be planned or laid out. From the said points or indentations 14 perpendiculars 15 are drawn over the body 1, and on these perpendiculars are indicated the different sizes of pipes in regular increasing succession from the cavity 12 toward the left end of the body. There are other measuring-lines indicated on the body for describing the edge curves of the elbow pattern or section to be laid out. To obtain these latter measuring devices, an arc 16 is described from the cavity 12 as a center and extending from the base-line 3 to the perpendicular 17. The said arc is divided into any number of equal parts, four being shown for

illustration, and from said division-points perpendiculars 18 are dropped to the base-line 3, and where said perpendiculars 18 intersect the said base-line indentations or 5 compass-point centers are formed and distinguished from the other adjacent centers by surrounding circles 19. There are four of the said centers A, B, C, and D, and from the center A a tangent 20 is drawn over the 10 body parallel with the perpendiculars.

The shape of the body shown is preferred for convenience, but a rectangular contour can be adopted, if desired, and as the angle cut is only half that of the finished bend it 15 has been found best to number the degrees on the body double what they are. In the methods heretofore practically carried out in obtaining the same result as desired by the use of the improved protractor a drawing of 20 the whole finished elbow was made and also profile or circle full diameter of the pipe was described and spaced off. Radial lines were then drawn across the bend, showing where the seams in the elbow were to be made, and 25 other numerous lines were also drawn to show where the sheet of stock was to be cut. By the use of the improved device and the method pursued in conjunction therewith to mark out an elbow for a two-inch pipe, for instance, 30 (see Fig. 2,) draw a line through the middle of cut to be made on the sheet to be used and divide the line into four times the number of spaces shown on base-line 3, (marked A B C D,) which will be sixteen. Draw perpendiculars 35 through the division-points of the said line. The elbow to be made, for instance, is ninety degrees, with three seams thirty degrees each, and with this in view the blade or strip is drawn over the body 1 until the 40 straight edge 13 thereof alines with the thirty-degree mark, as shown. Then set one point of one leg of an ordinary form of dividers or compasses on the center in the base-line 3, intersected by the perpendicular marked "two-in. pipe," and make the opposite leg-point 45 touch the edge of the blade or strip where it crosses the said perpendicular. Without changing the distance between the compass-points as thus obtained, set one point in the 50 center A at the point where the tangent 20 intersects the base-line 3 and bring the other point to rest on the tangent above. Then move the blade or strip to touch the point resting on the tangent and then lay out this 55 distance, just ascertained between the center A and the point of the compasses on the tangent 20, on the pattern to define the line *aa*. Without further changing the position of the blade on the body with measurements taken 60 from centers B, C, and D on their respective perpendiculars to edge of blade or strip, mark the lines or spaces *b b*, *c c*, and *d d* on the pattern, the said spaces being applied on opposite sides of the center line on the sheet to 65 produce convex and concave edges for obvious reasons and measured from parallel lines drawn from one similar end dimension to the

other. In explanation of the foregoing rule it must be stated that the invention as embodied in the protractor is based upon the assumption that identical measurements are 70 obtained from divisions of concentric circles and that lines drawn from the centers set forth to an equal height on tangents will cut the corresponding perpendiculars at an equal 75 distance from the base. This same rule will be carried out in the construction of pipe-elbows of different dimensions.

On the back of the protractor an ordinary sector 21 is defined, as shown by Fig. 3, and 80 this adds to the convenience of the instrument because the sector is frequently used and, in fact, is necessary in the construction of patterns of the class set forth.

If the tangent of the arc used on the body 85 and the perpendicular indicating one of the sizes of pipes are the same, then the blade will not be moved in marking out an elbow for that size of pipe. It is also obvious that changes in the degrees and measurement 90 marks and points can be made at will to accommodate similar devices of different or larger dimensions and retain the same principle and pursue the same operation.

Having thus described the invention, what 95 is claimed as new is—

1. A device of the class set forth having a lower straight edge and a base-line above the latter and parallel therewith, a degree-scale extending along one end edge, an arc divided 100 into an arbitrary number of equal parts from the division-points of which perpendiculars are drawn to said base-line, a line tangent to the said arc and parallel to the said perpendiculars and also intersecting the base-line, lines parallel to the perpendiculars and 105 intersecting the base-line to designate different sizes of pipes, and a blade or strip having a lower straight edge to aline with the marks of the degree-scale and provided with 110 a pivoting device, the central portion of the latter being used as the center to describe the said arc.

2. A device of the class described having a lower straight edge and a base-line above the 115 latter and parallel therewith, a degree-scale extending along one end edge, an arc divided into an arbitrary number of equal parts from the division-points of which perpendiculars are drawn to said base-line, a line tangent to 120 said arc and parallel to the perpendiculars and also intersecting the base-line, lines parallel to the perpendiculars and intersecting the base-line to designate different sizes of pipes, the points on the base-line where the 125 said tangent and perpendiculars intersect therewith being distinguished by particular marks and the lines designating the sizes of pipes being supplied with means indicating the successive sizes which increase regularly 130 from the end of the body on which the arc is located toward the degree-scale, and a blade or strip movable over the body and formed with a lower straight edge to aline with the

marks of the degree-scale and also having an
end projection which is pivoted to the body,
the pivoting device for said blade or strip
having a center cavity which forms the cen-
5 ter for said arc and with which said straight
edge of the blade or strip is in direct aline-
ment.

In testimony that I claim the foregoing as
my own I have hereto affixed my signature in
the presence of two witnesses.

JAMES MAXEY MCFARLAND.

Witnesses:

JOHN U. ZALLIE,
J. N. GARDINER.