June 14, 1960 J. R. JASSE 2,940,364

BASE PLATE FOR MORTARS AND THE LIKE

Filed July 17, 1957 2 Sheets-Sheet 1

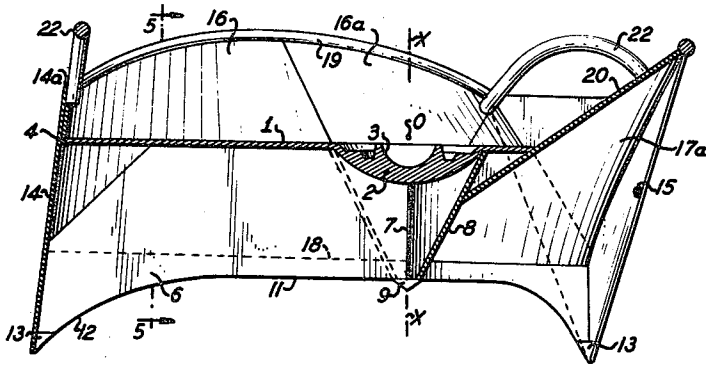

Fig. 1

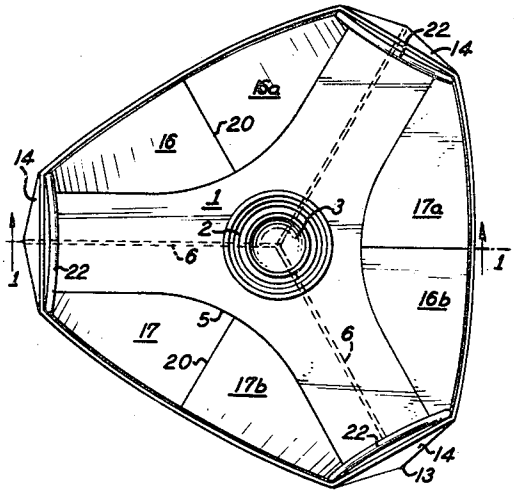

Fig. 2

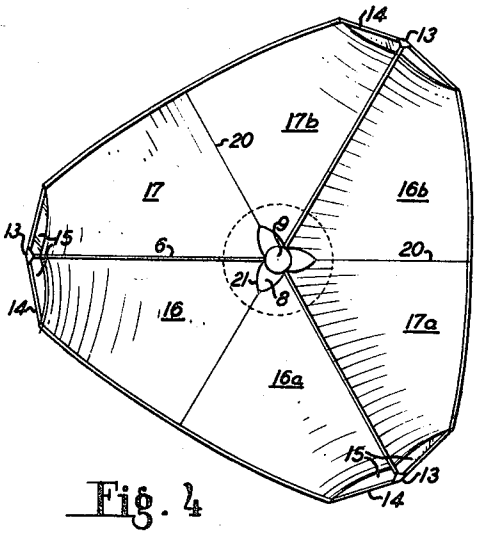

Fig. 4

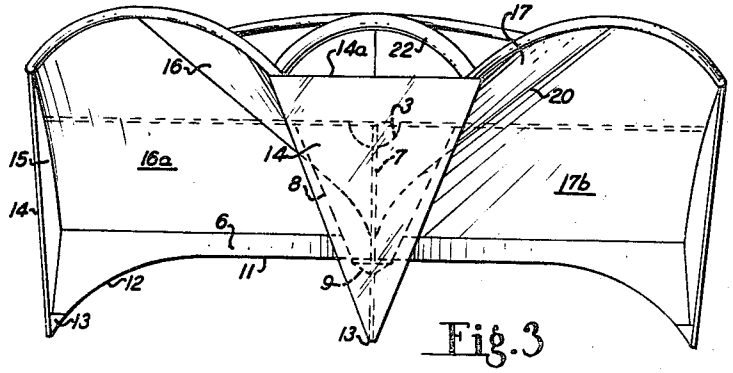

Fig. 3

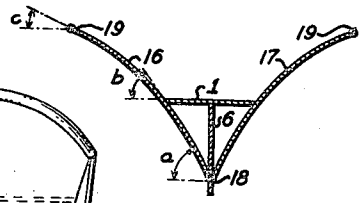

Fig. 5

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Fig. 7

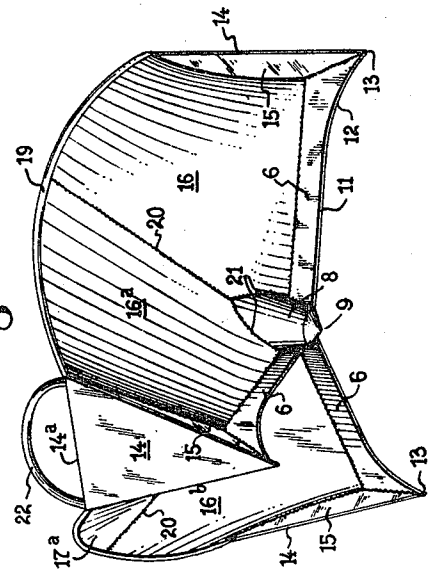
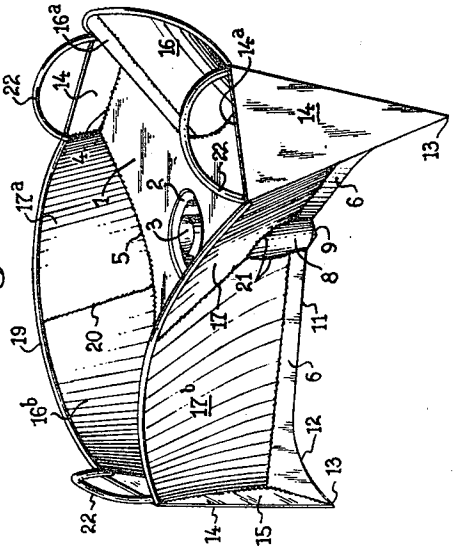


Fig. 6



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BASE PLATE FOR MORTARS AND THE LIKE

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7 Claims. (Cl. 89—37)

The present invention relates to base plates for mortars or like firing devices adapted to be anchored in the ground for receiving the thrust of the tube of the firing device when firing.

The object of the invention is to provide a base plate which is simple in construction, particularly convenient to use and permits obtaining a remarkable stabilization of the firing device after the first shots, this plate being easy to extract from the ground after firing.

This base plate comprises in combination: a flat panel provided at its centre with a cup or other device adapted to receive the rear end of the firing device, and, protruding from the lower face of this panel, on one hand, fins perpendicular to the panel the lower edges of these fins forming ground-penetrating points and, on the other hand, inclined curved walls forming arches which are symmetrical in pairs so as to constitute supporting wedges in the ground, said walls being upwardly divergent and higher than said lower edges of said fins.

Owing to this construction as soon as the first shots are fired, the base plate is driven into the ground a certain distance very rapidly along the parts of the fins which protrude downwardly relative to the curved walls, the latter then progressively bear against the ground and damp or brake from that moment on the speed at which the base plate is driven into the ground while providing the base plate with a very large ground-contacting surface.

In this way, the surface of the base plate bearing against the ground increases progressively and continuously with the penetration when anchoring the base plate in the ground.

Experiments have shown that there is obtained a first very rapid stabilization sufficient to ensure correct direction of firing for the first shots, and thereafter an excellent seating of the base plate even in very soft or loose grounds.

Further features and advantages of the invention will be apparent from the ensuing description with reference to the accompanying drawings to which the invention is in no way limited.

In the drawings:

Fig. 1 is a vertical axial sectional view of a base plate embodying the invention taken along line 1—1 of Fig. 2;

Fig. 2 is a plan view thereof;

Fig. 3 is a side view corresponding to Fig. 1;

Fig. 4 is a view of the underside of the base plate;

Fig. 5 is a vertical sectional view taken along line 5—5 of Fig. 1;

Fig. 6 is a perspective view from above, and

Fig. 7 is a perspective view from below.

In the illustrated embodiment of the invention, the base plate comprises a flat panel 1 in the form of a three-branched star, for example composed of weldable steel plate. Preferably this panel has at its centre a reinforced part 2, for example attached by welding, in which an upper recess 3 is formed, this recess being part-spherical in shape the centre O of which is situated in the immediate vicinity and preferably slightly above the upper face of the panel 1.

Outside the part 2, the branches of the star-shaped panel 1 could have a constant thickness or, as is shown in Fig. 1, a thickness tapering from the part 2 toward the ends 4 of the branches (Figs. 1 and 6). These branches have lateral parallel edges interconnected by large-radius arcuate edges 5 (Figs. 2 and 6).

Fixed under the panel 1 are three fins 6 composed of thin plates. Each fin is disposed in a radial plane which is the median plane of one of the branches of the panel 1. The fins 6, which meet at the vertical axis XX intersecting the centre O of the recess 3, are interconnected by welding at 7 on this axis.

On the centre of the base plate, under the reinforced part 2 of the panel, the fins 6 are furthermore interconnected by a conical wall 8 which terminates at its base in a conical end member 9 the point of which is directed downwardly.

The lower edges 11 of the fins are parallel with the panel 1 in their portion in the vicinity of the centre of the base plate but these edges progressively curve downwardly at 12 and terminate in a peripheral point 13 which constitutes one of the three bearing points of the base plate the most distant from the panel 1 in the downward direction. The central point 9 is distinctly nearer the panel 1 than the peripheral point 13.

Each point 13 pertaining to one of the fins is reinforced by a peripheral spade 14 and by two gusset plates 15 which connect this spade to the fins 6. Each spade 14 consists of a triangular plate which extends a certain distance beyond the panel 1 and terminates in an upper large base 14^a which is rectilinear in the presently-described embodiment. Preferably, these spades 14 are slightly oblique and downwardly diverge relative to the axis XX.

The fins 6 are each combined with a pair of inclined curved walls in the form of arch portions 16—17, 16^a—17^a and 16^b—17^b. The two walls of each pair are connected at their lower edges to the corresponding fin along two lines 18 on opposite sides of this fin. These lines 18 are parallel with the panel 1 and are closer to the latter than the lower edges 11 of the fins.

The two walls of each pair upwardly diverge symmetrically relative to the corresponding fin 6, that is relative to an axial radial plane containing the axis XX, and extend beyond the panel 1 and terminate in a curved upper edge 19 which is preferably reinforced. These walls are part-conical and do not require to be pressed out when being put into shape, this shaping being obtained by a simple rolling operation. The angle of inclination of each of these walls relative to a plane parallel with the panel 1 progressively decreases from a value *a* at the level of the line 18, to a value *b* at the level of the panel, to a value *c* at the upper end 19 of the wall. These angles could advantageously have values between the following limits:

Angles:	Degrees
a	55 to 65
b	45 to 55
c	30 to 45

It will be observed that at the level of the panel 1 the curved walls are connected to the edges of this panel, these edges being chamfered at the angle *b*.

As can be easily seen from the figures, the curved walls forming arches pertaining to the various fins 6, are interconnected in pairs along lines 20 situated in axial radial plans and these lines, owing to a suitable shape of said walls, could be rectilinear as seen on the right side of Fig. 1, and in Figs. 4, 6 and 7.

Adjacent the periphery of the base plate, the curved

walls, pairs of which form a wedge-like structure as shown in Fig. 5, are connected to gusset plates **15** and spades **14** whereas at their inner parts these walls are connected to the conical wall **8** along lines **21** which are elliptical or the like and can be seen in Figs. 4, 6 and 7.

Preferably, the total area of the anchoring surfaces normal or substantially normal to the panel **1** (the parts of the fins **6** situated below the lines **18** and the spades **14**) only represent a relatively small fraction (20 to 30%) of the total anchoring surface.

The plate is completed by arcuate handles **22**, for example one handle for each spaced **14**, these handles being fixed to the latter at their ends.

The base plate of the invention is used in the following manner:

When the firing position has been selected, the base plate is placed directly on the ground on its three points **13** and the breach of the firing device is engaged by its rear swivel bearing in the part-spherical recess **3** on which the firing device is pivotable for adjusting the firing direction and elevation. As soon as the first shot has been fired, the reaction of the firing device exerts on the base plate a downward thrust through the centre of the recess **3** and, as a result of this thrust, the base plate is driven into the ground firstly at its points **13** and thereafter along the lower portions of the fins **6** and the spades **14**.

The rapid penetration of these anchoring surfaces, which are normal or substantially normal to the panel, is followed in the course of subsequent firing by much more progressive penetration of the portions of the curved inclined anchoring walls **16—17 . . . 16^b—17^b**. Owing to the wedge-like arrangement of the walls in symmetrical relation about the axial radial planes of the base plate, the penetration of the latter in the ground causes the ground to be pushed back in a symmetrical manner by the lower surfaces of these walls thereby creating a tamping effect so that the reactions of the ground have in the horizontal direction substantially zero components. Thus the ground, as it offers a resistance which is the greater as the angles *a*, *b*, *c* are smaller, does not cause the base plate to be displaced laterally, and the stability of this base plate as concerns its position at a given point in the ground is practically perfect.

The penetration or bedding-down of the base plate in the course of firing proceeds, but with an increasing damping or braking effect, since the angles of the portions of the inclined and curved walls which come into contact with the ground decrease from *a* to *c* as the base plate penetrates the ground and soon after a relatively small number of shots, and in any case less than ten shots, the base plate is practically secured in position. It is well seated on the ground and provides a substantially immovable support for the firing device for subsequent firing.

Tests have shown that with the variation in the angles from *a* to *c*, in ground with average resistance, irrespective of the position of penetration of the base plate, the friction of the surfaces embedded in the ground is sufficient to oppose any rebound due to new portions of surfaces entering into contact with the ground as penetration proceeds at the start of successive shots.

The base plate of the invention has other important advantages. It is very strong owing to the fact that the walls **16—17 . . . 16^b—17^b** form with the flat panel a strong box-like structure in the form of a star which transmits to said walls, which form arches and bear against the ground, the initial percussion of the successive shots. It is very easy to extract from the ground compared with most of known base plates. The slopes due to the angles *a* to *c* are such that the ground does not adhere to the base plate and the latter never needs cleaning.

Although a specific embodiment of the invention has been described, many modifications and changes may be made therein without departing from the scope of the invention as defined in the appended claims.

Having now described my invention what I claim as new and desire to secure by Letters Patent is:

1. A base plate for a mortar or like firing device, said base plate comprising: a flat panel including a substantially central portion, vertical fins depending from said panel and extending radially from said central portion, said fins including pointed portions extending downwardly and spaced from said central portion, and a pair of curved walls operatively engaged with said panel and extending along and converging towards a respective one of said fins to engage therewith at a position spaced from the bottom of said one fin, said walls being curved in a cross-section normal to the radial extent of said one fin, said walls diverging upwardly for braking the displacement of the plate into the ground after the fins have entered the ground by engaging the ground with increasing amounts of surface area.

2. A base plate as claimed in claim 1 wherein the walls extend above and below the panel and define angles with the horizontal which vary from between 55–65° at their lowermost extremes to 45–55° at the panel and 30–45° at their uppermost extremes.

3. A base plate as claimed in claim 1 wherein said walls are connected to the respective fins along substantially horizontal lines.

4. A base plate as claimed in claim 1 comprising spades at the peripheral ends of the fins, said spades being interconnected by the peripheral ends of adjacent pairs of said walls.

5. A base plate as claimed in claim 4 comprising peripheral gusset plates providing a reinforced connection between said spades, fins and walls.

6. A base plate as claimed in claim 1 comprising a pointed member depending downwardly from the center of said panel and interconnecting the fins.

7. A base plate as claimed in claim 6 wherein said member includes two connected sections in vertical alignment, the upper section being of inverted truncated cone shape, the lower section being of inverted conical shape.

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