

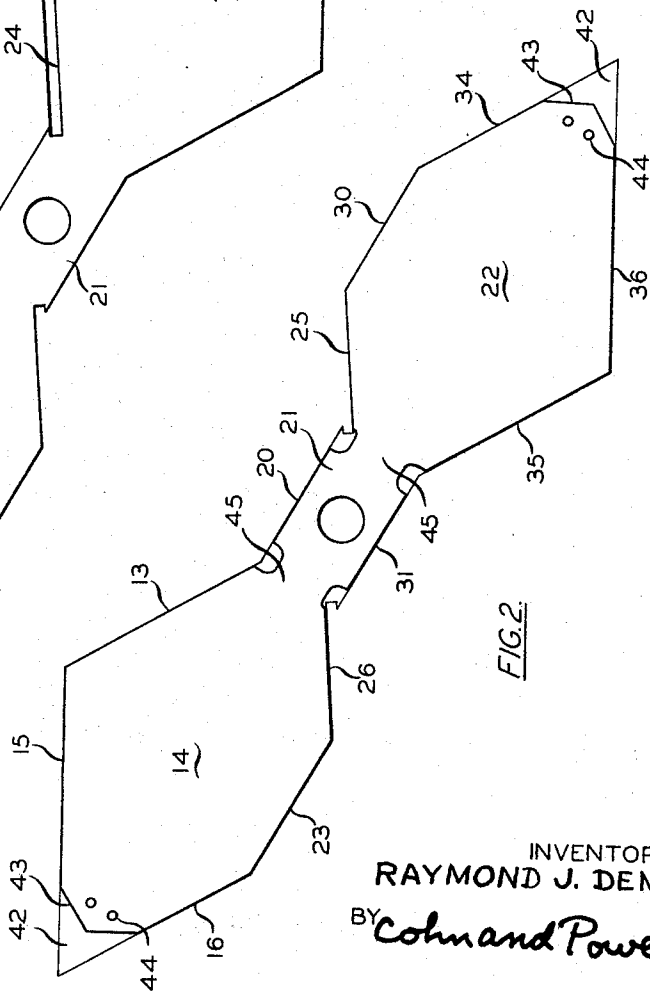
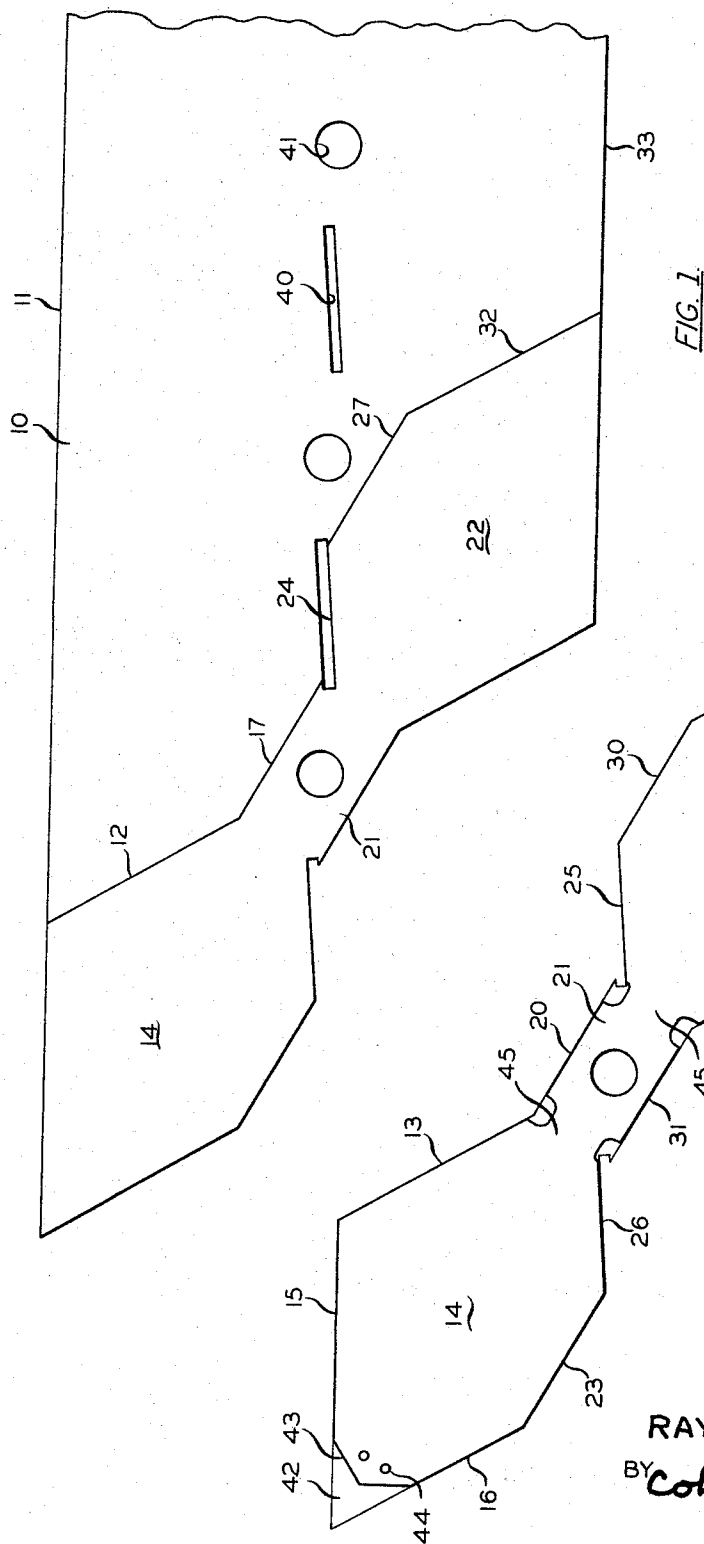
July 11, 1967

R. J. DE MOOR
EARTH ANCHOR WING

3,330,632

Filed May 10, 1965

3 Sheets-Sheet 1



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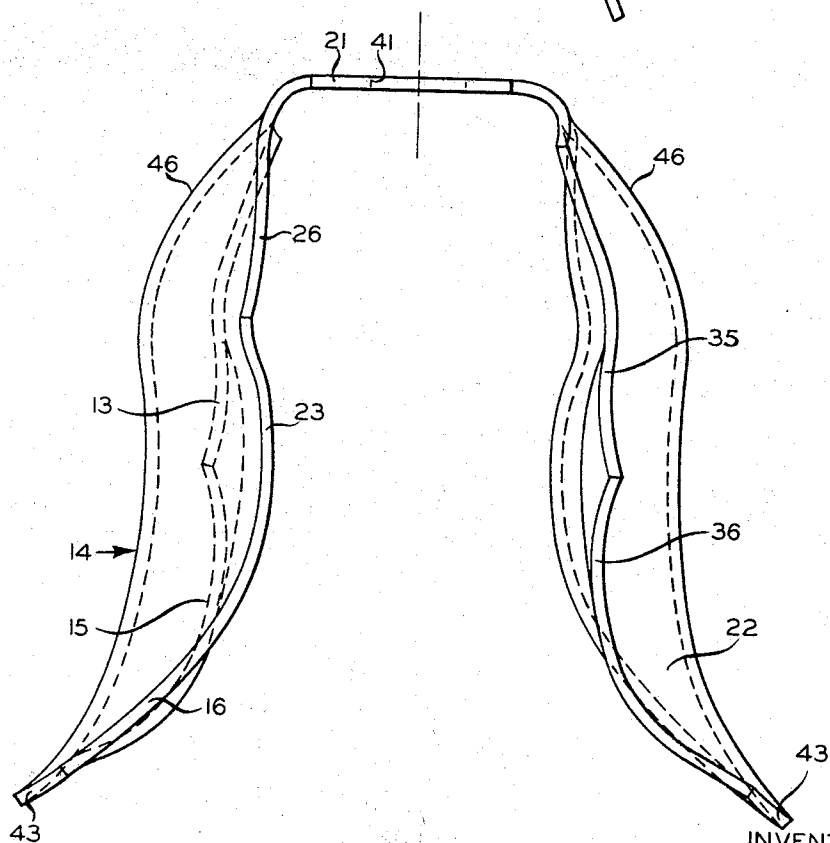
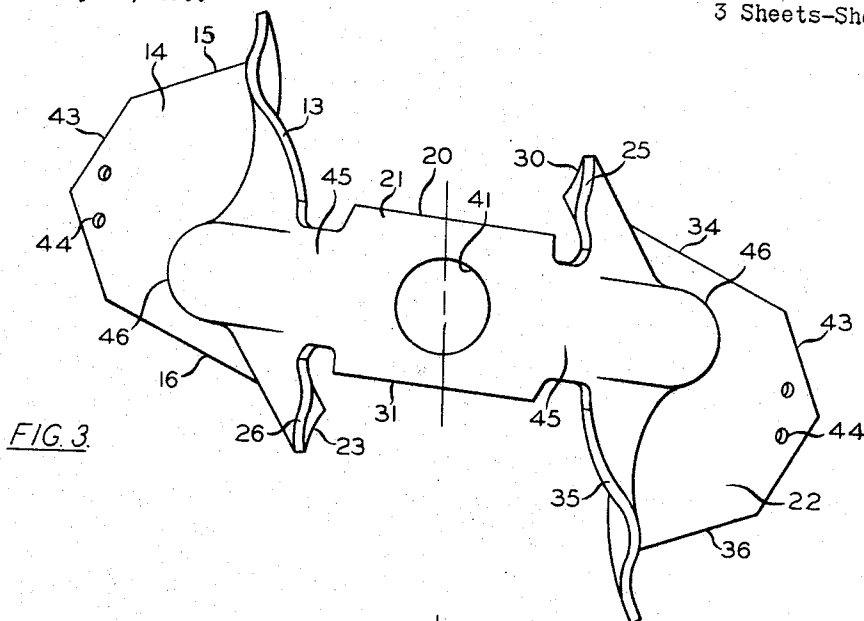
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3 Sheets-Sheet 3

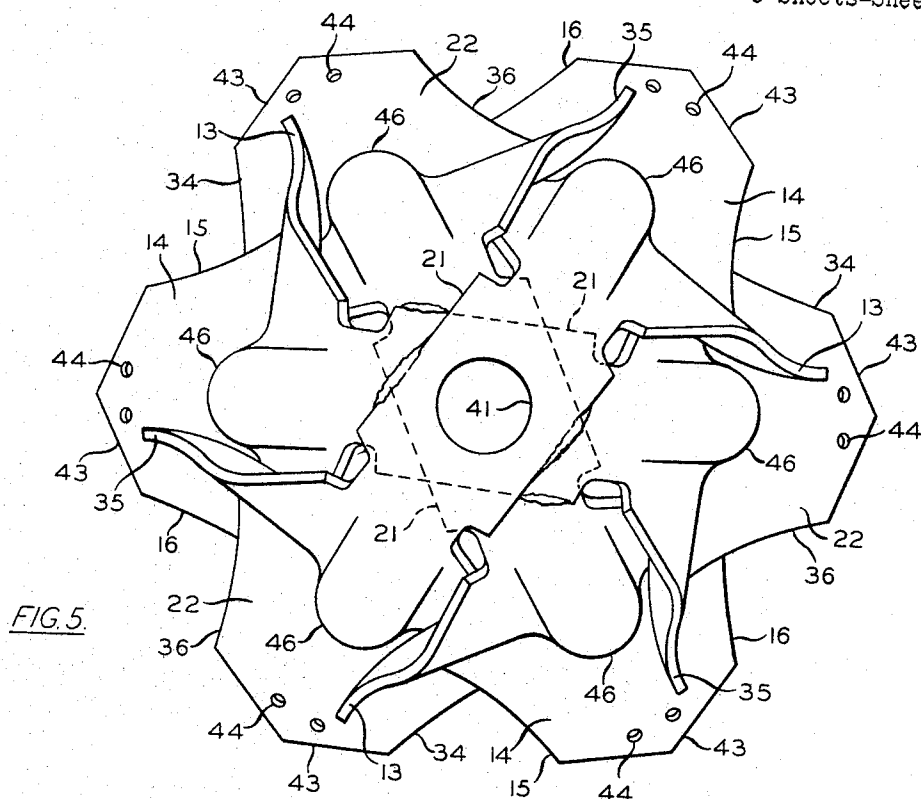


FIG. 5.

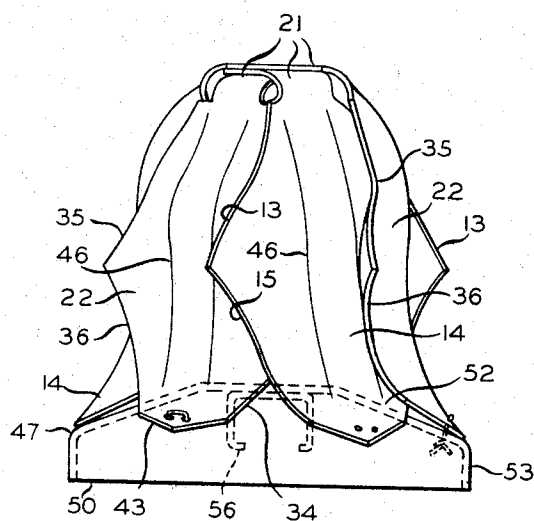


FIG. 6.

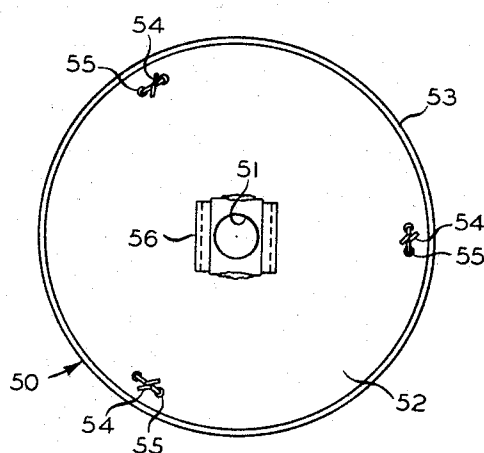


FIG. 7.

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3,330,632

EARTH ANCHOR WING

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Filed May 10, 1965, Ser. No. 454,442

12 Claims. (Cl. 29—193.5)

This invention relates generally to improvements in an earth anchor, and more particularly to an improved blanking layout of anchor wings, and to an improved anchor wing construction and wing assembly.

It is an important object to achieve a blanking layout of anchor wings from a sheet strip which utilizes the material with optimum efficiency so that very little material is lost as scrap.

An important object is realized in forming anchor wings, each of which includes a pair of blades integrally connected by a web, by severing the sheet strip diagonally from side to side so that one side of one blade of each wing constitutes one side of the web of the next adjacent wing.

Another important object is attained by the previous structural arrangement in which the one side of one blade of each wing constitutes one side of the web of the next preceding wing in the blanking layout, and in which one side of the other blade of each wing constitutes the opposite side of the web of the next succeeding wing.

Yet another important object is afforded by the blanking layout in which one portion of each severance line across the strip forms a part of one side of one blade and one side of the web of one wing and forms the opposite side of the corresponding blade of the next adjacent wing, and another portion of the same severance line forms one side of the other blade of the said one wing and forms the opposite side of the corresponding web and part of the opposite side of the corresponding blade of the said next adjacent wing.

An important object is provided by forming one side of one blade with a pair of angularly related side portions, and by forming the same side of the other blade with three angularly related side portions, the intervening side portion of the said three side portions constituting one side of the web of the next adjacent wing.

Another important object is achieved by the provision of an anchor wing in which one side of each blade has a pair of angularly related side portions, and the other side of each blade has three angularly related side portions, the sides of the respective blades being reversely constructed so that the pair of side portions of one blade and the three side portions of the other blade are on the same side of the wing.

Still another important object is attained by the structural arrangement of a plurality of such anchor wings in nested relation with their webs superimposed and with their longitudinal axes angularly related so that one side of each blade of each wing underlies the opposite side of the corresponding blade of the next adjacent wing in the wing assembly.

An important object is to provide a blanking layout of anchor wings that is efficient, and to provide anchor wings that are simple and durable in construction, and economical to manufacture and assemble.

The foregoing and numerous other objects and advantages of the invention will more clearly appear from the following detailed description of a preferred blanking layout of anchor wings and of a preferred embodiment of such wing and wing assembly, particularly when considered in connection with the accompanying drawings, in which:

FIG. 1 is a top plan view of the sheet strip illustrating the blanking layout;

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FIG. 2 is a top plan view of a severed anchor wing, showing the portions trimmed;

FIG. 3 is a top plan view of a formed U-shaped anchor wing;

FIG. 4 is a side elevational view of the formed U-shaped wing shown in FIG. 3;

FIG. 5 is a top plan view of a wing assembly;

FIG. 6 is a side elevational view of an earth anchor, and

FIG. 7 is a bottom plan view of the anchor shown in FIG. 6.

Referring now by characters of reference to the drawings, and first to FIG. 1, it is seen that each anchor wing is formed from an elongate sheet strip generally indicated at 10. This strip 10 is severed diagonally from side to side by spaced severance lines. For example, the strip 10 is severed inwardly from one strip margin 11 so that a first shear portion 12 forms a side portion 13 of one blade 14. Another side portion 15 of the same side of blade 14 is provided by the strip margin 11. Thus, it is seen that the one side of blade 14 is provided by a pair of angularly related side portions 13 and 15. Specifically, the side portions 13 and 15 of blade 14 converge at an angle to the wing axes to form substantially a point. The same shear portion 12 forms one side portion 16 of the corresponding blade 14 of the next succeeding wing in the blanking layout.

Continuing along the severance line, it is seen that another shear portion 17 forms one side portion 20 of the web 21 integrally interconnecting the pair of anchor blades 14 and 22. This same shear portion 17 forms another side portion 23 at the opposite side of the corresponding blade 14 of the next succeeding wing.

Still another portion 24 of the severance line is provided by an elongate slot 40 and forms a side portion 25 of the blade 22, and forms a side portion 26 at the opposite side of the blade 14 of the succeeding wing. It will be noted that this opposite side of blade 14 is provided by three angularly related side portions 16, 23 and 26. The intervening side portion 23 of these three side portions 16, 23 and 26 constitutes one side 20 of the web 21 of the next preceding wing in the blanking layout. The intervening side portion 23 is disposed substantially parallel to the longitudinal axis of the anchor wing.

Continuing along the severance line, another shear portion 27 forms another side portion 30 of blade 22, and forms the opposite side 31 of the web 21 of the next succeeding wing.

The last shear portion 32 extending to the opposite strip margin 33 forms another side portion 34 of blade 22, and forms an opposite side portion 35 of the corresponding blade 22 of the next succeeding wing in the blanking layout. It will be noted that the three angularly related side portions 25, 30 and 34 constitute one side of blade 22. The intervening side portion 30 is substantially parallel to the wing axis and forms one side 31 of the web 21 of the next succeeding wing.

The opposite side of blade 22 is formed by side portion 35 and by an angularly related side portion 36 that constitutes a part of the strip margin 33. The angularly related side portions 35 and 36 converge at an angle to the wing axis to form substantially a lateral point.

From the above detailed description, it will be understood that one side of each blade has a pair of angularly related side portions, one of which is the side margin of the strip, while the other side of each blade has three angularly related side portions, the sides of the blades being reversely constructed so that the pair of side portions of one blade and the three side portions of the other blade are on the same side of the wing. Specifically, the pair of angularly related side portions 13 and 15 of

blade 14 are on the same side of the wing as are the three angularly related side portions 25, 30 and 34 of the other blade 22. Similarly, the pair of angularly related side portions 35 and 36 of blade 22 are on the same side of the wing as are the three angularly related side portions 16, 23 and 26 of the other blade 14.

The sheet strip 10 is passed through a three station, progressive die. As each anchor wing is severed along the diagonal severance line composed of portions 12, 17, 24, 27 and 32, the strip 10 is punched to form an elongate slot 40 and a web hole 41 for succeeding wings. After the wing is severed, the strip 10 is advanced in the die for a similar, subsequent severance and punching action.

After the anchor wing has been cut from the sheet strip 10, it is trimmed as is indicated in FIG. 2 to remove the excess material and to shape the parts precisely. For example, the ends 42 of the wing are cut away to provide the pointed tips 43 for the blades 14 and 22. Immediately adjacent each of the blade tips 43, a pair of small spaced holes 44 are provided, the purpose of which will be apparent upon later description of parts.

At the junctures of the blades 14 and 22 with the interconnecting web 21, a small amount of material is removed at each side to provide bendable zones 45. The bendable zones 45 are of sufficient transverse width to provide rigidity and strength to the anchor wing, yet allow the blades 14 and 22 to be efficiently bent upon expansion of the earth anchor.

Each anchor wing, after trimming, is folded to the configuration best shown in FIGS. 3 and 4. The anchor wing assumes a substantially inverted, U-shape. Each blade 14 and 22 is curved such that its outer pointed tip 43 is directed outwardly relative to the center zone thereof, and each blade contains a relatively deep-pressed rib 46 strengthening the blades 14 and 22 against transverse bending stresses. As will be apparent from FIG. 3, the lateral point formed by the pair of angularly related side portions 13 and 15 of blade 14 and a lateral point formed by the pair of angularly related side portions 35 and 36 of blade 22 extend a greater distance from the longitudinal axis passed through the web 21 than does the opposite, three angularly related side portions 16, 23, and 26 of blade 14 and the three side portions 25, 30 and 34 of blade 22 respectively. Moreover, the lateral point at one side of each of these blades 14 and 22 are curved outwardly to a greater degree than the opposite side to enable the blades of the respective wings to be nested in overlapping relation as will be later described. The sides of the blades 14 and 22 of each wing provide the maximum amount of earth-gripping blade area.

A plurality of U-shaped anchor wings are disposed in nested relation as is best seen in FIGS. 5 and 6. In the present embodiment, the wing assembly consists of a total of three wings arranged in nested relation with their webs 21 superimposed. When arranged, one side of each blade which is formed by the three angularly related side portions underlies the opposite side of the corresponding blade of the next adjacent wing, such opposite side being formed by the pair of angularly related side portions forming the lateral point. The webs 21 of the nested, U-shaped wings are secured together as by welding. The center holes 41 in the superimposed webs 21 are in alignment to permit the passage of an anchor rod (not shown).

When the wings are disposed in the folded assembly as shown in FIGS. 5 and 6, the depending blades 14 and 22 respectively extend downwardly so that their pointed tips 43 seat upon the rounded peripheral edge 47 of the strain plate 50 constituting a blade-expanding member. The uppermost web 21 of the uppermost wing presents a substantially flat horizontal surface adapted to receive the impact blows of a hammer.

The strain plate 50 is stamped from a blank of heavy gauge metal, and is provided with a circular aperture 51 in the center which is aligned directly below the cooperating circular holes 41 formed in the superimposed wing

webs 21. An anchor rod (not shown) extends through the circular aperture 51 and below the strain plate 50. The upper surface 52 of the strain plate 50 slopes downwardly from the central area around the circular opening 51 to the rounded peripheral margin 47 that is adapted to guide and direct the blades 14 and 22 into distended earth-engaging positions upon tampering of the anchor. A downturned peripheral flange 53 extends from the rounded peripheral margin 47.

A wire 54 is inserted through a pair of openings 44 formed in the tapered tip 43 of each blade 14 and 22, the wire 54 extending through corresponding openings 55 formed in and near the periphery of the strain plate 50. The wire 54 is twisted to lock the blades 14 and 22 in folded assembly as illustrated in FIG. 6, until the blades 14 and 22 are sheared free of the wires by the initial blows of the percussion tool.

A nut-retaining element 56 is located about the anchor rod aperture 51 and is secured as by welding to the underneath surface of the strain plate 50. The nut-retaining element 56 receives and closely fits a nut (not shown) that is threadedly attached to the end of the anchor rod. Rotation of such nut is prevented by the nut-retaining element 56, thereby enabling the removal of the anchor rod while the anchor is in its spread operative position underground.

It is thought that the blanking layout and the method of blanking anchor wings from a sheet metal strip 10 have become fully apparent from the foregoing detailed description. However, for completeness of disclosure, the assembly and installation of an anchor incorporating these particular anchor wings will be briefly described.

Each of the wings is folded along the bending zones 45 to form the inverted, substantially U-shape illustrated in FIGS. 3 and 4. The initial assembly of the anchor wings is shown by the drawing in FIGS. 5 and 6. To form the wing assembly, three folded wings are disposed in nested relation with their longitudinal axes angularly related and with their webs 21 superimposed one on top of the other. One side of each blade underlies the opposite side of the next adjacent blade of the next superimposed wing. The webs 21 are then welded together to provide a unitary wing assembly.

The wing assembly is then placed on the strain plate 50. The tapered tips 43 of the blades are seated upon the peripheral rounded margin 47 of the strain plate 50, and are locked in position by the insertion of lock wires 54 in and through the compatible blade holes 44 and strain plate holes 55, the wires 54 being twisted securely. An anchor rod (not shown) is inserted through the uppermost web holes 41 and is inserted through the strain plate opening 51 for threaded engagement with a cooperating nut (not shown) contained in the nut-retaining element 56.

On the job site, a hole of desired depth is formed in the ground, and the anchor is inserted. A suitable tamping tool (not shown) is employed to strike the flat impact surface provided by the uppermost web 21 of the uppermost anchor wing. The initial tamping blows shear the wires 54 and commence the penetration of the blades 14 and 22 into the surrounding earth. During the expansion of the blades 14 and 22, the wings will bend in the bending zones 45. The wings are deformed from the folded position illustrated in FIG. 6 to a completely expanded earth-gripping position. In the fully expanded position, the intervening webs 21 are brought down upon and close to the upper surface 52 of the strain plate 50.

Although the invention has been described by making detailed reference to a preferred embodiment, such detail is to be understood in an instructive, rather than in any restrictive sense, many variants being possible within the scope of the claims hereunto appended.

I claim as my invention:

1. In a blanking layout of anchor wings from a sheet

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strip, each wing having a pair of blades integrally connected by a web:

- (a) each wing extending diagonally from side to side of the strip and formed by spaced severance lines,
 - (b) one portion of each severance line forming a part of one side of one blade and the one side of the web of one wing and forming the opposite side of the corresponding blade of the next adjacent wing, and
 - (c) another portion of each severance line forming one side of the other blade of the said one wing and forming the opposite side of the corresponding web and part of the opposite side of the corresponding blade of the said next adjacent wing.
2. In a blanking layout of anchor wings from a sheet strip, each wing having a pair of blades integrally connected by a web:
- (a) each wing extending diagonally from side to side of the strip and formed by spaced severance lines,
 - (b) one side of one blade of each wing constituting one side of the web of the next adjacent wing.
3. In a blanking layout of anchor wings from a sheet strip, each wing having a pair of blades integrally connected by a web:
- (a) each wing extending diagonally from side to side of the strip and formed by spaced severance lines,
 - (b) one side of one blade of each wing constituting one side of the web of the next preceding wing, and
 - (c) one side of the other blade of each wing constituting the opposite side of the web of the next succeeding wing.
4. In a blanking layout of anchor wings from a sheet strip, each wing having a pair of blades integrally connected by a web:
- (a) each wing extending diagonally from side to side of the strip and formed by spaced severance lines,
 - (b) one side of the web of each wing being formed by one side of one blade of the next preceding wing, and
 - (c) the opposite side of the web being formed by the opposite side of the other blade of the next succeeding wing.
5. In a blanking layout of anchor wings from a sheet strip having substantially parallel margins, each wing including a pair of blades integrally connected by a web:
- (a) each wing extending from side to side of the strip and formed by spaced severance lines, each severance line extending inwardly from one strip margin so that a first shear portion forms a part of one side of a first blade and forms a part of the opposite side of the corresponding first blade of the next adjacent wing.
 - (b) a second shear portion forms one side of the web and forms another part of the said opposite side of the corresponding first blade of the next adjacent wing.
 - (c) a third shear portion forms a part of one side of a second blade and forms another part of the said opposite side of the corresponding first blade of the next adjacent wing,
 - (d) a fourth shear portion forms another part of the one side of the second blade and forms the opposite side of the web of the next adjacent wing, and
 - (e) the severance line extending to the opposite strip margin so that a fifth shear portion forms another part of the one side of the second blade and forms a part of the opposite side of the corresponding second blade of the next adjacent wing.
6. In a blanking layout of anchor wings as defined in claim 5, in which:
- (f) the severance lines extend diagonally from side to side, and
 - (g) the adjacent severance lines being spaced to define each wing so that the strip sides between the adjacent severance lines form one side portion of each blade.
7. In a blanking layout of anchor wings from a sheet strip, each wing having a pair of blades integrally connected by a web:

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- (a) each wing extending from side to side of the strip and formed by spaced severance lines,
 - (b) one side of one blade being formed with a pair of angularly related side portions, the same side of the other blade being formed with three angularly related side portions,
 - (c) the intervening side portion of the said three angularly related side portions constituting one side of the web of the next adjacent wing.
8. In a blanking layout of anchor wings from a sheet strip, each wing having a pair of blades integrally connected by a web:
- (a) each wing extending from side to side of the strip and formed by spaced severance lines,
 - (b) one side of one blade of each wing being formed with a pair of angularly related side portions, one of which is the side margin of the strip,
 - (c) the same side of the other blade of each wing being formed with three angularly related side portions, and
 - (d) the side of the web and one angularly related side portion of each blade at each side of each wing forming the three angularly related side portions of one blade of the next adjacent wings.
9. In a blanking layout of anchor wings from a sheet strip, each wing having a pair of blades integrally connected by a web:
- (a) each wing extending from side to side of the strip and formed by spaced severance lines,
 - (b) one side of one blade of each wing being formed with a pair of angularly related side portions, one of which is the side margin of the strip,
 - (c) the same side of the other blade of each wing being formed with three angularly related side portions,
 - (d) the side of the web and one angularly related side portion of each blade at one side of each wing forming the three angularly related side portions at the opposite side of the corresponding said one blade of the next adjacent wing, and
 - (e) the three angularly related side portions of the said other blade forming the side of the web and one angularly related side portion of each blade at the opposite side of the said next adjacent wing.
10. In a blanking layout of anchor wings from a sheet strip, each wing having a pair of blades integrally connected by a web:
- (a) each wing extending from side to side of the strip and formed by spaced severance lines,
 - (b) one side of each blade having a pair of angularly related side portions, one of which is the side margin of the strip,
 - (c) the other side of each blade having three angularly related side portions, and
 - (d) the sides of the blades being reversely constructed so that the pair of side portions of one blade and the three side portions of the other blade are on the same side of the wing.
11. In a blanking layout of anchor wings from a sheet strip, each wing having a pair of blades integrally connected by a web:
- (a) each wing extending from side to side of the strip and formed by spaced severance lines,
 - (b) one side of each blade having a pair of angularly related side portions, one of which is the side margin of the strip,
 - (c) the other side of each blade having three angularly related side portions,
 - (d) the sides of the blades being reversely constructed so that the pair of side portions of one blade and the three side portions of the other blade are on the same side of the wing, and
 - (e) the intervening side portion of the three side portions at one side of each blade constituting one side of the web of the next adjacent wing.

12. In a blanking layout of anchor wings from a sheet strip, each wing having a pair of blades integrally connected by a web:

- (a) each wing extending from side to side of the strip and formed by spaced severance lines,
- (b) one side of each blade having a pair of angularly related side portions, one of which is the side margin of the strip,
- (c) the other side of each blade having three angularly related side portions,
- (d) the sides of the blades being reversely constructed so that the pair of side portions of one blade and the three side portions of the other blade are on the same side of the wing, and
- (e) the opposite sides of the web of each wing consti-

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tuting the intervening side portions of the three side portions of one blade of the next adjacent wing.

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