Jan. 10, 1939. I. O'ROURKE 2,143,448

CORE FORMER FOR MAKING DUCTS

Filed Aug. 1, 1936

Fig. 1.

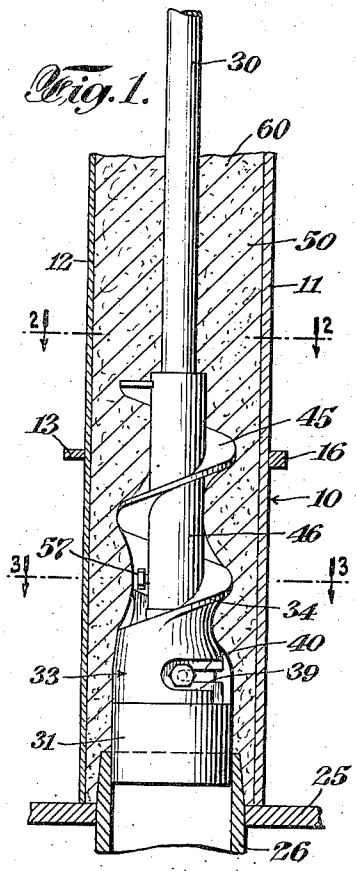


Fig. 4.

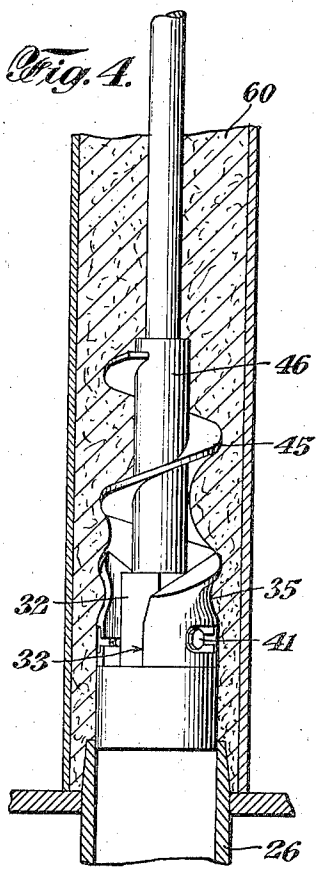


Fig. 5.

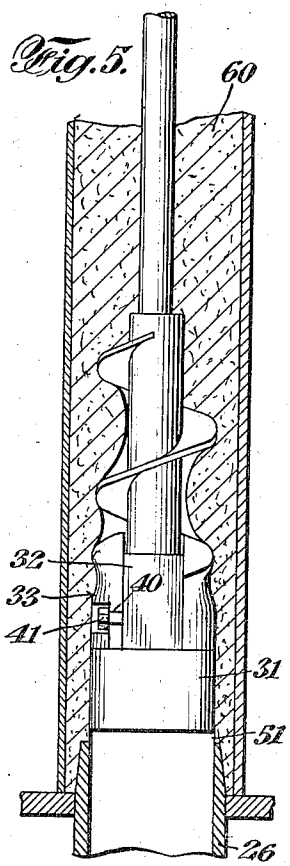


Fig. 2.

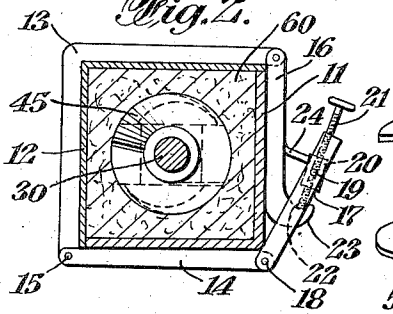


Fig. 3.

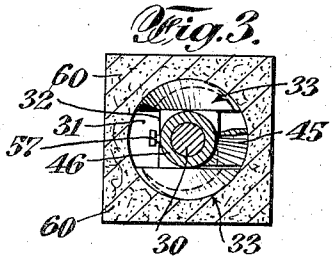


Fig. 6.

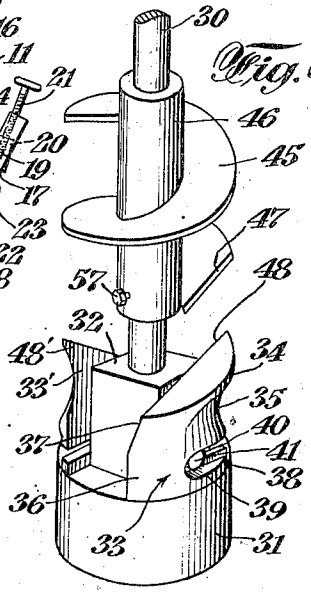
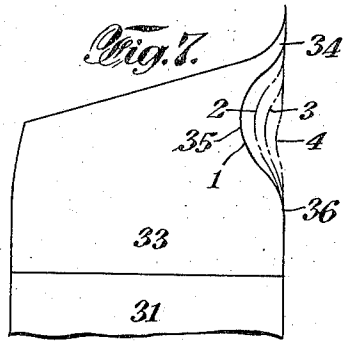


Fig. 7.



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CORE FORMER FOR MAKING DUCTS

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Application August 1, 1936, Serial No. 93,785

11 Claims. (Cl. 25—36)

This invention relates to apparatus for forming hollow molded bodies such as concrete ducts. This invention relates particularly to a core former adapted to form the core of a hollow molded body such as a duct made of concrete.

Heretofore hollow bodies such as ducts, pipes and the like have been produced using apparatus which comprises a vertical mold adapted to form the external surface of a body such as a duct and a core former for compacting and troweling moldable material such as concrete within the mold so as to produce a hollow core. The core former in apparatus of this character has been mounted on a rotatable shaft and has included a cylindrical head having approximately the diameter of the core which is to be formed in the completed duct. Means have been provided for rotating the shaft and head and for elevating the head from the bottom of the mold to the top while the shaft is being rotated.

In apparatus heretofore manufactured, the core former has taken many different forms. Generally, the core former includes one or more cam shaped members attached to the shaft above the cylindrical head, the cam surface presented by the cam shaped member having its radius from the axis of the shaft become increased until the maximum radius corresponds to the radius from the axis of the shaft of the periphery of cylindrical head. Likewise, agitators have been attached to the shaft above the core former so as to distribute moldable material such as wet concrete above the cam shaped troweling member.

The present invention is especially applicable to the manufacture of ducts having a cylindrical hollow core and external surfaces disposed at an angle with respect to each other as is the case for example when the cross section of the external surfaces forms a square (such ducts being referred to herein as "square" ducts). Prior to this invention I encountered serious difficulties in the manufacture of square ducts. In using apparatus heretofore employed, I found that the concrete at the corners of the molds was compacted more loosely than in the thin layer of concrete between the central hollow core and the mid portion of the walls of the duct. This was very disadvantageous as the corners of the ducts crumbled and the ducts were not acceptable. Many different types of core formers including cam shaped troweling members, agitators, and the like, were tried by me but the percentage of unsatisfactory ducts remained as high as 50%. For some time it appeared that the manufacture of square ducts using machinery of the general character hereinabove referred to was an impossibility from the standpoint of commercially satisfactory production which demands that the percentage of rejects be small.

It is a purpose of this invention to overcome defects of the character above referred to. According to this invention, a core former for compacting concrete and forming the compacted concrete into a core of a duct has been developed by which concrete ducts having a square external cross section can be manufactured with substantial elimination of rejects due to soft corners. The problem was not solved except after prolonged experimentation. In this connection it may be mentioned that the mixture of cementitious material and filler which is used in making concrete ducts is quite dry and that it must be very highly compacted in order to set properly to form a duct which has the requisite structural strength throughout all portions thereof.

Features of this invention relate to the manner in which a spiral blade has been combined with a cam shaped compactor and with other elements of the core former. From one point of view, it is a feature of this invention that a spiral blade fixed to a rotatable shaft is carried down so as to be in endwise juxtaposition with the end of the cam compactor. Other features of this invention relate to the relative positions of the spiral blade and the cam compactor and to the form characteristics of these parts. From another point of view, other features of this invention relate to the distribution of the spiral blade between a blade part and a wing member (to be defined herein below). Still other features of this invention relate to the manner in which the blade part and wing are mounted relative to each other and to the cylindrical follower so as to permit adjustment of some relationships while retaining other relationships. Thus, for example, the relationship of the blade portion of the wing member to the blade of the blade part can be maintained while the cam surface presented by the wing member can be adjusted laterally relative to the shaft according to this invention.

Further features, purposes and advantages of this invention will be apparent in connection with the illustrative embodiment of this invention shown in the accompanying drawing, wherein—

Fig. 1 is a side view partly in section showing a core former embodying this invention and a portion of a mold for molding a hollow body such as a concrete duct.

Fig. 2 is a section of the apparatus shown in Fig. 1 taken on the line 2—2.

Fig. 3 is a view similar to that shown in Fig. 2 but taken on the line 3—3 of Fig. 1.

Fig. 4 is a view similar to Fig. 1 with the core former in a different position from that shown in Fig. 1.

Fig. 5 is a view similar to Figs. 1 and 4 with the core former in a still different position.

Fig. 6 is a detail perspective view of the core former with the spiral blade part separated from the wing member, and

Fig. 7 is a detail side view of a portion of the wing member and illustrates the different radii from the shaft of the different portions of the cam compactor portion thereof.

While a core former embodying this invention may be used in connection with any type of mold for forming the external surface of a molded article such as a concrete duct, it is shown in Figs. 1, 2, 3, 4 and 5 for purposes of illustration in connection with a mold for forming a square duct and is peculiarly suited for use with a mold of this character. The mold is indicated generally by the reference character **10**. It is preferred that the mold be of the type disclosed in my application Ser. No. 93,786, filed August 1, 1936, for Apparatus and method for making ducts (executed on even date herewith). In such case the mold **10** comprises two portions, one portion of which is a master section **11** and the other portion of which is a pallet **12**. The master section and pallet of the mold may be maintained in assembled relation by means of any suitable clamping means such as a device comprising the V-shaped member **13** which carries at one end the link **14** hinged thereto by hinge **15**. At the other end of the member **13** is a hooked member **16**. Parallel bar members **17** are hinged by hinge **18** to both sides of the end of link member **14** and hinge pin means **19** carries block **20** between the bar members **17** so that the block **20** can be rotated about the axis of the hinge pin means **19** relatively to the bar members **17**. In screw threaded engagement with the block **20** is threaded rod **21** having an end **22** which is adapted to rest in hooked end **23** of hook member **16**. Projecting from hook member **16** is a lug **24**. By the means above described, the master mold and pallet mold may be clamped together firmly and disassembled when desired as is more fully described in my said application Ser. No. 93,786.

In use the mold **10** can be rested on a suitable support **25** and can be maintained in proper position by suitable means (not shown) such as the means shown and described in my said application Ser. No. 93,786. If the hollow molded form is to be a duct having male and female ends, a die **26** may be used for forming the female end of the duct. This die may be stationary but is preferably operatively connected to suitable means (not shown) for raising and lowering the die and for rotating the die. The die **26** fits within an appropriate opening in the support **25**. It is to be understood that any other suitable die may be used or that a die may be omitted altogether.

The device for shaping the other end of the duct is not shown herein but may comprise apparatus of the character described in my application Ser. No. 93,787, filed August 1, 1936, for Apparatus for making ducts (executed on even date herewith). It is to be understood that any other suitable die for shaping the top of the duct formed in the mold **10** may also be used or can be omitted.

The core former to which this invention is particularly directed is mounted on shaft **30**. It is to be understood that suitable means (not shown) are employed for rotating the shaft and for elevating and lowering the shaft. Moreover, it is to be understood that the shaft is adapted to be rotated by suitable means while the shaft is being raised or lowered or while it is maintained at a constant level. Many types of means for imparting the motion to shaft **30** which has been referred to above are well known and for this reason require no description herein.

Secured to the lower end of the shaft **30** in coaxial relation thereto is a cylindrical head or follower **31**. The radius of the follower normally corresponds to the radius of the core which it is desired to produce in the interior of the finished duct. The block **32** is also secured to the shaft **30**. The follower **31** and the block **32** may be formed in one piece with shaft **30** or may be made separately and assembled in secured relation thereto by suitable means (not shown) as may be desired.

Above the former head and mounted on the block **32** are wings or wing members indicated generally by the reference character **33**. In the embodiment here shown, two wings **33** are employed. Each wing **33** has an inclined blade portion **34**, a cam compactor portion positioned with reference to the shaft so as to have a troweling surface **36** that is at a maximum radius from the shaft **33** (which radius preferably is substantially the same as the radius of the periphery of the follower **31**). The cam surface presented by the cam compactor portion also includes portions of lesser radius affording a valley **35** immediately adjacent and alongside the blade portion **34** and between the blade portion **34** and the follower **31**. This part of the wing is referred to as a cam compactor portion as it has a cam action on material in sliding contact therewith, namely on the moldable material in the mold urging it outwardly away from the axis of the shaft and against the mold parts which form the external surfaces of the duct when the shaft is turned. The wing likewise has an upwardly tapering portion **37** which serves a purpose referred to below. The wing also includes the base portion **38** which overlies the follower **31** and has a radius corresponding substantially to the radius of the follower **31**. The valley **35** is deepest and widest adjacent the widest end of the wing **33** and becomes gradually of decreased depth and width progressing toward the troweling surface **36**. Moreover, the upper end of the wing (and of the cam compactor portion thereof) is inclined as shown so that the cam compactor portion is immediately adjacent the inclined blade throughout a substantial peripheral distance of the blade and of the cam compactor portion.

Each of the wings **33** is mounted for adjustment to vary the radial distance of the troweling surface of the wing (the portion thereof at the greatest radial distance from the shaft) from the axis of the shaft. To this end the wing **33** has a recess **39** in the base portion **38**, in the bottom of which is slot **40**. A bolt **41** has its head in the recess **39** and extends through the slot **40** into an internally threaded part of the block **32**. By loosening the bolt **41**, the wing **33** can be slid into position and the slot **40** permits a substantial amount of adjustment of the wing laterally of the shaft. When the wing member **33** is in what is normally the desired position, i. e., with

the troweling surface 36 in alignment with the periphery of follower, the bolt can be tightened down so as to fix the cam member in the selected position. The wing and particularly the troweling surface 36 thereof is, however, subject to severe abrasive conditions which cause it to wear away. As aforesaid, it is normally desirable to have the radius of the troweling surface 36 of the wing approximately that of the cylindical head 31. As wear takes place on the troweling surface 36 so as to reduce its radius from the shaft, the wing can have its position adjusted by loosening the bolt 40 and moving the wing 33 so that the troweling surface 36 thereof again comes into alignment with the cylindrical surface of the follower 31.

A spiral blade part 45 is fixed to a sleeve 46 which is slidable longitudinally with respect to the shaft 30. The sleeve 46 can be maintained in any desired fixed position on a shaft 30 by tightening the set screw 57 one or more of which is carried by the sleeve 46 and is adapted to have its end forced into contact with the shaft 30. The end 47 of the blade part 45 is adapted to abut the end 48 of the blade portion 34 of one of the wings 33. In this manner the spiral blade part 45 is made substantially continuous with the blade portion 34 of said wing 33; and the blade part 45 and inclined blade portion 34 in effect are parts of one continuous spiral blade. Normally it is preferable to have the pitch of the blade portion 34 the same as that of the blade part 45 as shown or at least approximately the same.

The normal working positions of the parts of the core former are shown in Figs. 1, 4 and 5. In Fig. 6 for purposes of clarity the blade part 45 is shown moved upwardly on the shaft 30 so as to indicate how the spiral blade part 45 can be moved into position with reference to wing 33 so that the end 47 of the blade part 45 and the end 48 of the blade portion 34 will be in abutting relation with respect to each other. It is also to be noted that the end 48 of the blade portion 34 of the wing 33 is in a plane corresponding to the plane of lateral movement afforded the wing 33 on block 32. When the end 47 of the blade part 45 is in abutting relation to the end 48 of blade portion 34, the end 47 will likewise be in this plane. This arrangement enables the wing 33 to be adjusted with reference to follower 31 (and with reference to the shaft 30) in the manner above described while still maintaining the ends 47 and 48 in abutting relation with reference to each other.

The radius of the outside edge of the spiral blade 45 is preferably substantially the same as the radius of the follower 31 and likewise the longitudinal extent of blade 45 is preferably at least as great as the diameter thereof.

Apparatus made according to this invention can be used with only one wing 33. However, two wings 33 are preferably employed as illustrated herein. In the device herein shown, the spiral blade part 45 can only be made substantially continuous with the blade portion 34 of one of the wings 33. However, the second wing serves a purpose as it serves to subject to a second compacting and troweling action moldable material such as concrete which has been acted upon by the other wing 33. Moreover, the second wing 33 which does not have its blade portion 34 abutting the end of the spiral blade part 45 is not subjected to as severe wear as the other or first wing. After the first wing 33 has become badly worn, the blade part 45 can be loosened on the shaft 30 and readjusted so that the end 47 thereof will come into abutting relation with the end of the blade portion of the second wing 33. This adjustment enables the apparatus to be used for substantially twice as long without renewing the wings 33. While only one spiral blade part 45 is ordinarily contemplated it would be possible in carrying out this invention to use one spiral blade part 45 in connection with one wing 33 and a second spiral blade part similar to spiral blade part 45 in connection with the other wing.

In operation the core former can be used in any desired way. For example, the mold 10 can be assembled, clamped together and placed in position in the support 25. The die 26, if used, is placed in position at the bottom of the mold. The core former on shaft 30 is then lowered to position adjacent the bottom of the mold and is partially inserted in the hollow interior portion of the die 26. Concrete 60 is then poured into the mold in a moist condition and the core former is caused to rotate and to be elevated through the concrete. Preferably the core former is elevated somewhat more slowly while it is adjacent the bottom of the mold to insure compacting of the material into all parts of the female end to the duct being formed and the speed of rotation is controlled as desired. In Figs. 1, 4 and 5 the core former is shown in different stages of rotation and elevation, the follower 31, in Fig. 5, having been removed from the die 26, leaving a formed core 51 in the concrete 60 (or other moldable material) in mold 10. The core former may be eventually lifted out of the mold 10 and the duct, having the core 51, can then be removed from the mold.

Compacting of the material in the mold is produced when the core former is rotated in a counter-clockwise direction in the apparatus shown in the drawing and is due to the combined action of the spiral blade and of the cam compactor. Of course, the parts can be in reverse direction so as to produce a like effect when the parts are rotated in a clockwise direction. Moreover, as the core former moves upwardly within the mold, the tapered portion 37 has a still further compacting effect on material within the mold. During rotation of the core former, the moldable material may be forced by the spiral blade into the valley 35 in the cam compactor portion of the wing 33 at a time when the valley has the depth indicated at 1 in Fig. 7. Upon rotation of the core former, the material will slide in reference to the core former and will be forced to occupy the valley 35 when the depth has decreased to that shown by line 2 in Fig. 7. Upon further rotation of the core former, the depth of the valley, which a particular portion of the material occupies, is decreased as indicated by lines 3 and 4 in Fig. 7 and eventually becomes eliminated. At the same time the width of the valley decreases as the dotted lines 1, 2, 3 and 4 also indicate which imparts a further compacting effect on the material. The material is then troweled by the troweling surface 36 presented by wing 33 and by the periphery of follower 31.

In connection with a core former constructed in the manner herein illustrated and described, it is significant that the spiral blade and cam compactor portions are in endwise juxtaposition. The moldable material, e. g. concrete, is in sliding contact with the spiral blade and material on a surface thereof toward the cam compactor is

urged toward the cam compactor upon rotation of the shaft in a given direction. Without interruption of the compacting force the material is brought into sliding contact with the cam compactor which then urges the material outwardly from the shaft and toward the wall of the mold. This results in the building up of high pressures on the concrete so that even the remote parts in the angles of square molds are filled and furthermore the compacting is at all times uniform so that there are not portions of concrete of varying consolidations within the mold. In previous devices neither the degree of pressure nor the uniformity thereof in different parts of the mold was sufficient to avoid a large percentage of rejectable ducts. In connection with this aspect of this invention, it may be said that if a spiral blade is used which is independent of and is substantially separated from a cam compactor, the results obtainable are very much inferior both in degree of compacting and in uniformity of compacting. With the core former embodying this invention rejections of ducts because of poor consolidation has been substantially eliminated and ducts of substantially higher strength as a whole and uniformity throughout and of substantially improved structure are obtainable.

It may also be noted that the spiral blade including blade portion **34** of wing **33** is so positioned in endwise juxtaposition to the cam compactor portion of the wing **33** that it terminates in that part of the wing having greatest radius from the shaft, namely, above troweling surface **36** of the wing **33**. This causes the portions of different radius from the shaft of the cam surface presented by the wing **33** to be immediately alongside the blade portion **34** so as to augment the combined downward and outward compressive forces acting in the material in the mold. Likewise the cam compactor portion is not only decreased in depth but also is decreased in width progressing downward the portion of the wing having greatest radius from the shaft so as to further augment the wedging and compacting of the material in the mold, before it is finally troweled and smoothed by the follower **31**.

The foregoing desirable effects, can, according to this invention, be secured in a core former in which the parts can be readily adjusted and in which the more rapidly wearing parts can be readily renewed. In this connection the adjustability of the wing **33** with reference to the follower **31** while maintaining desired relation between the wing **33** and the blade part **45** is to be observed. The construction of the spiral blade so as to be partly on a blade part and partly on an adjustable wing contributes to this feature. Other desirable features relate to the facility with which the wings **33** and the spiral blade part **45** cannot only be adjusted but completely removed and be replaced when desired.

It is to be understood that the embodiment of this invention which has been shown and described hereinabove is illustrative merely and that apparatus embodying this invention may take various forms. Accordingly the scope of this invention is to be limited only by the language of the following claims.

I claim:

1. In apparatus of the character described, a core former adapted to form the core of a concrete duct, which comprises a shaft, a cam compactor in secured relation to said shaft presenting a cam surface adapted to urge material in sliding contact therewith outwardly away from said shaft upon rotation of said shaft in a given direction, and a spiral blade disposed about said shaft in secured relation thereto adapted to urge material in sliding contact with a surface thereof facing said cam compactor toward said cam compactor upon rotation of said shaft in said direction, said spiral blade and cam compactor being in substantially immediate endwise abutment on said shaft.

2. In apparatus of the character described, a core former adapted to form the core of a concrete duct, which comprises a shaft, a cam compactor in secured relation to said shaft presenting a cam surface adapted to urge material in sliding contact therewith outwardly away from said shaft upon rotation of said shaft in a given direction, and a spiral blade disposed about said shaft in secured relation thereto adapted to urge material in sliding contact with a surface thereof facing said cam compactor toward said cam compactor upon rotation of said shaft in said direction, said spiral blade and cam compactor being in substantially immediate endwise abutment on said shaft, the radial distance of the end of the outer edge of said blade being substantially the same as the greatest radial dimension of said cam compactor.

3. In apparatus of the character described, a core former adapted to form the core of a concrete duct, which comprises a shaft, a cam compactor in secured relation to said shaft presenting a cam surface adapted to urge material in sliding contact therewith outwardly away from said shaft upon rotation of said shaft in a given direction, a spiral blade disposed in endwise juxtaposition to said cam compactor about said shaft in secured relation thereto and adapted to urge material in sliding contact with a surface thereof facing said cam compactor toward said cam compactor upon rotation of said shaft in said direction, said cam compactor having the end portion toward said spiral blade inclined to correspond at least approximately to the pitch of said spiral blade so that the said cam surface throughout a substantial peripheral extent thereof about said shaft is immediately adjacent said spiral blade throughout a substantial portion of the length of said blade.

4. In apparatus of the character described, a core former adapted to form the core of a concrete duct which comprises a shaft, a cam compactor in secured relation to said shaft presenting a cam surface adapted to urge material in sliding contact therewith outwardly away from said shaft upon rotation of said shaft about its axis in a given direction, a spiral blade disposed in endwise juxtaposition to said cam compactor about said shaft in secured relation thereto and adapted to urge material in sliding contact with a surface thereof facing said cam compactor toward said cam compactor upon rotation of said shaft about its axis in said direction, a cylindrical follower in coaxial secured relation with said shaft and in endwise juxtaposition with the end of said cam compactor remote from said spiral blade, said cam surface having its maximum distance radially from said shaft about the same as the radial distance from the axis of said shaft of the periphery of said follower and affording throughout at least a part of the peripheral length thereof a valley between said blade and said follower which diminishes in depth and in width progressing toward the portion of said cam surface which is at maximum distance radially from said shaft.

5. In apparatus of the character described, a core former adapted to form the core of a concrete duct which comprises a shaft, a cylindrical follower in coaxial secured relation to said shaft, a spiral blade part disposed about said shaft in secured relation thereto adapted to urge material in sliding contact with a surface thereof facing said follower toward said follower upon rotation of said shaft about its axis in a given direction, and a wing member interposed in endwise juxtaposed position between said follower and said spiral blade part, said wing member having a blade portion at the end thereof adjacent said spiral blade part which has a pitch corresponding at least approximately to the pitch of said spiral blade part and having a cam compactor portion between said blade portion and said follower which is adapted to urge material in sliding contact therewith outwardly away from the axis of said shaft upon rotation of said shaft about its axis in said direction.

6. In apparatus of the character described, a core former adapted to form the core of a concrete duct which comprises a shaft, a cylindrical follower in coaxial secured relation to said shaft, a spiral blade part disposed about said shaft in secured relation thereto and adapted to urge material in sliding contact with a surface thereof facing said follower toward said follower when said shaft is rotated about its axis in a given direction, and a wing member interposed in endwise juxtaposed relation between said follower and said spiral blade part, said wing member having a blade portion with its end adjacent said spiral blade part in abutting relation with respect to the end of the said spiral blade part and with a pitch corresponding at least approximately to the pitch of said spiral blade part and having a cam compactor portion between said follower and said blade portion presenting a cam surface adapted to urge material in sliding contact therewith outwardly from said shaft upon rotation of said shaft in said direction about its axis and a troweling surface adapted to smooth the outwardly urged material, means affording said wing member movement laterally of said shaft while maintaining the end of said blade portion thereof in substantially abutting relation with respect to the end of said blade part to vary the radial distance from said shaft of said troweling surface, and means for maintaining said wing member in secured relation with respect to said shaft in a plurality of different positions afforded by said movement.

7. In apparatus of the character described, a core former adapted to form the core of a concrete duct which comprises a shaft, a sleeve about said shaft in slidable relation therewith, means for fastening said sleeve to said shaft, a spiral blade part disposed about and secured to said sleeve, a cylindrical follower in coaxial secured relation to said shaft, a block in secured relation to said shaft between said follower and said sleeve, and a wing member presenting a cam surface adapted to urge material in sliding contact therewith outwardly away from the axis of said shaft when said shaft is rotated about its axis in a given direction, said wing member being mounted for adjustment laterally of said shaft on said block to vary the maximum radial distance of said cam surface from said shaft, and said spiral blade part being adapted to urge material in sliding contact with a surface thereof facing said wing member toward said wing member.

8. In apparatus of the character described, a core former adapted to form the core of a concrete duct which comprises a shaft, a sleeve about said shaft in secured relation thereto, a spiral blade part disposed about and secured to said sleeve, a cylindrical follower in coaxial secured relation to said shaft, a block in secured relation to said shaft between said follower and said sleeve, a wing member including a blade portion having a pitch corresponding at least approximately to the pitch of said spiral blade part and a cam compactor portion presenting a cam surface adapted to urge material in sliding contact therewith outwardly from the axis of said shaft when said shaft is rotated about its axis in a given direction and means for mounting said wing member on said block with the end of said blade portion thereof abutting the end of said spiral blade for adjustment of the alignment of the portion of said cam surface at maximum radial distance from the axis of said shaft with reference to the peripheral surface of said follower, said spiral blade part being adapted to urge material in sliding contact with a surface thereof facing said wing member toward said wing member upon rotation of said shaft about its axis in said direction.

9. In apparatus of the character described a core former adapted to form the core of a concrete duct, which comprises a shaft, a cam compactor presenting a cam surface adapted to urge material in sliding contact therewith outwardly away from said shaft upon rotation of said shaft about its axis in a given direction and a troweling surface adapted to smooth the outwardly urged material, a spiral blade part disposed about said shaft detachably and adapted to urge material in sliding contact with a surface thereof facing said cam compactor toward said cam compactor upon rotation of said shaft in said direction about its axis, means for mounting said cam compactor for adjustment to vary the radial distance from said shaft of said troweling surface, and means for mounting said spiral blade on said shaft for adjustment to vary the longitudinal position of said spiral blade on said shaft.

10. In combination with a core former mounted on a shaft and adapted to form the core of a concrete duct, compacting means comprising an inclined blade part and a cam compactor part, said inclined blade part upon rotation of said core former about its axis in a given direction being adapted to urge material in sliding contact with a surface thereof facing said cam compactor part longitudinally of said shaft toward said cam compactor part, and said cam compactor part presenting a cam surface immediately alongside said inclined blade part throughout a substantial portion of the length of said blade part adapted to urge material in sliding contact therewith outwardly away from said shaft upon rotation of said shaft about its axis in said direction so that said material is urged outwardly by said cam surface simultaneously with being urged longitudinally by said spiral blade part upon rotation of said shaft.

11. In apparatus of the character described a core former adapted to form the core of a concrete duct which comprises a shaft, a wing member including a cam compactor portion presenting a cam surface adapted to urge material in sliding contact therewith outwardly from said shaft upon rotation of said shaft about its axis in a given direction and an inclined blade portion adjacent an end thereof adapted to urge

material in contact with a surface thereof facing said cam compactor portion toward said cam compactor portion when said shaft is rotated about its axis in said direction, a spiral blade part disposed about said shaft in secured relation thereto with an end thereof abutting the end of said wing member carrying said blade portion, said spiral blade part being adapted to urge material in sliding contact with a surface thereof facing said wing member toward said wing member upon rotation of said shaft about its axis in said direction, and said wing member being mounted on said shaft with the end of said blade portion carried by said wing member abutting said end of said blade part, and means for adjusting said wing member to vary the maximum radial distance of said cam surface from said shaft while maintaining said end of said spiral blade part abutting said end of said blade part carried by said wing member.

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