April 11, 1944. W. MORGAN 2,346,447

WIRE DRAWING BLOCK

Filed Nov. 27, 1942 2 Sheets-Sheet 1

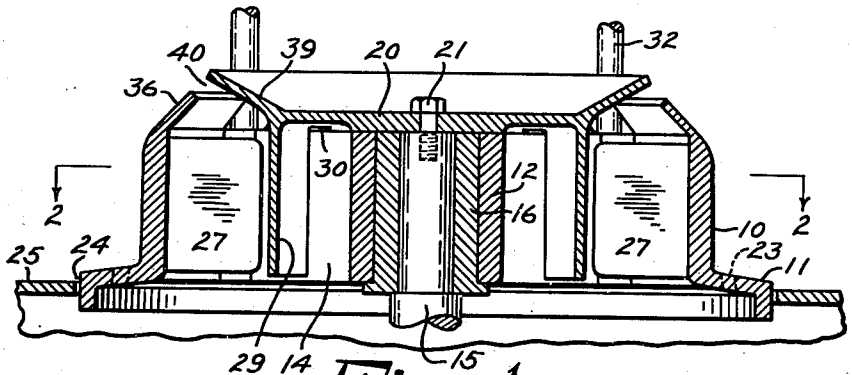


Fig. 1

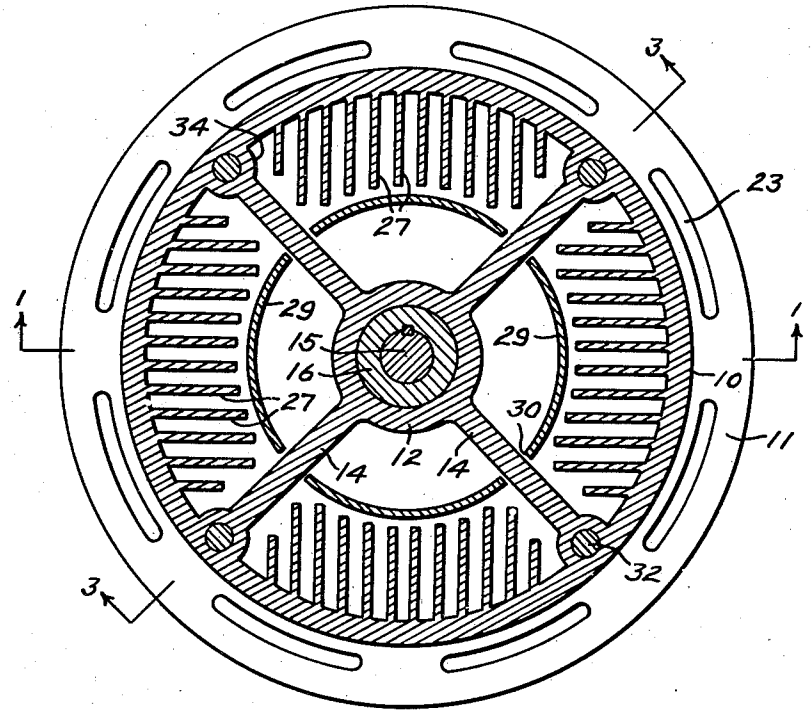


Fig. 2

Inventor

WELD MORGAN

By Albert G. Blodgett

Attorney

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Filed Nov. 27, 1942 2 Sheets-Sheet 2

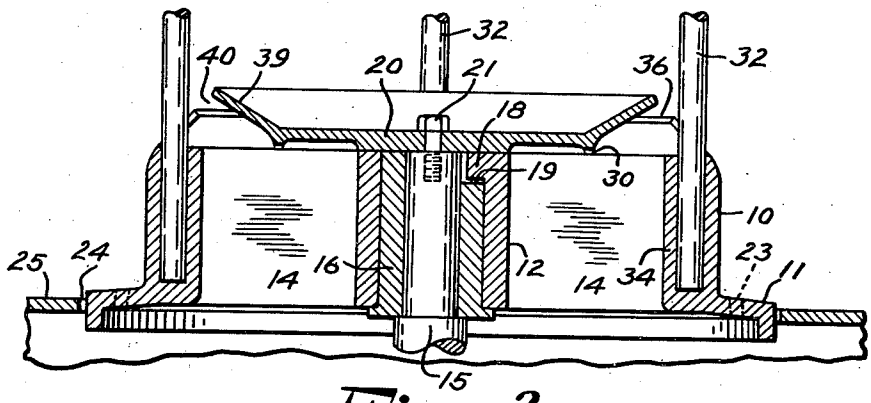


Fig. 3

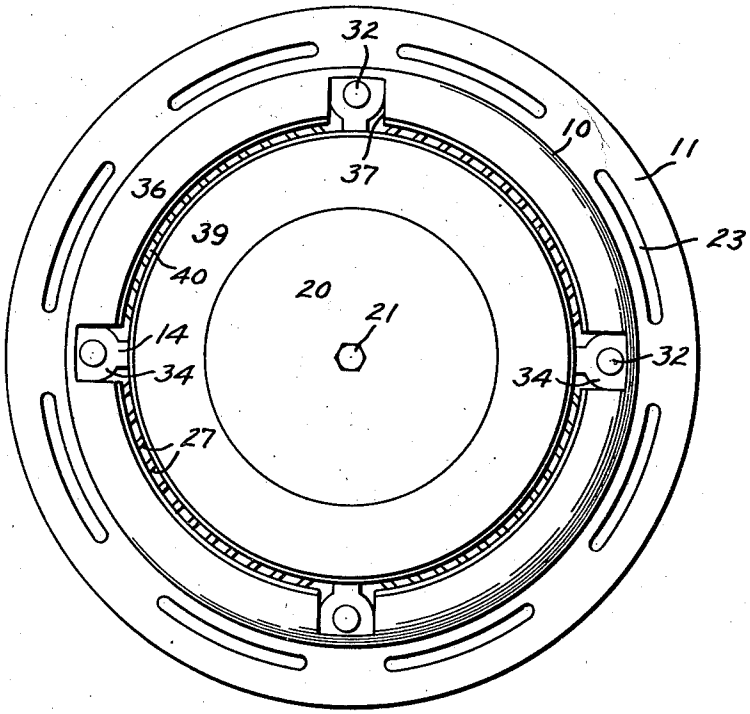


Fig. 4

Inventor

WELD MORGAN

By Albert G. Bridge

Attorney

Patented Apr. 11, 1944 2,346,447

UNITED STATES PATENT OFFICE

2,346,447

WIRE DRAWING BLOCK

Weld Morgan, Worcester, Mass., assignor to Morgan Construction Company, Worcester, Mass., a corporation of Massachusetts

Application November 27, 1942, Serial No. 467,083

12 Claims. (Cl. 205—20)

This invention relates to wire drawing blocks, and more particularly to blocks of the type having provision for the circulation of air therethrough for cooling purposes.

The prior patent to Morgan et al. No. 2,247,248 discloses a wire drawing block comprising an annular capstan portion surrounding a central hub and connected thereto by spokes which are spaced apart to provide passages for the flow of air. The inner surface of the capstan portion is provided with a multiplicity of ribs which extend into the passages to transfer heat from the capstan portion to the air stream. The inner ends of these ribs terminate somewhat short of the hub so that a single core may be used to form each passage and the associated ribs when casting the block. A wide space between the ribs and the hub is desirable in order that the core may have a strong solid body portion, but such a wide space will form a free path for the air and allow a substantial part thereof to flow out of contact with the ribs. Consequently it has been thought necessary to make this space as narrow as possible without unduly hampering the manufacturing of the block by weakening the cores employed for the casting operation.

It is accordingly one object of the invention to provide an air cooled wire drawing block which will be comparatively simple and inexpensive to manufacture and highly efficient in operation.

It is a further object of the invention to provide a wire drawing block having a multiplicity of air cooling ribs and so constructed that cores of ample strength can be employed in manufacturing the block in the foundry, and yet the air will be compelled to flow in intimate contact with the ribs when the block is in service.

It is a further object of the invention to provide a wire drawing block of the air cooled type which will discharge the air in a highly effective manner into contact with the wire accumulated on the block.

It is a further object of the invention to provide a wire drawing block which will form the drawn wire into an orderly bundle free from crossed convolutions and which will discharge cooling air into the bundle.

With these and other objects in view, as will be apparent to those skilled in the art, the invention resides in the combination of parts set forth in the specification and covered by the claims appended hereto.

Referring to the drawings illustrating one embodiment of the invention and in which like reference numerals indicate like parts.

Fig. 1 is a vertical section through a wire drawing block and taken on the line 1—1 of Fig. 2;

Fig. 2 is a section on the line 2—2 of Fig. 1;

Fig. 3 is a section on the line 3—3 of Fig. 2; and

Fig. 4 is a top plan view of the block.

The embodiment illustrated comprises an annular capstan portion in the form of a hollow vertical cylinder 10 having a flange 11 extending outwardly from its lower edge. At the center of the block is a hub 12 likewise in the form of a hollow vertical cylinder, this hub being connected to the surrounding capstan portion by means of a plurality of radial spokes 14 which extend outwardly from the hub and lie in axial planes. In order to support and drive the block there is provided a vertical rotatable spindle 15 having a bushing 16 keyed to the upper portion thereof. The outer surface of this bushing is cylindrical and of the proper size to receive the hub 12 of the block. At the upper end of the hub there is provided an inwardly projecting lug 18 (Fig. 3) arranged to fit with a notch 19 in the upper end of the bushing 16, to prevent relative rotation of these parts. The block is held in place on the bushing by means of a flat plate or cap 20 which is fastened to the upper end of the spindle 15 by a screw 21.

The flange 11 is preferably provided with a series of circumferentially spaced arcuate openings 23 arranged to direct streams of air upwardly into cooling contact with the wire which is wrapped about the capstan portion 10. For this purpose the block is mounted above a circular opening 24 (Fig. 1) in the top plate 25 of the hollow frame of the machine, and this frame is supplied with air under pressure from any suitable source, all as disclosed in the prior patent to Morgan et al. No. 2,185,416. Some of the air flows upwardly through the openings 23, and some of the air flows upwardly through the interior of the capstan portion 10 to cool the same.

In order to cool the block more effectively, there are provided a multiplicity of thin ribs 27 which extend inwardly from the capstan portion 10 and afford a very large area for the transfer of heat to the air as it flows between the ribs. As best shown in Fig. 2, these ribs are arranged in groups, with one group located between each pair of adjacent spokes 14, and the ribs in each group are substantially parallel with one another and with the axis of the block. Preferably each group of ribs is symmetrically disposed with respect to an axial plane extending through the center of the group. Furthermore, the ribs preferably terminate a considerable distance short of the

hub 12, so that it will be feasible to cast the ribs integral with the capstan portion and to form each group of ribs by means of a single core having a comparatively strong solid body portion, as will be apparent to those skilled in the foundry art.

It is important, however, that the air should flow in intimate contact with the ribs 27 in order that they may be effective in transferring heat to the air as desired. Accordingly a separately formed baffle means is assembled with the main cast portion of the block to prevent the air from flowing through the space between the inner ends of the ribs and the hub 12, and to compel the air to flow through the spaces between the ribs. For this purpose the plate 20 is extended outwardly and provided with a depending annular skirt 29 in the form of a hollow cylinder which lies close to the inner ends of the ribs 27. This skirt is provided with notches 30 to receive the spokes 14. These notches divide the skirt 29 into a plurality of arcuate pieces, one for each group of ribs.

The block illustrated is constructed to support a bundle of wire above the capstan portion 10, and for this purpose it is provided with a series of upright posts or rods 32. The lower portions of these posts are inserted in sockets formed in bosses 34 adjacent the junctures of the spokes 14 with the capstan portion. The posts are located within a circle somewhat smaller in diameter than the capstan portion 10 in order that the convolutions of wire may shuffle laterally and remain in proper order as they are pushed upwardly by the continuous addition of wire to the capstan portion.

There has been a tendency with prior blocks for the convolutions in the bundle to become crossed and out of order, which causes great difficulty in the subsequent uncoiling of the bundle. In order to overcome this difficulty, the block is shaped to provide a wire-supporting surface which merges smoothly and gradually with the capstan portion and decreases in diameter gradually from the diameter of the capstan portion to a diameter less than that defined by the posts 32. In the preferred construction illustrated an annular flange 36 is provided as an upward continuation of the capstan portion. This flange slopes upwardly and inwardly, and it is interrupted by notches 37 (Fig. 4) to avoid interference with the posts 32. This construction results in a gradually increased shuffling of the upwardly moving convolutions as they approach contact with the posts, and produces a much more satisfactory bundle.

The air which flows upwardly past the ribs 27 is preferably discharged into direct cooling contact with the wire bundle supported by the posts 32. For this purpose the plate 20 is provided with an upwardly and outwardly flaring flange 39 which overlies the ribs 27 and cooperates with the flange 36 to provide an annular slot 40. The air will flow through this slot, and the flange 39 will direct the air jet outwardly in the desired manner.

The operation of the invention will now be apparent from the above disclosure. The spindle 15 will be rotated by any suitable means, and the wire will pass through the associated die into engagement with the flange 11 and thence around the capstan portion 10. The convolutions of wire will be forced upwardly by the on-coming wire, and as they reach the upper portion of the capstan portion with its inwardly sloping flange 36 they will be subjected to a gradually increasing lateral shuffling which will ensure an orderly bundle. Air jets will be discharged against the wire from the openings 23 in the flange 11. Air will also flow upwardly between the ribs 27 to cool the block in an efficient manner and thence outwardly through the slot 40 into contact with the wire bundle. The plate 20 and skirt 29 will prevent the air from traveling through the open spaces between the inner ends of the ribs 27 and the hub 12. These spaces are of great value in facilitating manufacture of the block, since they make it possible to utilize cores having strong solid bodies in casting the block in the foundry.

It will be obvious that various changes may be made in the actual construction of the block without departing from the spirit of the invention as set forth in the claims.

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

1. A wire drawing block comprising a central hub, an annular capstan portion surrounding the hub and spaced radially therefrom, means connecting the hub to the capstan portion, a series of thin ribs extending inwardly from the capstan portion and terminating a considerable distance short of the hub, the ribs being substantially parallel with the axis of the block and adapted to transfer heat from the capstan portion to a stream of air flowing through the block, and a separately formed baffle means located in the space between the inner ends of the ribs and the hub to direct the air stream between the ribs.

2. A wire drawing block comprising a central hub, an annular capstan portion surrounding the hub and spaced radially therefrom, a plurality of spokes extending outwardly from the hub to the capstan portion, a series of thin ribs extending inwardly from the capstan portion between the spokes and terminating a considerable distance short of the hub, the ribs being substantially parallel with the axis of the block and adapted to transfer heat from the capstan portion to a stream of air flowing through the block between the spokes, and a separately formed baffle means located in the space between the inner ends of the ribs and the hub to direct the air stream between the ribs.

3. A wire drawing block comprising a central hub, an annular capstan portion surrounding the hub and spaced radially therefrom, means connecting the hub to the capstan portion, a series of thin ribs extending inwardly from the capstan portion and terminating a considerable distance short of the hub, the ribs being substantially parallel with the axis of the block, and a separately formed baffle located close to the inner edges of the ribs and cooperating with the capstan portion to define a passage for the flow of air through the block in intimate contact with the ribs.

4. A wire drawing block comprising a central hub, an annular capstan portion surrounding the hub and spaced radially therefrom, a plurality of spokes extending outwardly from the hub to the capstan portion, a series of thin ribs extending inwardly from the capstan portion between the spokes and terminating a considerable distance short of the hub, and a separately formed baffle located between the spokes and close to the inner edges of the ribs to cooperate with the capstan portion in defining a passage for the flow of air through the block in intimate

contact with the ribs, the baffle being arranged to revolve with the block.

5. A wire drawing block comprising a central hub, an annular capstan portion surrounding the hub and spaced radially therefrom, means connecting the hub to the capstan portion, a series of thin ribs extending inwardly from the capstan portion, the ribs being substantially parallel with the axis of the block and terminating a considerable distance short of the hub, a separately formed baffle extending along and close to the inner edges of the ribs to cooperate with the capstan portion in defining a passage for the flow of air through the block in intimate contact with the ribs, and means preventing air from flowing between the baffle and the hub.

6. A wire drawing block comprising a central hub, an annular capstan portion surrounding the hub and spaced radially therefrom, a plurality of spokes extending outwardly from the hub to the capstan portion, a series of thin ribs extending inwardly from the capstan portion between the spokes and terminating a considerable distance short of the hub, a plate extending outwardly from the hub, and an annular flange extending from the plate along and close to the inner edges of the ribs to cooperate with the capstan portion in defining a passage for the flow of air through the block in intimate contact with the ribs, the flange having notches therein for the reception of the spokes.

7. A wire drawing block comprising a central hub rotatable about a vertical axis, an annular capstan portion surrounding the hub and spaced radially therefrom, a plurality of spokes extending outwardly from the hub to the capstan portion, a series of thin ribs extending inwardly from the capstan portion between the spokes and terminating a considerable distance short of the hub, a separately formed plate extending outwardly from the hub above the spokes, and an annular flange depending from the plate and extending along and close to the inner edges of the ribs to cooperate with the capstan portion in defining a passage for the flow of air upwardly through the block in intimate contact with the ribs, the flange having notches therein for the reception of the spokes.

8. A wire drawing block comprising a central hub rotatable about a vertical axis, an annular capstan portion surrounding the hub and spaced radially therefrom, means connecting the hub to the capstan portion, a series of thin ribs extending inwardly from the capstan portion and adapted to transfer heat from the capstan portion to a stream of air flowing upwardly through the block, a series of posts extending upwardly above the capstan portion to support convolutions of wire which are pushed upwardly from the capstan portion, and means providing an annular slot concentric with the block and through which the said stream of air is discharged from the block and into contact with the said convolutions of wire.

9. A wire drawing block comprising a central hub rotatable about a vertical axis, an annular capstan portion surrounding the hub and spaced radially therefrom, means connecting the hub to the capstan portion, a series of thin ribs extending inwardly from the capstan portion and adapted to transfer heat from the capstan portion to a stream of air flowing upwardly through the block, a series of posts extending upwardly above the capstan portion to support convolutions of wire which are pushed upwardly from the capstan portion, the posts being located within a circle somewhat smaller in diameter than the capstan portion, and an annular flange integral with the capstan portion and forming an upward continuation thereof, the flange merging smoothly and gradually with the capstan portion and sloping upwardly and inwardly to a diameter less than that of the said circle to ensure a gradually increasing lateral shuffling of the wire convolutions as they approach contact with the posts.

10. A wire drawing block comprising a central hub rotatable about a vertical axis, an annular capstan portion surrounding the hub and spaced radially therefrom, means connecting the hub to the capstan portion, a series of thin ribs extending inwardly from the capstan portion and adapted to transfer heat from the capstan portion to a stream of air flowing upwardly through the block, a series of posts extending upwardly above the capstan portion to support convolutions of wire which are pushed upwardly from the capstan portion, the posts being located within a circle somewhat smaller in diameter than the capstan portion, an annular flange forming an upward continuation of the capstan portion, the flange sloping upwardly and inwardly to a diameter less than that of the said circle to ensure a gradually increasing lateral shuffling of the wire convolutions as they approach contact with the posts, and an upwardly and outwardly sloping flange located adjacent to the upper edge of the first-mentioned flange and cooperating therewith to define an annular slot through which the said stream of air is discharged from the block and into contact with the convolutions of wire on the posts.

11. A wire drawing block comprising a capstan portion rotatable about a vertical axis and having a substantially cylindrical outer surface and a flange extending outwardly at the bottom thereof, a series of posts extending upwardly above the capstan portion to support convolutions of wire which are pushed upwardly from the capstan portion, the posts being located within a circle somewhat smaller in diameter than the said cylindrical surface, and means providing a wire-supporting surface merging smoothly and gradually with the cylindrical surface to form an upward continuation thereof and decreasing in diameter to a diameter less than that of the said circle to ensure a gradually increasing lateral shuffling of the wire convolutions as they approach contact with the posts.

12. A wire drawing block comprising a central hub rotatable about a vertical axis, an annular capstan portion surrounding the hub and spaced radially therefrom, the capstan portion having a substantially cylindrical outer surface and a flange extending outwardly from the bottom thereof, a plurality of spokes extending outwardly from the hub to the capstan portion, a series of thin ribs extending inwardly from the capstan portion between the spokes and terminating a considerable distance short of the hub, a series of posts extending upwardly above the capstan portion to support convolutions of wire which are pushed upwardly from the capstan portion, the posts being located within a circle somewhat smaller in diameter than the said cylindrical surface, an annular flange forming an upward continuation of the capstan portion and sloping upwardly and inwardly to a diameter less than that of the said circle to ensure a gradually increasing lateral shuffling of the wire convolutions as they

approach contact with the posts, a separately formed plate extending outwardly from the hub above the spokes, an annular flange depending from the plate and extending along and close to the inner edges of the ribs to cooperate with the capstan portion in defining a passage for the flow of air upwardly through the block in intimate contact with the ribs, the said depending flange having notches therein for the reception of the spokes, and a flange sloping upwardly and outwardly from the plate and located adjacent to the upper edge of the upwardly and inwardly sloping flange and cooperating therewith to define an annular slot through which the said stream of air is discharged from the block and into contact with the convolutions of wire on the posts.

WELD MORGAN.