Mar. 6, 1923.

1,447,683.

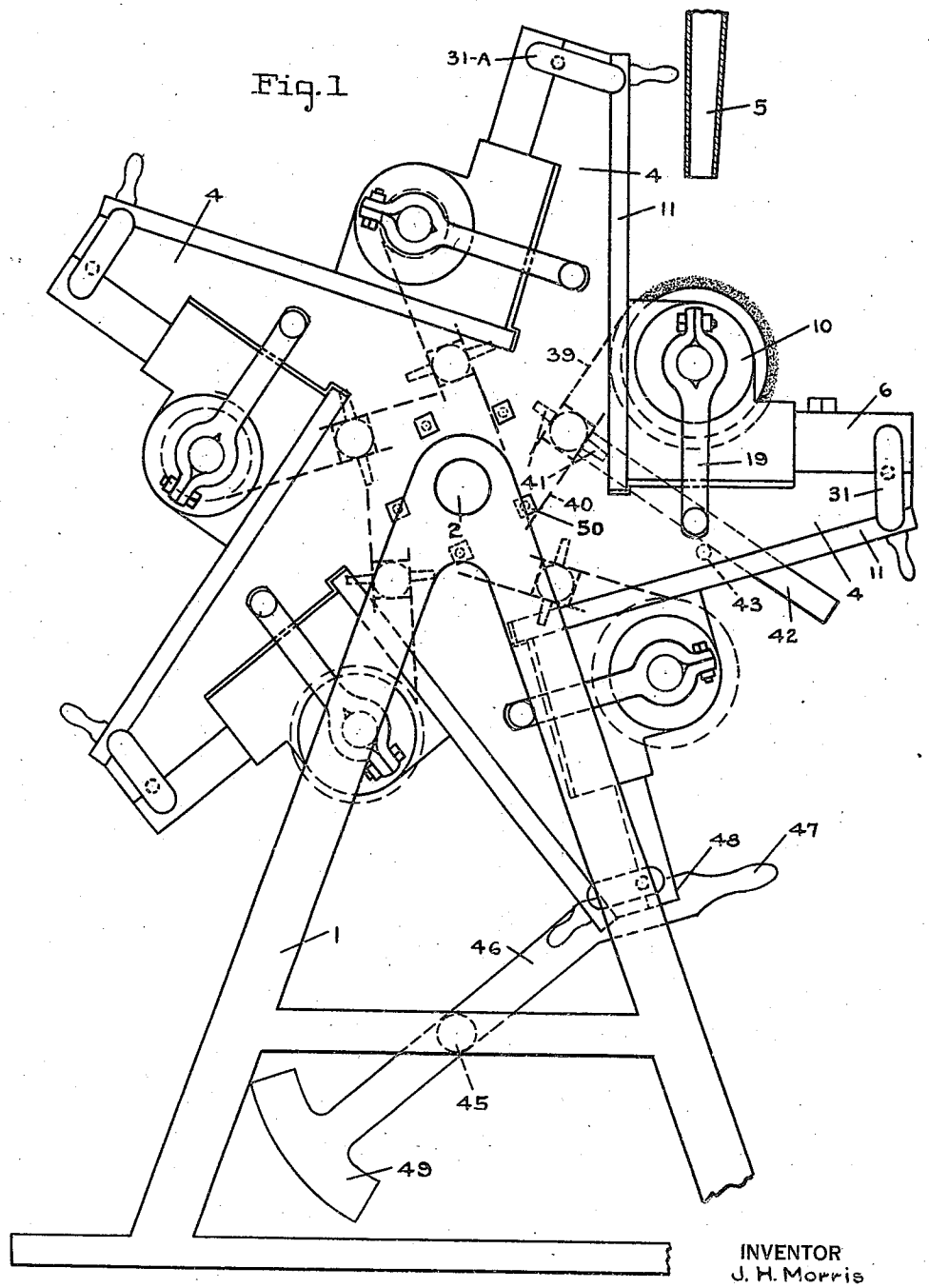
J. H. MORRIS.

MULTIPLE CORE MAKING MACHINE.

FILED FEB. 8, 1921.

4 SHEETS—SHEET 1.

Fig. 1



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J. H. Morris

BY

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Mar. 6, 1923.

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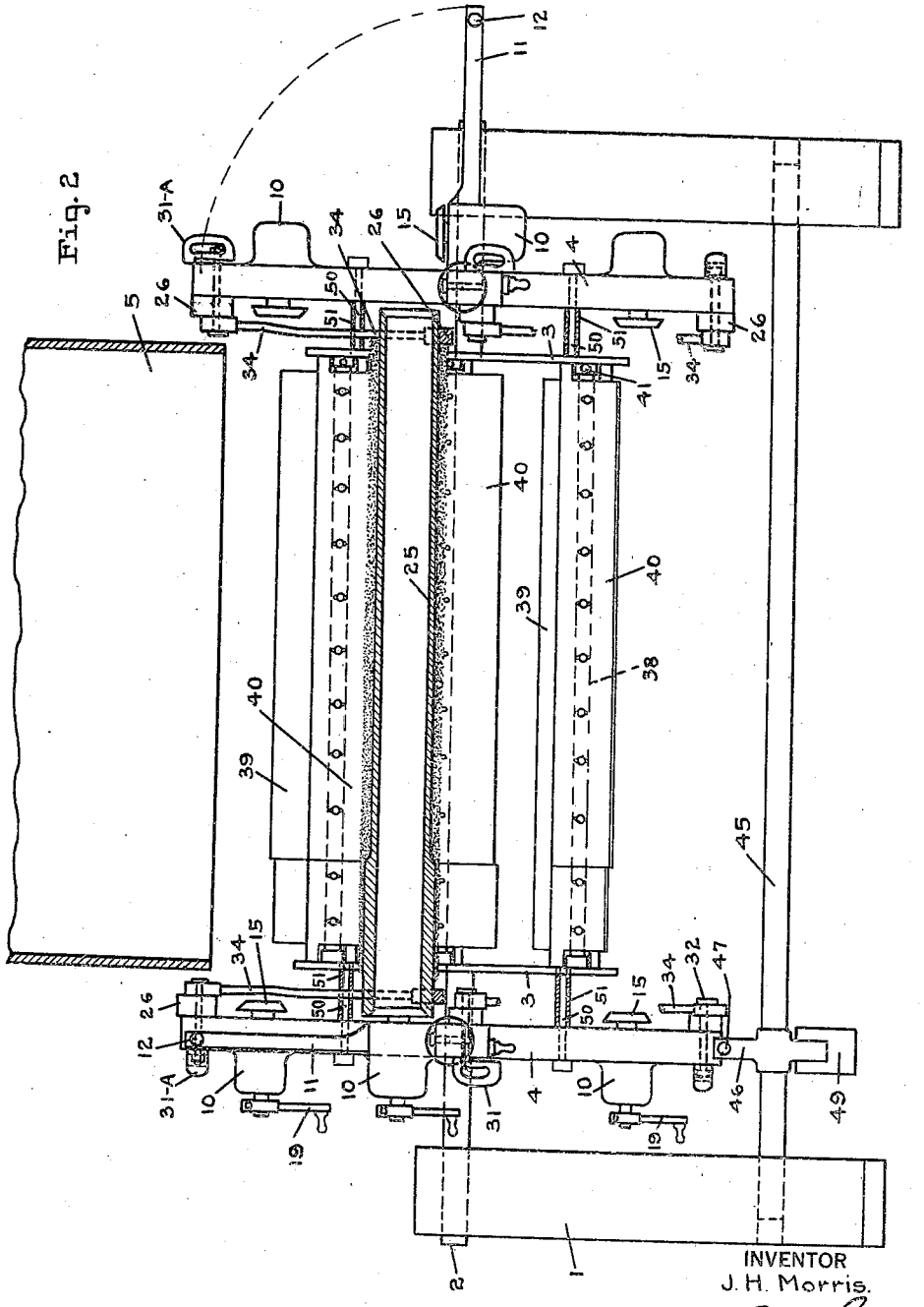
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4 SHEETS—SHEET 2.

Fig. 2



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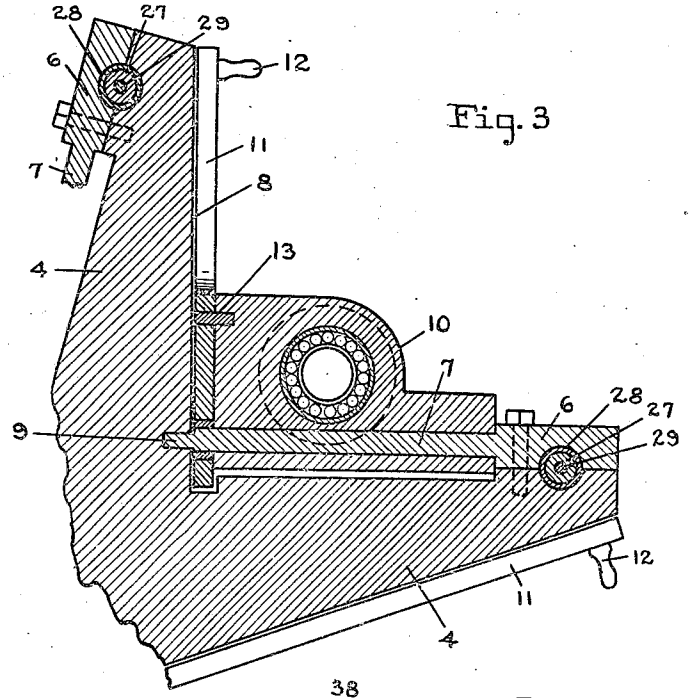


Fig. 3

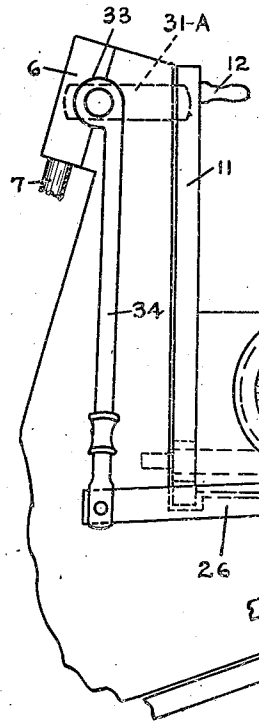


Fig. 4

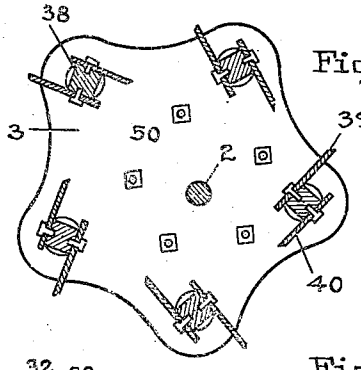


Fig. 5

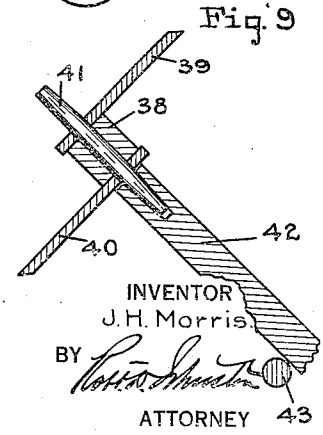


Fig. 9

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MULTIPLE CORE MAKING MACHINE.

FILED FEB. 8, 1921.

4 SHEETS—SHEET 4.

Fig. 6

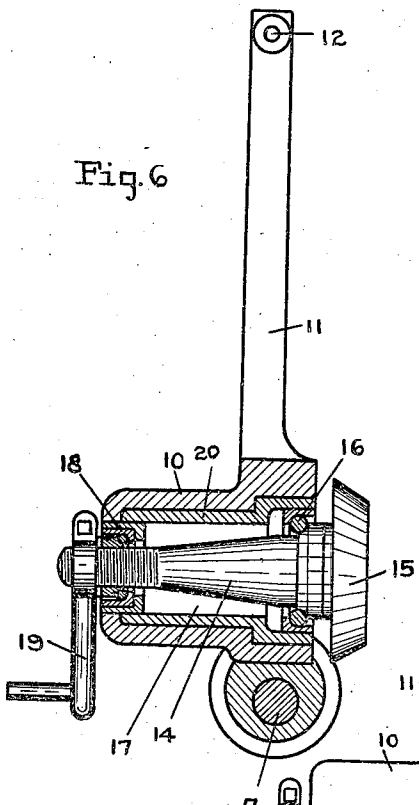


Fig. 7

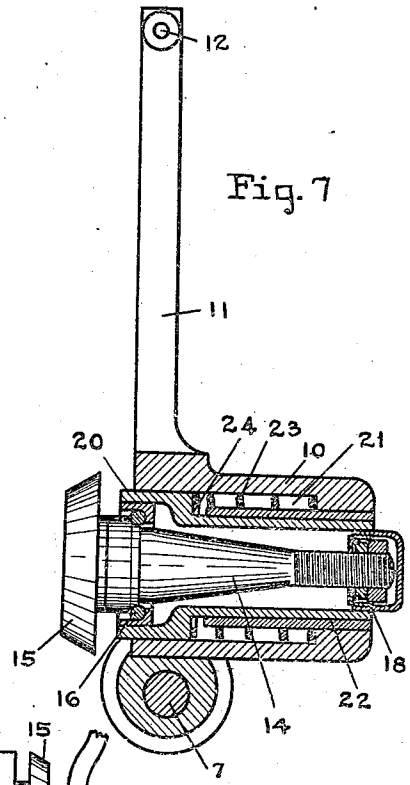
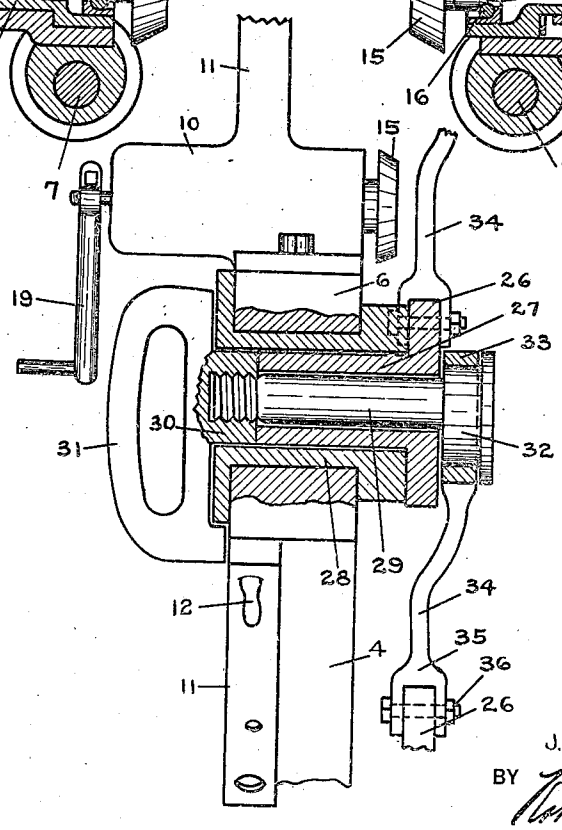


Fig. 8



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Patented Mar. 6, 1923. 1,447,683

UNITED STATES PATENT OFFICE.

JOHN H. MORRIS, OF BIRMINGHAM, ALABAMA.

MULTIPLE CORE-MAKING MACHINE.

Application filed February 8, 1921. Serial No. 443,457.

To all whom it may concern:

Be it known that I, JOHN H. MORRIS, a citizen of the United States of America, residing at Birmingham, in the county of Jefferson and State of Alabama, have invented certain new and useful Improvements in Multiple Core-Making Machines, of which the following is a specification.

My present invention relates to a multiple core making machine, the chief object of which is to substitute for the present manual adjustment of the knives a suitable mechanism which will present to the arbors, for various sized pipe, knives in accurate and proper adjustment for the finish of the standard or extra heavy pipe cores on such arbors.

One of the most serious problems in connection with the manufacture of cast pipe or soil pipe, and particularly with the smaller sizes of less than 6″ diameter, has been to produce the cores with such accuracy that the pipe would not carry excess weight in metal, which represents a loss to the foundry, and which would not produce an abnormal percentage of defective castings by reason of uneven thickness of walls.

In the ordinary foundry practice it is customary for the core maker to adjust the knives from time to time according to the work and this adjustment involves very accurate setting of the knife edge relatively to the arbor axis so as to produce a core of an exact diameter required for the production of a given size of pipe so that it will have a normal weight per unit of length.

Experience has proven that manual knife adjustment is so unreliable as to cause, in the average output of a foundry, a very considerable percentage of rejected pipe as being over or under weight and the core maker is continually seeking to reach a mean between these two extremes.

The object of this invention is to relieve the core maker of the necessity of adjusting the knife for the formation of different cores, and when it is considered that in normal practice knife changes have to be made as many as thirty times a day, it will be at once apparent that a large amount of the core maker's time is wasted in the making of these changes, all of which will be saved by a machine in which the adjustments are prearranged and it is only necessary to present the appropriate knife and its support in operative relation with the arbor and the resultant core formed will be of the exact dimension desired.

The general practice heretofore has been to mount the arbors on rollers or slide journals on the core machine on which the arbor was rotated during the finishing of the core and it is obvious that, with length of use the friction on both arbor and its supports and the presence of sand will cause a substantial wear or the arbor or a displacement thereof. In practice, the arbors worn to varying extents are mounted successively on the core machine and it is therefore wholly impractical to adjust the knife with any regard to the extent of wear of each particular arbor. From this condition it follows that, as the arbor becomes worn, it changes the diameter of the core. This change will involve an increase or decrease in the core diameter according to the extent of wear on the arbor by which the knife was set, and conditions such as this make it practically impossible with the present practice to avoid a large variation in the weight of pipe manufactured. I propose to overcome this difficulty in the manufacture of uniform weight pipe by taking off of the arbor itself all opportunity for wear and this is most easily accomplished by providing the core machine with rotatable arbor centering journals which take all of the wear and thus protect the arbor itself from any change in size. Moreover, should appreciable wear occur in these journals, the effect thereof would be uniform throughout the cores made and would develop so gradually that an occasional adjustment of the various sized knives would compensate for such wear.

A further object of my invention is to provide a rotatable frame carrying arbor journals and co-related knives for the varying sizes of cores to be produced, the machine being adapted to be moved to present any desired arbor journal and knife into operating position.

A further object of my invention is to re-

duce the number of arbor journals by providing for each pair of journals a double knife support carrying knives for standard and extra heavy pipe for a given diameter with suitable means for setting either knife in operating position without requiring adjustment thereof.

My invention also comprises novel means for mounting the arbor in its centering journals and for releasing it from the latter so that it can be conveniently lifted off in the customary manner by core sticks inserted in the open ends of the arbor.

My invention also comprises the novel details of construction and arrangements of parts, which in their preferred embodiment only are illustrated in the accompanying drawings which form a part of this specification, and in which:—

Fig. 1 is an end elevation of my improved multiple core making machine.

Fig. 2 is a front elevation of Fig. 1 with the arbor and the core being formed thereon shown in cross section and one of the arbor journals being shown in lowered position. In this view those duplicate details of the arbor journals at the rear of the machine have been omitted for the sake of clearness.

Fig. 3 is a vertical sectional view; and

Fig. 4 is an end elevation of one arm of the star wheel and of the arbor journal thereon.

Fig. 5 is a detail cross sectional view taken through the series of five knife shafts and showing their support in elevation.

Figs. 6 and 7 are detail cross sectional views through the swinging journals for the arbor.

Fig. 8 is a detail cross sectional view of the handle and eccentric for latching the arbor journal in operating position and operating the arbor support.

Fig. 9 is an enlarged detail view showing the taper pins on each knife shaft and the lever for turning and holding the shaft in operating position.

Similar reference numerals refer to similar parts throughout the drawings.

According to the embodiment of my invention which is illustrated in the drawings and which may be obviously varied to suit different conditions without departing from its principles of construction, I show a support for the multiple core making machine comprising end frames 1 which are suitably anchored or braced at their bases and which are provided overhead with journal bearings for the main shaft 2 which rotatably supports the multiple core making machine proper. On this shaft between the bearings I mount two end plates which are similar and which are of an approximate star shape carrying on each of its five similar arms 4 a complete core making machine, except the sand feed hopper 5 which is adapted to cooperate with any one of the five core making machines which is brought into operating position beneath it. As each arm 4 and each of the complete core making machines carried thereby are alike, except as they may be varied in size to produce the different sizes of pipe cores, the description of one machine will serve for all, and only one will therefore be described.

Taking as the core making machine to be described that which is shown in operating position in Fig. 1, the corresponding arms 4 on the star wheel which support such machine are disposed with their upper faces in a horizontal plane and to each upper face I bolt the outer squared end 6 of an axle 7 extending to the wall 8 of the adjacent arm 4 next above the one in question and the inner end of such axle is further reduced and supported in a bearing 9 in said wall 8. A swinging journal frame 10 is mounted to rotate on each axle 7, having a handle 11 fast to its inner edge and extending, when in operating position, to the top of the face 8 of the arm 4 next above it on its respective star wheel. Each arm 11 is provided with a handle 12 and when made separate from the frame the handle is connected thereto by having the axle 7 passed through its lower end and a pin 13 inserted through its upper end.

The journal frames 10 at each end of the machine are alike, except that the chamber therein is adapted to receive different bearings for the arbor journals. The journal frame 10 at the left hand end of the machine (Fig. 1) is designed to receive a crank operated journal 14 (Fig. 6) carrying at its inner end a taper head 15 which is adapted to enter the open end of a core arbor and center the arbor relatively to the axis of the journal. Obviously the shape of this head may be changed to engage the arbor in any way which will center it. The journal is adapted to rotate on ball bearings 16 mounted in the inner open end of a sleeve 20 seated in the chamber 17 in the frame, while the outer threaded end of the journal carries a ball bearing 18 seated in the outer end of said sleeve. The journal ends project through bearing 18 and has fast on its outer end a crank 19 by means of which the journal 14 and its head 15 can be rotated in the frame about an axis at right angles to the axis of the frame axle 7. The opposite journal frame 10 carries a similar journal 14, centering head 15, ball bearings 16 and 18, and sleeve 20, but, in this case the sleeve 20 is free to slide in the chamber 21 in the journal frame and the sleeve has its inner end reduced to telescope into a pipe 22 mounted in the outer end wall of the frame 10. A coil spring 23 is mounted in the chamber 21 surrounding the pipe 22 and

bearing on the shoulder 24 on the sleeve 20 so as to urge the latter, and with it the journal bearing, towards the opposite journal. This is intended to take care of variations in arbor lengths and to maintain the requisite driving friction between the crank driven journal 14 and the arbor 25.

When the arbor is first placed in the machine, the frames 10 are both swung outwardly to horizontal position on their axes 7 and it is therefore necessary to provide a temporary support for the arbor which will hold its ends in position to be engaged and centered by its journals when swung up into operating position to clamp the arbor between them, after which the temporary support will release the arbor so that it turns freely with the journals. Such a temporary supporting means is typically illustrated in Fig. 4. Here I show on the inner side of each corresponding pair of arms a swinging pivoted supporting bar 26, which at its outer end is provided with an inturned sleeve 27 (see Fig. 8), which is inserted in and is free to turn in a bushing 28 flanged at each end and clamped in position in semi-circular seats provided in the end 6 of the axle and in the outer end of its respective arm 4 (see Fig. 3). The bar 26 is held in position in the bushing by means of a pin 29 which is inserted therethrough and has a threaded end projecting beyond the sleeve 27 and adapted to receive the internally threaded boss 30 on a handle 31. The boss 30 is turned to make a snug fit in the outer end of the bushing 28. The inner headed end of the bolt is turned to form an eccentric 32 which receives an eccentric strap 33 at the outer end of a rod 34, which at its other end is provided with a yoke 35 which straddles and is pivoted by a bolt 36 to the free end of the arbor supporting bar 26 for the succeeding core making machine. The handle 31, when screwed tight on the bolt 29, serves as a means for rotating the bolt and the eccentric to raise and lower the rod 34 mounted on its respective bolt. The handle on the arm 4 carrying the core machine in operative position (Fig. 1) does not therefore control the supporting bar 26 which is intended to co-operate with the arbor of the operating machine, but such bar 26 is controlled by the handle 31^a on the arm 4 in uppermost position (Fig. 1.) It will be noted that each handle 31 projects into the path of an arm 11 on the adjacent arbor journal and they thus serve as latches to prevent the outward movement of the journal frames 10. When the handles 31 are in latching position their eccentrics 32 are disposed to lower the rods 34 controlled thereby (see Fig. 4) and to drop the supporting bars 26 to which such rods are connected out of engagement with the arbor, thus leaving the arbor free to turn on its ball bearing journals. When, however, the handles 31 are thrown to unlatched position the eccentrics will move to position to raise the rods 34 and lift the bars 26 into position to engage and support the arbor, the bars 26 having a groove 37 in their upper face to receive and center the arbor therein. The arms 11 controlling the journal frames 10 being unlatched can be swung outwardly apart from each other to horizontal position, see the right hand journal bearing in Fig. 2, and when this occurs the arbor ends are exposed so that the core sticks can be readily inserted therein for removing the core. In like manner, when another arbor is placed in position, it is at first seated in the grooves 37 on the supporting bars 26 and then the journal frames, by means of their arms 11, are swung up to vertical position and their latch handles 31 are moved to latch the frames in operating position and to lower the supporting bars 26 to clear the arbor.

The knife supporting plates 3 are mounted loose on shaft 2 between the star wheels 4 and are cross connected by five squared knife shafts 38. The ends of these shafts are left rounded and are free to turn in the plates 3. The shafts are mounted at gradually increasing distances from the shaft center 2 according to the diameter of the core to be formed thereby, and on each shaft one knife 39 is adapted for the formation of a standard weight pipe of a given diameter, and the other knife 40 on said shaft is designed to form a core for an extra heavy pipe of the same diameter. Through one end of each of the knife shafts I insert a pin having its opposite ends 41 slightly tapered and adapted to receive the socketed end of a handle 42 which can be applied to a pin end for the purpose of turning the shaft to present the desired knife in operating position. The lever itself is adapted to engage a stop pin 43 on its respective star wheel arm 4 so as to bring the knife shaft to rest in its operating position. The handle is removable so that the knife shaft can be turned and the handle again presented and caused to engage the stop pin to hold the desired knife in operating position. For each set of journal bearings is provided its respective knife shaft and the knives on the shaft are attached thereto rigidly in proper adjustment by set screws 44.

In order to hold the star wheels 4 in the desired operating position I provide on the bottom cross shaft 45 connecting the bases of the bearing 1 a swinging latch arm 46 having at one end a handle 47 and near that a notch 48 in which the outer end of a star wheel arm is adapted to be received and held in fixed position. The other end of the latch arm is provided with a counterweight 49 to hold it in latching position.

The operation of the machine is as fol-

lows. Assuming the core making machine designed for the size of pipe core to be produced is moved into position under the sand hopper 5 and the star wheel 4 latched in this position by the latch 46, and also assuming that, by means of the handle 42, the desired knife blade 39 or 40 has been presented in operating position in such machine, the appropriate handles 31ª are operated to unlatch the journal bearing arms 11 and the journal frames 10 are swung outwardly. The arbor is laid in the grooves 37 on the raised temporary arbor supporting bars 26 and the journal frames are then swung back to upright position so as to engage, clamp and center the arbor ends between them, whereupon the handles 31ª are turned to latch such journal frames in operating position and to lower the supporting bars 26. The operator then grasps the crank 19 of the operating machine and turns it, causing the arbor to turn therewith on its roller bearing journals and as the sand falls from the hopper 5 it is caught by the knife 39 or 40 to produce a core of the diameter desired. If the core be for a standard size type the knife 39 is used and if for an extra heavy pipe, the knife 40 is used. The core maker can thus change from standard to extra heavy without loss of time or danger to inaccurate adjustment, thereby greatly increasing his output and its uniformity. If a different sized pipe core is desired, the latch 46 is released and the core machine is rotated on its shaft 2 until the core making machine of the desired size comes into operating position, whereupon it is latched in this position by means of the latch 46 and the appropriate knife 39 or 40 is moved to operating position and the manufacture of this different size core proceeds with dispatch and with the same accuracy and uniformity.

In practice, the various knives 39 and 40 when once properly adjusted need no further attention until natural wear in the knives themselves requires it. I therefore reduce to a minimum all labor incident to knife changing and adjustment and maintain mechanically a standardization of the cores which will produce a uniform foundry product with a minimum wastage.

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

1. In a multiple core making mechanism, a movable carrier, a plurality of core making machines for varying core sizes mounted on said carrier, and means to latch the carrier with the desired machine in operating position.

2. In a multiple core making mechanism, a movable carrier, a plurality of core making machines for varying core sizes mounted on said carrier, means to latch the carrier with the desired machine in operating position, and a hopper for feeding sand to the machine in operating position.

3. In a multiple core making mechanism, a rotatable frame, a plurality of core making machines for different sized cores mounted on said frame, and means to latch the frame in position to present different machines in operating position.

4. In a multiple core making mechanism, a rotatable frame, a plurality of core making machines for different sized cores mounted on said frame, means to latch the frame in position to present different machines in operating position, and a fixed sand hopper above the machine in operating position.

5. In a core making mechanism, a support on which a core arbor is adapted to be rotated, a knife support having a plurality of knives mounted thereon to form different sized cores on said arbor, and means to set said support with the desired knife in operative position, said knife support being a shaft having opposite parallel knife seats on which the knives are mounted to project in opposite directions.

6. In a core making mechanism, a support on which a core arbor is adapted to be rotated, a pivoted knife supporting shaft having opposite parallel knife seats, knives mounted on said seats to project in opposite directions and set to form cores for a standard and for an extra heavy pipe of a given diameter, there being opposite taper pins on said shaft, and means to set said support with the desired knife in operative position, said means comprising a handle having a taper socket to receive one or the other of said taper pins.

7. In a core making mechanism, an arbor support, a pair of vertically swinging journals adapted to receive an arbor from said support, and a knife set with its edge and the axis of rotation of the arbor in a plane substantially at right angles to the plane in which the journals swing.

8. A core making mechanism, as described in claim 7, in which the journals are hinged to swing in a vertical plane with the axis of rotation of the arbor.

9. In a core making mechanism, vertically movable arbor supports, swinging journals adapted to receive an arbor from said support, and a common means to latch the journals in operating position and adjust said supports.

10. A core making mechanism, as described in claim 9, in which said means is adapted to lower said supports as it latches said journals in operating position and vice versa.

11. A core making mechanism, as described in claim 9, in which said common means comprises a latch and a crank mov-

able therewith, with operating connections from the crank to an arbor support.

12. In a core making mechanism, a support, a plurality of sets of arbor journals mounted on said support, a knife support also mounted in said support for each set of arbor journals and each spaced from its respective journals according to the size of the core to be made on its said journals, and a knife support in fixed adjustment relatively to the axis of its respective journals.

In testimony whereof I affix my signature.

JOHN H. MORRIS.

Witness:
NOMIE WELSH.