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COLLAPSIBLE CORE FORMS FOR MOLDING DUCTS

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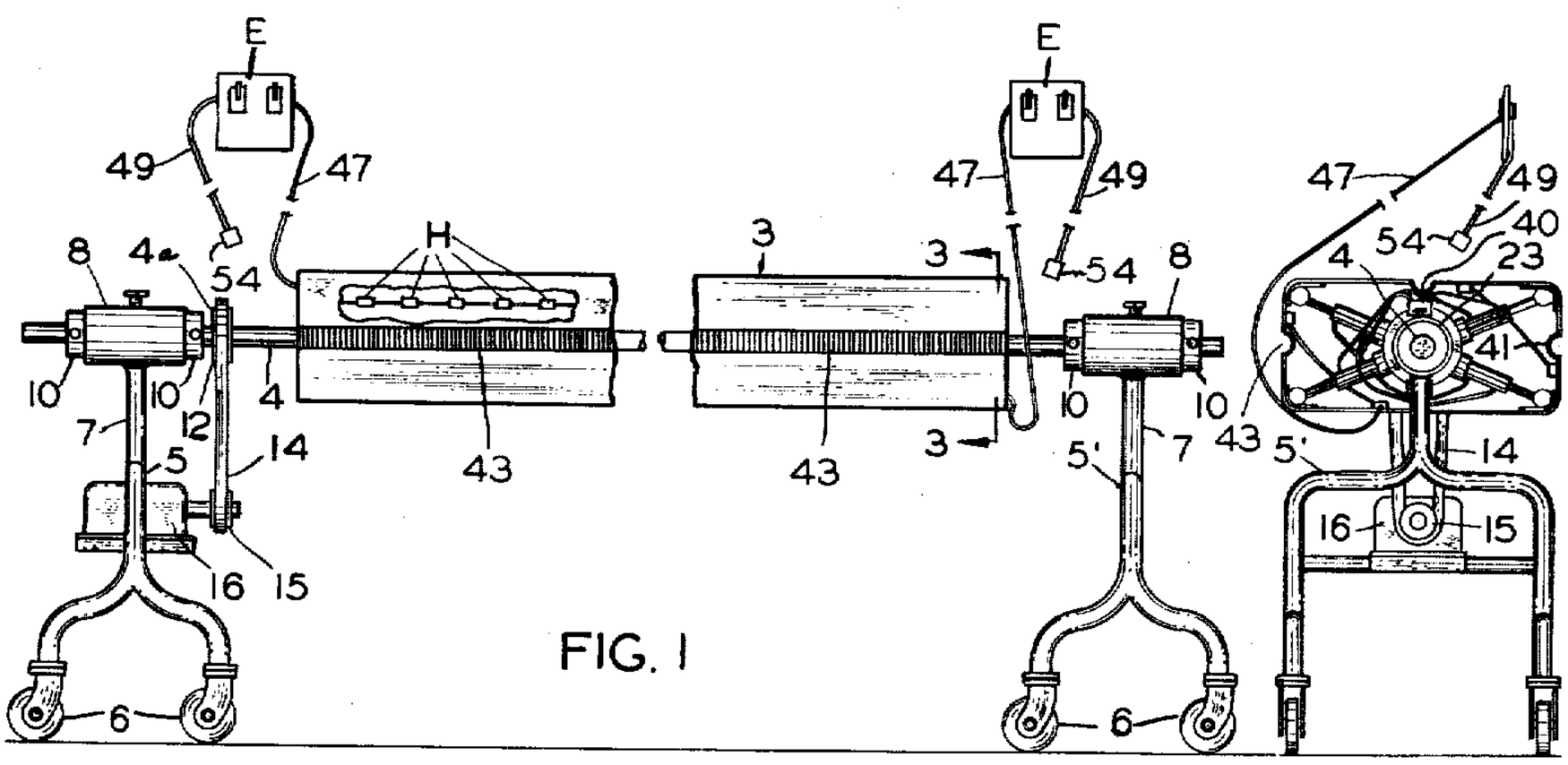

FIG. 1

FIG. 2

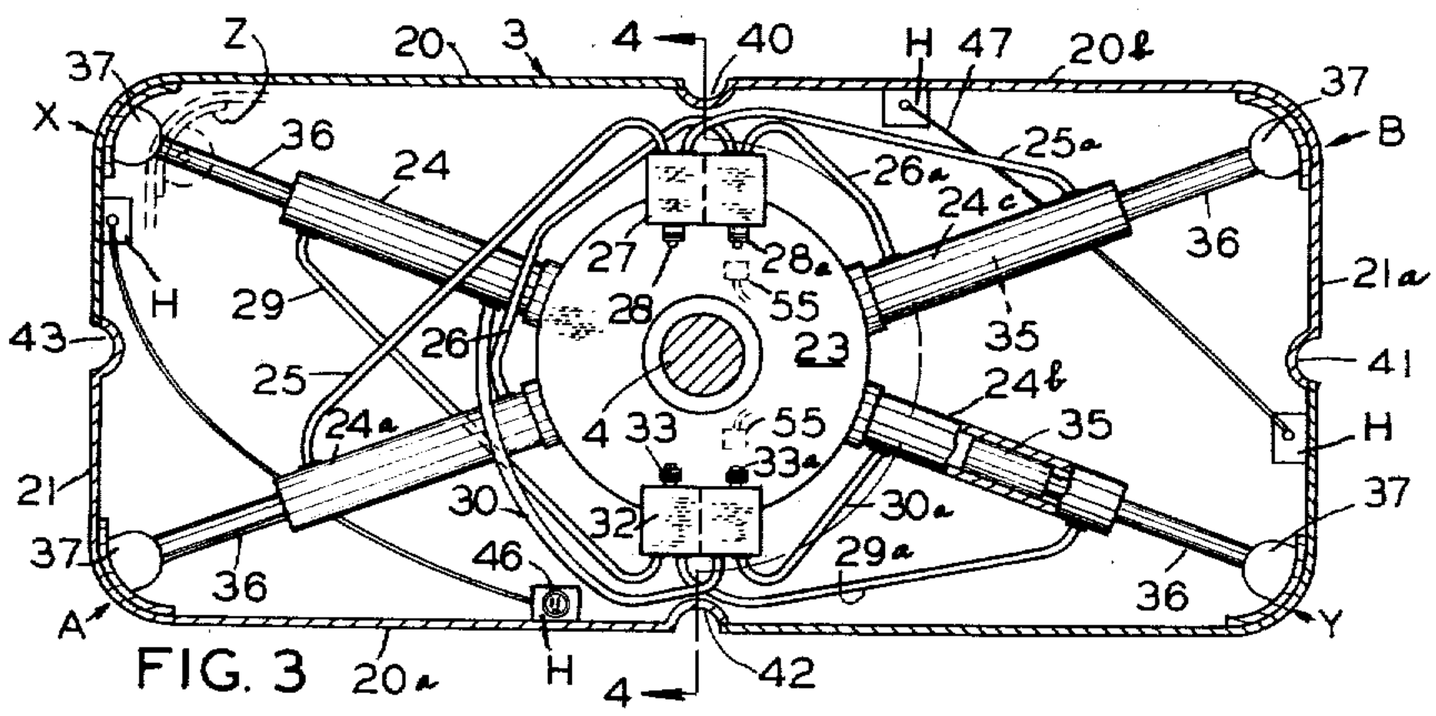

FIG. 3

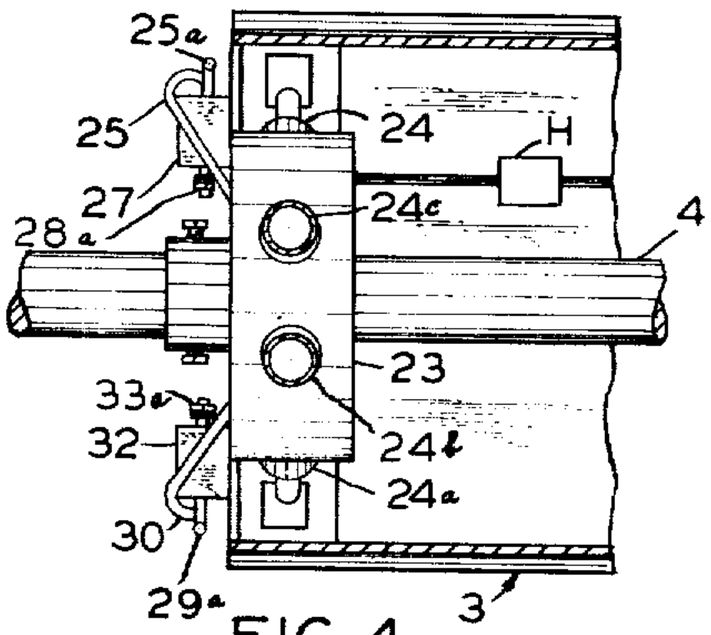

FIG. 4

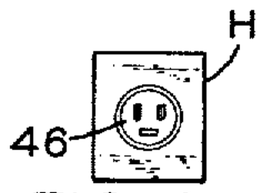

FIG. 6

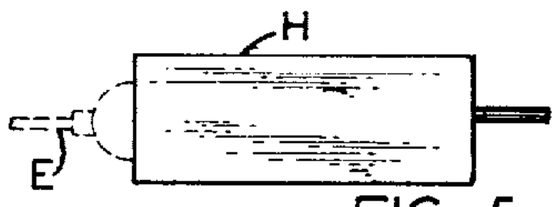

FIG. 5

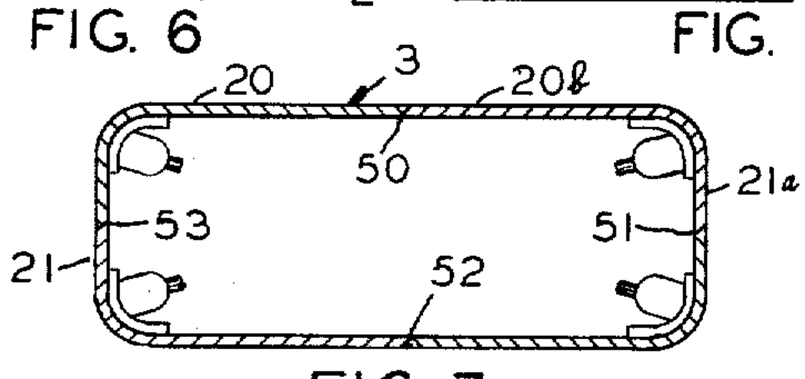

FIG. 7

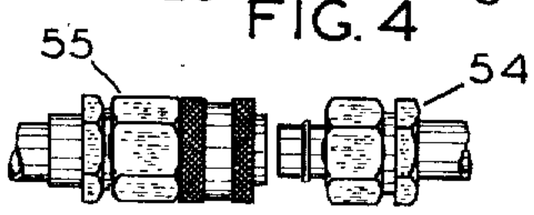

FIG. 8

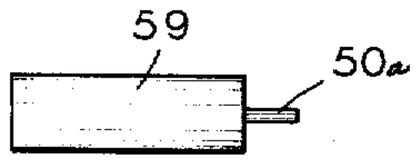

FIG. 9

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COLLAPSIBLE CORE FORMS FOR MOLDING DUCTS

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This invention relates to collapsible core forms for moulding plastics.

More particularly the invention relates to collapsible moulds used as core forms on which plasticisable material, together with strengthening material may be built up to form tubes for air vents or the like.

One of the objects of the invention is to provide a collapsible core which may be expanded and contracted vertically and laterally so that a tube formed on its surface may be easily removed.

Another object is to provide a mechanism for supporting the core body which may be moved and transported upon a shop floor.

Still another object is to provide a collapsible form which may be rotated at a uniform speed while the core is being used as a base on which plastic material is sprayed or otherwise applied in order to form a tube.

Still another object is to provide an elongated core, having mechanical means for collapsing it vertically and laterally and having means for rotating, when desired, and means for heating the surface during and after the operation of applying plasticisable material on its surface.

Still another object is to provide a core, as above stated, which has a slight taper throughout its length to aid in the removal of a tube formed on its surface.

Other objects will appear hereinafter.

I attain the foregoing objects by means of the structure, parts, and combinations of parts shown in the accompanying drawings, in which—

FIGURE 1 is a side elevational view of the collapsible form;

FIGURE 2 is an end view thereof;

FIGURE 3 is a section taken on line 3—3 of FIGURE 1, showing the interior construction of the form and drawn on an enlarged scale;

FIGURE 4 is a section taken on line 4—4 of FIGURE 3 and showing the interior construction of the form;

FIGURE 5 is a side elevation of a heater element;

FIGURE 6 is an end elevation thereof;

FIGURE 7 is a cross section of a modified form of core body;

FIGURE 8 is a side elevation of an air tube coupling unit; and

FIGURE 9 is a side elevation of a tube coupling fitting for releasing air from the air cylinders.

Similar numerals refer to similar parts in the several views.

The collapsible form includes, in general, the core body **3** which may be of any length desired and which is supported by means hereinafter described on the supporting shaft **4**. The supporting shaft **4** is, in turn, supported on movable trestles **5** and **5'** at each end. Each of these trestles **5** is supported on four casters **6**. At the top of each trestle there is an upright stem **7** which supports a bearing sleeve **8**. There are roller bearings in each sleeve that have inner thimbles which receive and support shaft **4**. These hold the shaft **4** with an easy sliding fit. The bearing sleeves **8** are kept from sliding longitudinally on shaft **4** by two collars **10** which engage against the ends of the bearing sleeve **8**.

At one end of the shaft, which for the purposes indicated is marked **4***a*, there is a pulley **12** over which a

belt **14** passes and which is driven by belt **14** and pulley **15** on the shaft of motor **16**. This means and combination of parts is used to rotate shaft **4**.

Within each end portion of the core body **3** there is a mechanism, shown particularly in FIGURE 3, for expanding and contracting the four corner sections of the walls of the core body. These walls include the flat sides **20** and **20***a* and edges **21** and **21***a*. A central hub **23** is supported at its center on shaft **4**. Air cylinders **24**, **24***a*, **24***b* and **24***c* extend radially from the hub **23** toward the corners of core body **3**. Tubes **25**, **25***a* and **26** and **26***a* connect the outer and inner ends of cylinders **24***a* and **24***c*, respectively, to the left and right sides of air distribution block **27** and passageways within the block connect with air inlet nipples **28** and **28***a*, respectively. Similarly tubes **29** and **29***a*, and **30** and **30***a* connect the outer and inner ends of cylinders **24** and **24***b* to the left and right sides, respectively, of air distribution block **32**. Nipple valves **33** and **33***a* can be used to introduce compressed air to the left and right sides, respectively, of block **32**. Pistons **35** operate piston rods **36** of all air cylinders. The outer ends of piston rods **36** are connected to the several corner portions or sections of the walls of the core body by rigid fittings **37**.

To collapse the core body pistons in cylinders **24***a* and **24***c* are operated first to draw in core corner sections **20***b*—**21***a*, marked A in FIGURE 3, and corner section **20***a*—**21** marked B. Conversely these cylinders are used last to expand these same core sections.

Thereafter the corners *x* and *y* are contracted by applying coupling part **55** to nipple **33** on block **32**. The edges of these corner sections overlap the edges of the corner sections A and B, first contracted. Diagonal inward movement of corner *x* is indicated by dotted outline **2**. Re-expansion of corners is done by applying air coupling **55** to nipple **33***a* on block **32**.

It is to be noted that the same arrangement of cylinder, pistons, hub and fittings is provided at each end of body **3**. These parts would appear as shown in side section in FIGURE 4. The cylinders limit the pistons' travel.

The four grooves **40**, **41**, **42** and **43** are formed on the side and edge faces of the core body, as shown, in order to accommodate tubes or wiring ducts. These tubes (not shown) may be used for gas service pipes or for electrical wiring when and as desired. When not desired the form of body shown in FIGURE 7 is used.

In addition to the tubing **49**, above described, electrical wiring cables **47** are attached at the ends of the core to sockets **46** in the end heating blocks H. Extension cords **47** are connected to a source of electrical energy which is sufficient to heat all the inter-connected heating elements H. They are positioned in longitudinal rows extending throughout the length of the core. These heating blocks are spaced close enough so that the entire outer surface of the core may be heated to a temperature sufficient to congeal or harden any plasticisable material applied to the outer surface of the core. Wall outlet panels E are used to provide conveniently positioned sources of compressed air for tubes or hose **49**, and electric power supply for 220 volt cable **47**.

In use the core is set up and supported on trestles **5**. The core is expanded by applying the air hose coupler fitting **55** to the air inlet nipples **28** and **28***a*, as well as the nipples on distribution block **32**. The cylinders **24***a* and **24***c* and then **24** and **24***b* are operated outwardly. Each end of the mould body **3** is treated similarly. When the last operative sections of the mould form are in place the mould is complete and the adjacent edges are in register. Compressed air is retained within the

cylinders by reason of the fact that nipples 28 and 28*a*, in block 27, as well as those in block 32 contain inwardly opening check valves.

After the mould body 3 has been expanded and set up, as above described, the heaters H are warmed by connecting the socket 46 to a source of electricity by means of the electrical conduit 47. After the heaters reach the proper temperature the entire outside surface of the body 3 is then heated sufficiently to cause fluid or semi-fluid plastic to harden.

Plastic is then applied to the entire outer surface of the body 3 and while it is still tacky, or in a condition where it is apt to run to the lower part of the form, the form body is rotated by operating motor 16. Heat supplied from the heaters H and a catalyst contained in the softened plastic harden the plastic in a short time, and due to rotation during the hardening period, a smooth layer of plastic is formed on the outside of the body 3. Conduits or tubes (if desired) placed in the longitudinal grooves 40, 41, 42 and 43 on the surface of the mould body are cemented in place in the plastic sleeve or coating formed on the mould body.

When hardening is complete the mould body 3 is contracted by first moving the corner sections A and B inward and thence moving the diagonally opposite sections *x* and *y* inward. The moulded sleeve of plastic, thus formed on the body 3 may then be slid longitudinally from the form. The taper toward the right end provided by the shape of the form body 3 aids in this process. Thereafter sleeve 8 is removed from shaft 4 after loosening a collar 10 and removing sleeve 8 at this end and the entire sleeve of moulded plastic may then be completely removed from the apparatus for use, as desired.

It is to be understood that after the core has been expanded and air pressure remains in the cylinders and the fittings, it is necessary to release this air pressure through the nipple through which air was applied. To do this a blank fitting 50 is applied to the nipple. This fitting has no tube attached but has stem 50*a* which will enter the end of the nipple and hold its valve open so that the air can escape around the stem. The outside of the fitting can be expanded and contracted and when contracted will hold onto the nipple. This fitting is well known to the trade and the art and is not claimed as part of this invention. The cylinders in each case receive air which is retained until released. It is also to be noted that the various sections of the core 3, such as, for example, the section having a top portion 20*b* and a side portion 21*a*, is fitted to include the longitudinal grooves 40 and 41, respectively. When this section is moved diagonally inward there will be no interference with other parts. The joint between the end of the piston rod and the corner of the sections, as well as the other sections, is welded and held solid, as shown.

We claim:

1. A core for forming plastic tubes for ducts on its outer surface, consisting, in combination, of a tubular

core body, having a rectangular cross section, divided longitudinally into four longitudinally extending corner sections, each corner section consisting of half of one top or bottom face and half of an adjacent edge face, the longitudinal edges of the core corner sections meeting closely, and one diagonally positioned pair of core corner sections having its edges underlapping the adjacent edges of the opposite diagonally positioned pair of core corner sections, hubs having shaft bores centrally disposed in each end of said core body, four radially extending and circumferentially spaced telescoping core section supports having cylinders opening outward from said hubs, and piston rods extending outward from said cylinders and attached to the inner surface of the corner bends of each of said sections of said core; means for pneumatically operating said pistons in said cylinders inwardly to contract said core, and outwardly to expand said core to working position to receive a coating of plastic; means, including a plurality of interconnecting electrically energized heating blocks placed on the inner face of said core sections and extending longitudinally along said sections, for heating the surfaces of said sections to aid in hardening plastic spread on their outer surfaces, and means for rotatably supporting said core body including a shaft extending through the shaft bores of said hubs, movable trestles having removable bearings journalled on the ends of said shaft, and a motor attached to one of said trestles operably connected to said shaft to rotate it when desired.

2. The device as described in claim 1 wherein the core body, when the core sections are moved to expanded position, has a longitudinal taper to aid in the longitudinal removal of material placed upon and hardened on the surface of said core.

3. The device as described in claim 1, wherein the pneumatic means used to operate the cylinders on the core hub, is adapted to contract the diagonal pair of core sections having underlapping edges first and before contracting the diagonally opposite pair of corner sections, and wherein said means will expand said pairs of corner sections in reverse sequence.

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