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[54] **INJECTION DIE-CASTING MECHANISM FOR SHEATHING A CONNECTION POINT**

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[51] **Int. Cl.** **B29c 6/04**

[58] **Field of Search** 425/108, 123, 392, 242, 425/135, 137, 150; 264/261; 164/136

[56] **References Cited**

UNITED STATES PATENTS

3,004,290 10/1961 Toulmin, Jr. ..... 425/242 X

3,242,533 3/1966 Wintriss ..... 425/150 X

FOREIGN PATENTS OR APPLICATIONS

45-1049 1/1970 Japan 425/242

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[57] **ABSTRACT**

An injection die-casting mechanism for sheathing a connection point. e.g., between orientation thread and heddle in the case of Jacquard machines, whereby the sheathing takes the form of an extended piece of plastic applied by means of an injection cylinder which can be raised and lowered and by means of a subjacent matrix consisting of two half molds as well as a kinematic connection between the injection cylinder and the matrix.

4 Claims, 3 Drawing Figures

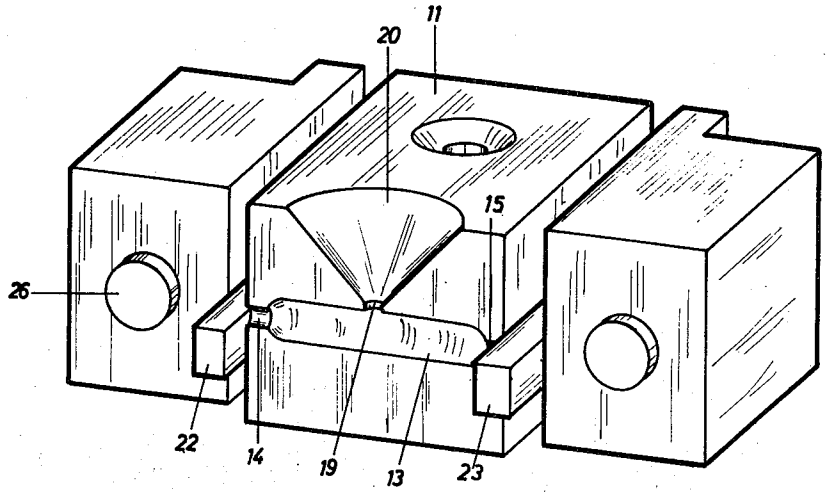


Fig. 1

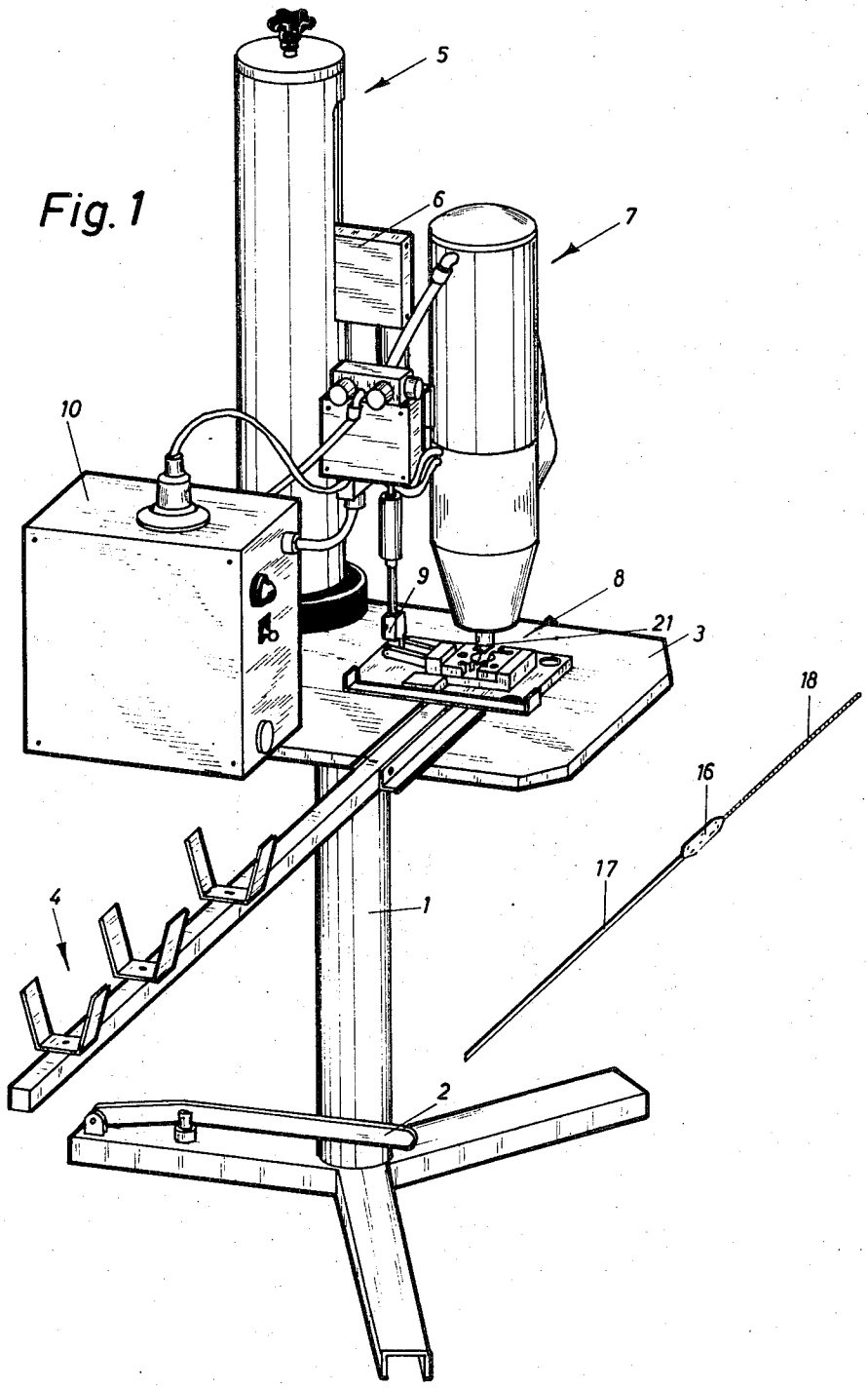


Fig. 2

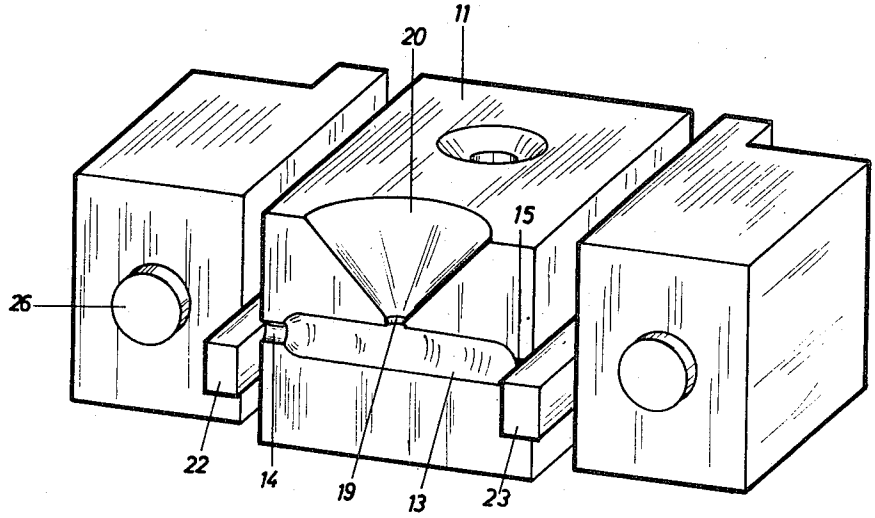
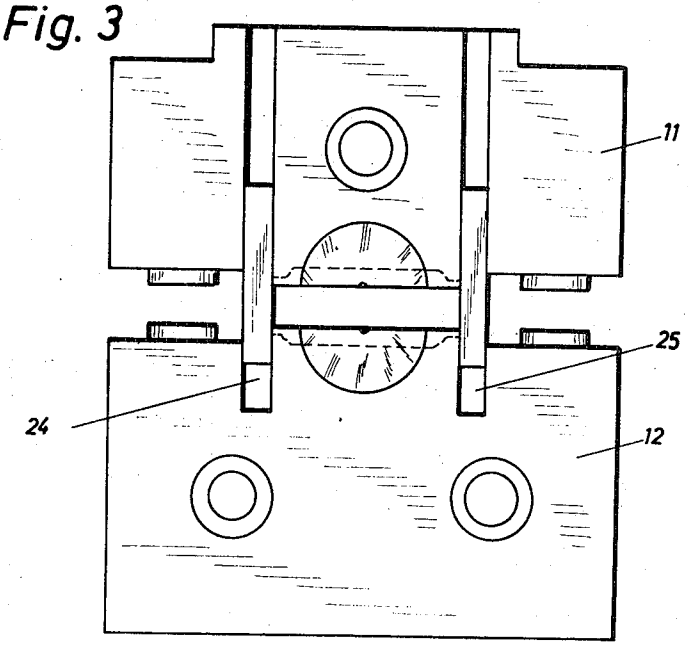


Fig. 3



INJECTION DIE-CASTING MECHANISM FOR SHEATHING A CONNECTION POINT

BACKGROUND AND SUMMARY OF THE INVENTION

East German Pat. No. 51 427 describes an injection die-casting mechanism for sheathing the connection point of crossed construction steel rods, whereby the longitudinal rods needed in the manufacture of a construction steel mat remain stationary in a certain horizontal plane while the two half molds move relative to these rods in a vertical direction. For this reason, the two half molds for each of the connection pieces are vertically movable opposite the plane of the longitudinal wires and inside their own closed frame or a closed frame used for all mold units. The problem of bedding the parts to be connected and the simultaneously occurring problem of the flawless guiding and closure of the two half molds do not appear in a familiar large machine of this type.

By contrast, the invention refers to an injection die-casting mechanism for sheathing a connection point as between orientation thread and heddle in Jacquard machines. Its basic task is to attain a flawless bedding of the strands to be connected by means of the injection die-casting mechanism and simultaneously to achieve flawless guiding and closure of the two half molds as well as a lowering of the injection cylinder.

This basic goal of the invention is achieved as follows. One half mold is movable in a horizontal plane and coupled with the injection cylinder and, in the area near the ends of the mold cavities, two rotatable sensors are set in the recesses of the opposite half mold thus bridging the gap between the separated half molds. This assures that a closure of the two half molds is possible only when the connection point is perfectly inserted in the mold cavity, whereby the guiding and closing of the two half molds is accomplished simultaneously as the perfect insertion is assured. At the same time, the descending movement of the injection die-casting cylinder is started.

Swiss Pat. No. 339 373 describes a process for applying amounts of thermoplastic material at periodic intervals to extended objects, whereby this process is conceived as a continuous operation such that the extended object is guided through the mold and the two half molds move closer and separate rhythmically. The flawless insertion of the extended object presents no problem and the machine can be controlled very simply by means of its automatic cadence.

To assure that the unit for initiating the work is switched on only when the connection point has been correctly inserted it is further suggested that both sensors be engaged to initiate the injection process.

To secure the parts to be connected located on either side of the connection point inside the mold in such a way as to prevent damage, two coordinated rubber buffers are located on each of the opposing surfaces of the half molds.

To make it possible to move along a prepared sickle side and, in so doing, to make each connection encountered, it is suggested that the mechanism be designed to be movable but with lockable wheels.

The included drawings show a version of the invention.

Specifically:

FIG. 1 shows a perspective view of a mechanism for producing the sheathing.

FIG. 2 is a diagrammatic view on a larger scale of a mold plate.

FIG. 3 is a top view on a smaller scale of the two coordinated mold plates.

In FIG. 1, 1 designates a stand which rests on the floor by means of a familiar cross-base which is equipped with rollers. One of these rollers can be either locked or raised by the illustrated lever 2, thus rendering the stand immovable. On the upper part of stand 1 is a work surface 3 which has a rail 4 in which the connections to be treated can be inserted to facilitate the operation.

The work surface 3 supports an air cylinder 5, the piston of which supports a support mechanism 6 on which a familiar (and therefore not to be discussed) injection cylinder 7 is located. By this arrangement, the injection cylinder 7 can be raised and lowered dependently of the movement of the piston in air cylinder 5.

Located below the injection cylinder is the actual mold 8, the construction of which is explained in greater detail by FIGS. 2 and 3. The injection cylinder 7 or the support mechanism 6 is connected with the movable half mold by means of a lever mechanism 9 in such a way that depending on the lowering movement of the piston along with the injection cylinder 7, the two half molds can be brought together, thus forming mold cavity 13.

10 indicates the switching and control device which contains the appropriate switching elements and circuits to assure that the individual mechanisms are activated in accord with the work cycle. Since such devices are familiar in principle, further explanation of these here would be superfluous.

The actual mold 8 consists of the two half molds 11 and 12, of which half mold 12 is movable in the version shown and so connected with lever mechanism 9 that it can be brought together with the front surface of half mold 11.

In the abutting surface of both half molds a mold cavity 13 is provided which has a long shape in accord with the desired connection point, whereby the manufacture of a long molded piece is made possible. On the two longitudinal ends of the mold cavity recesses 14 and 15 are provided which serve to accommodate the sections adjoining the connection point, e.g., the heddle and the orientation thread, and the size of which is in accord with the diameter of these parts. Such a connection point is shown in FIG. 1, whereby 16 refers to the molded piece produced, 17 to the heddle and 18 to the orientation thread. In so doing, it is, of course, possible to connect the familiar eleastic cords (not shown in the drawing) to the heddle.

The insertion of parts 17 and 18 in the recesses 14 and 15 also serves as the same time to seal the actual mold cavity 13.

Mold cavity 13 also has on its upper side an injection channel 19 which opens into a connection funnel 20 which is developed and shaped corresponding to the injection head 21 of injection cylinder 7.

On either side of the recesses 14 and 15 in half mold 11 sensors 22 and 23 are located which are shown in their rest position according to FIG. 2 and thus cover recesses 14 and 15. By introducing the parts to be connected these sensors are pushed down, thus switching

on the mechanism for initiating the operation. The sensors **22** and **23** and the dependent switch are so constructed that the machine is switched on for operation only when both sensors are depressed simultaneously and to the same extent. The sensors **22** and **23** protrude into corresponding recesses **24** and **25** of the opposite half mold, thus bridging the entire space between the two separated half molds **11** and **12.** This prevents with certainty any jamming or damage to the strands in the space between the two half molds.

Rubber buffers **26** are provided on the facing surface of both half molds **11** and **12.** These come into contact with one another and consist of soft sponge rubber and between them secure the parts to be connected, so as to eliminate unintended contact switching by raising the strands and thus also the sensors.

Corresponding to the heddle, recess **14** has a diameter of 0.9 mm, while the diameter of recess **15** is 0.6 mm to accommodate the orientation thread. The length of injection channel **19** is 1.5 mm and the diameter of the mold cavity 2 mm, while the length of the molded piece is 10.8 mm. From these dimensions the overall length of the mold can be inferred.

The mechanism operates in the following manner. By inserting the parts to be connected, e.g., a heddle **17** and an orientation thread **18** in the space between the two separated half molds **11** and **12** the sensors **22** and **23** are activated such that these are pressed downward and the heddle moves into recess **14** and the orientation thread **18** into recess **15.** In this way the connection point, e.g., a knot or other connection, is moved into the actual mold cavity. When the two sensors **22** and **23** are depressed, an appropriate switching valve of air cylinder **5** is activated, whereby the injection cylinder **7** is moved downward and, simultaneously, the two half molds **11** and **12** moved toward each other to form a seal on contact. At the same time, by introducing the actual injection head **21** into the connection funnel **20,** the injection cylinder **7** is switched on for operation. By means of a relay control or by using various piston sizes after the switching on of injection cylinder **7** has been accomplished, pressure is applied to the actual injection cylinder **7** and plastic-state material inside injection cylinder **7** is injected through the injection channel **19** into mold cavity **13,** thus forming the molded piece **16.**

By means of a time relay the duration of the injection, the temperature and other dependent factors are so regulated that after the time relay signal, i.e., after the injection operation has been completed, the switching of the air cylinder is reversed so that the piston is now moved upward, thus returning the injection cylinder **7** to its initial position and opening the half molds **11** and **12** to permit the removal of the finished molded piece **16** and the insertion of a new connection.

By sealing the recesses **14** and **15** with the piece to be connected, ridges and the like are eliminated. The only ridge which can occur may occur in the area of the injection channel **19** and in this case light finishing work is possible with no problem and with no great expenditure of time.

What is claimed is:

1. In an injection die-casting machine for sheathing a workpiece such as a connection point between the orientation thread and the heddle in Jacquard machines, said sheathing being in the form of an extended plastic piece made from plastic extruded from an injection cylinder which can be raised and lowered, said sheathing being formed in a mold comprising two half molds located beneath the injection cylinder, and a kinematic connection between the injection cylinder and the mold, the improvement comprising one of said half molds being coupled with said injection cylinder and movable thereby in a horizontal plane to provide a closable gap between said half molds, said molds having two oppositely disposed sets of recesses therein, and a pair of sensors bridging the gap and extending into said recesses, said sensors being movable by the insertion of a workpiece between said half molds to thereby signal said insertion.

2. An injection die-casting machine according to claim **1,** wherein the injection operation is initiated by the activation of both sensors.

3. An injection die-casting machine according to claim **2,** wherein coordinated rubber buffers are located on each of the opposing facing surfaces of the half molds.

4. An injection die-casting machine according to claim **3,** wherein the machine is movable with lockable wheels.

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