A drawing device with hydrodynamic lubrication, designed for drawing wires, rods, and tubes made of metals and alloys, is provided with a universal centering system, intensive cooling of the drawing dies, and visual inspection means for the seal of the drawing dies in the course of operation of the drawing device. Labyrinth-type recesses form the sealing system between the drawing dies and the pressure sleeve, which are designed for simultaneous alignment of these members against each other. A chamber is formed between the system of drawing dies and the inner surface of the body, which chamber forms a system for the cooling medium to contact directly the outer surface of drawing dies. At least one inspection opening is provided on the drawing die body.

2 Claims, 2 Drawing Figures
DRAWING DEVICE WITH HYDRODYNAMIC LUBRICATION

BACKGROUND OF THE INVENTION

The present invention relates to a drawing device with hydrodynamic lubrication designed for drawing wires, rods, and tubes made of metals and their alloys, provided with a universal centering system, intensive die cooling, and means for visual inspection of the seal of the drawing dies during their operation.

There are many known single-and-multi-die drawing machines with hydrodynamic lubrication having a tandem arrangement of drawing dies or a tandem arrangement of drawing dies and pressure sleeve, wherein the axial centering is provided by the hole in the drawing die body or the collet. The known drawing dies are cooled through the drawing die body or by a cooling system built into the body or added onto the body.

A disadvantage of the known drawing dies is the difficulty in axial alignment of tandem drawing dies, and in axial alignment of the drawing dies and the pressure sleeve in the case of a drawing machine with hydrodynamic lubrication. The drawing dies must be specially fitted by turning the outer surfaces of their mountings and of the pressure sleeve. In centering, only the cylindrical side surfaces of the drawing dies and of the pressure sleeve are capable of being engaged.

Another disadvantage of the known drawing devices is the low intensity of cooling the drawing dies and the pressure sleeve.

A fourth disadvantage of the known drawing dies systems is the impossibility of inspecting the seal between the drawing dies during their operation.

The object of the present invention is to provide a drawing die system with hydraulic lubrication which admits drawing dies into its body without the previously necessary fitting of their outer dimensions or of their conical side surfaces, with a simultaneous increase in the exactness of the central alignment of the drawing dies and the pressure sleeve.

Another object of the invention is to increase the cooling intensity of the drawing dies, and to provide for inspection of the seals of the drawing dies during their use.

The above objects are achieved by the hydrodynamically lubricated drawing die system of the present invention wherein labyrinth-type recesses are employed which form a seal system between the drawing dies and the pressure sleeve and provide simultaneous centering of the members against each other.

Centering by means of labyrinth-type recesses enables the drawing machine to be equipped with cylindrical or conical drawing dies without having to turn them from the outside, and secures their exact alignment when they are arranged in tandem configuration.

The drawing device according to the present invention has a chamber formed between the drawing die system and the inner surface of the body, which chamber, being suitably sealed, provides a system whereby the cooling medium directly contacts the outer surface of the drawing dies and removes the heat generated by the drawing operation.

The drawing device is provided with at least one inspection opening for inspection of the coolant circula-

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a longitudinal sectional view of the drawing device of the present invention.

FIG. 2 is a longitudinal part-sectional view of the drawing device of the present invention.

Referring to FIG. 1, the drawing device according to the present invention consists of drawing dies 1 and pressure sleeve 2 provided with projections 4 and recesses 3, which are partitioned with the seal 8 during the drawing operation. The drawing dies 1 and the part of the pressure sleeve 2 situated within the body 5 have diameters smaller than the inner diameter of the body chamber 5. A chamber 6 is formed between the outer surface of the drawing dies 1 together with the pressure sleeve 2. The chamber 6 contains the cooling medium which is introduced to and drained from the chamber 6 through connector pipes 10.

Referring to FIG. 2, the inspection opening 7 is fitted onto the body 5.

The drawing device of the present invention operates as described hereinbelow.

Referring to FIG. 1, the material to be drawn, in the form of wire, rod, or tube, 11, is drawn from the pressure sleeve 2 towards the drawing dies 1. The projections 4 coming into the recesses 3, between which the seal 8 is placed, form a closed system of high pressure produced by the lubricant carried on the surface of the material 11 to be drawn. The effectiveness of the seal is checked through the inspection opening fitted on the drawing die body 5. The heat generated in the process of deforming the material 11 being drawn is removed by the cooling medium supplied to the chamber 6 and is drained from the chamber through connector pipes 10. The cooling medium contacts directly with the surface of the drawing dies 1 and of the pressure sleeve 2, thus providing the most efficient cooling system. Seals 9 are provided to seal the cooling system.

The advantage of the drawing device of the present invention is its universality, as it permits the use of conventional drawing dies as working tools without the necessity of turning their side surfaces, and, simultaneously, it ensures exact axial alignment of the drawing die holes and the pressure sleeve.

We claim:

1. Apparatus for drawing wires, bars, and tubes comprising a housing containing and surrounding a pressure sleeve and drawing dies in tandem alignment with labyrinth undercuts; gaskets sealing lubricant chambers between said drawing dies and (a) said pressure sleeve; an internal chamber for water cooling of said drawing dies and said pressure sleeve wherein labyrinth sealing undercuts are the only means for centering the tandem alignment of said drawing dies and said pressure sleeve, and wherein said internal chamber extends the axial length of said drawing dies and said pressure sleeve and is formed by internal walls of said housing, by external cylindrical surfaces of said drawing dies, and by the external cylindrical surface of said pressure sleeve.

2. Apparatus of claim 1 wherein the housing is equipped with an inspection window situated in front of said labyrinth undercuts.

* * * * *
UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,879,973 Dated April 29, 1975
Adam Godyn; Tadeusz Prajsnar; Jozef Rulinski;
Inventor(s) Leopold Sikora; Roman Wusatowski; Edward Zglobicki

It is certified that error appears in the above-identified patent
and that said Letters Patent are hereby corrected as shown below:

In the heading of the patent, line 12 change "Aug. 1, 1972"
to --June 8, 1972--.

Signed and Sealed this
twenty-first Day of October 1975

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks