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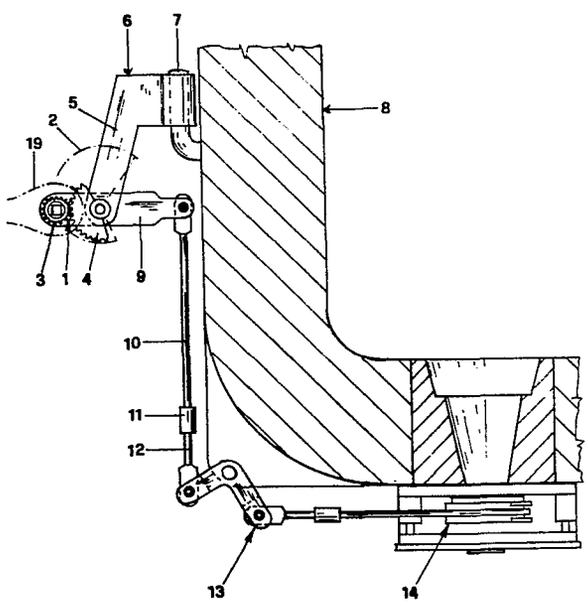
(54) Manual operating device for ladle type sliding gate.

(57) A manual operating device for ladle type sliding gate comprises a reversible advancing ratchet gear (17) which is moved by a rod (19) and which operates the movable plate of a closing device by means of a mechanism (1), with a toothed sector (4), and a lever system (12, 13).



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MANUAL OPERATING DEVICE FOR LADLE TYPE SLIDING GATE

This invention relates to a manual operating device for ladle type sliding gate.

Well-known are ladle type sliding gates which comprise a fixed plate, applied to the pouring container of the ladle and a parallelly movable plate with respect to the fixed plate. Each of the plates are provided with a hole and in a certain reciprocal position the two holes are coaxial and allow the pouring to be carried out.

In order to ensure the sealing of the discharger when the two holes are not corresponding it's necessary that the movable plate is kept forcedly adherent to the fixed plate, and this implies too higher stresses for the workman to carry out manual movement.

In order to overcome this problem, manual operating devices based essentially on the principle of reducing in one way or another the strain which the workman has to carry out in order to cause shifting of the movable plate, have been proposed.

A well-known operating device comprises a system of levers which are run by the workman and which have effect on the movable plate. A drawback of this device consists in that, notwithstanding the system of levers, running of the movable

of movement for the workman.

Another object of the invention is to realize a device that can be angularly oriented and which allows the workman to place himself in a most favourable and secure position.

Another object of the invention is to realize a device which allows quick running reverse of the movable plate of the discharger for optimal regulation of the pouring flow.

Lastly, another object of the invention is to realize a device which allows a quick removal of the moving rod in the case of an emergency.

The invention, as characterized in the claims, allows to attain these objects. It consists in a manual operating device for ladle type sliding gate comprising a reversible advancing ratchet gear which operates, through a stress reducer, the movable plate of a closing device.

Always according to the invention, the advancing ratchet gear can be housed in a head placed at the end of an operating rod, movably connected to the stress reducer.

Advantageously, the stress reducer can comprise a mechanism, formed by a pair of toothedwheels and a lever system operated by the larger diameter toothedwheel.

Also, advantageously, the ratched gear can be provided with an inversion advancement device, which is operated by axial

the other end.

The 10 is connected, by a hinged joint 11 to a further operating rod 12 of a lever system 13, which causes horizontal running of the sliding gate 14 of closing the hole of the ladle pouring seat 8.

The toothedwheel 3 has a square hole 15 for the insertion of a corresponding square key 16 provided on the advancing ratched gear 17 housed on a head end 18 of an operating rod 19. The said ratched gear 17 is of reversible type and its inversion is actuated by a small lever 20 which is mounted on the head 18 of the rod 19 and engaged with the prongs of a fork 21 fixed to the stem 22 of the rod 19, which can axially rotate with respect to the head 18.

The device according to the invention operates as follows: when the melted metal is ready to be discharged from the ladle 8 in the underlying ingot mold, the workman inserts the square key 16 of the ratched gear 17 in the corresponding hole 15 of the toothedwheel 3 and turns the support 6 with respect to the vertical pin 7 in the angular position which he finds most favourable and secure. Thus, reciprocating the rod 19, he operates the ratched gear 17. This reciprocation of the rod 19 in one direction causes the toothedwheel 3 rotate, but in the opposite direction carries

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CLAIMS

1. Manual operating device for ladle type sliding gate characterized in that it comprises a reversible advancing ratchet gear (17) which operates, through a stress reducer (1), the movable plate of a closing device.

2. Device according to claim 1 characterized in that the advancing ratched gear (17) is housed on a head (18) placed at the end of the operating rod (19) movably connected to the stress reducer (1).

3. Device according to claims 1 and 2 characterized in that the stress reducer (1) comprises a mechanism formed by a pair of toothedwheels (3,4) and a lever system (12,13) operated by the larger diameter toothedwheel (4).

4. Device according to claim 1 characterized in that the ratched gear (17) is provided with an advancement inversion device, operated by axial rotation of the rod (19) with respect to its head (18).

5. Device according to claims 1 and 4 characterized in that the inversion device is operated by a small lever (20) moved by a fork (21) integral to the stem (22) of the rod (19).

6. Device according to claims 1 and 3 characterized in that

in the centre of the toothed sector (4) there is a jointed fork element (9) which at one end supports the toothedwheels mechanism (1) jointed at the other end a rod (10) which is connected to a lever system (13).

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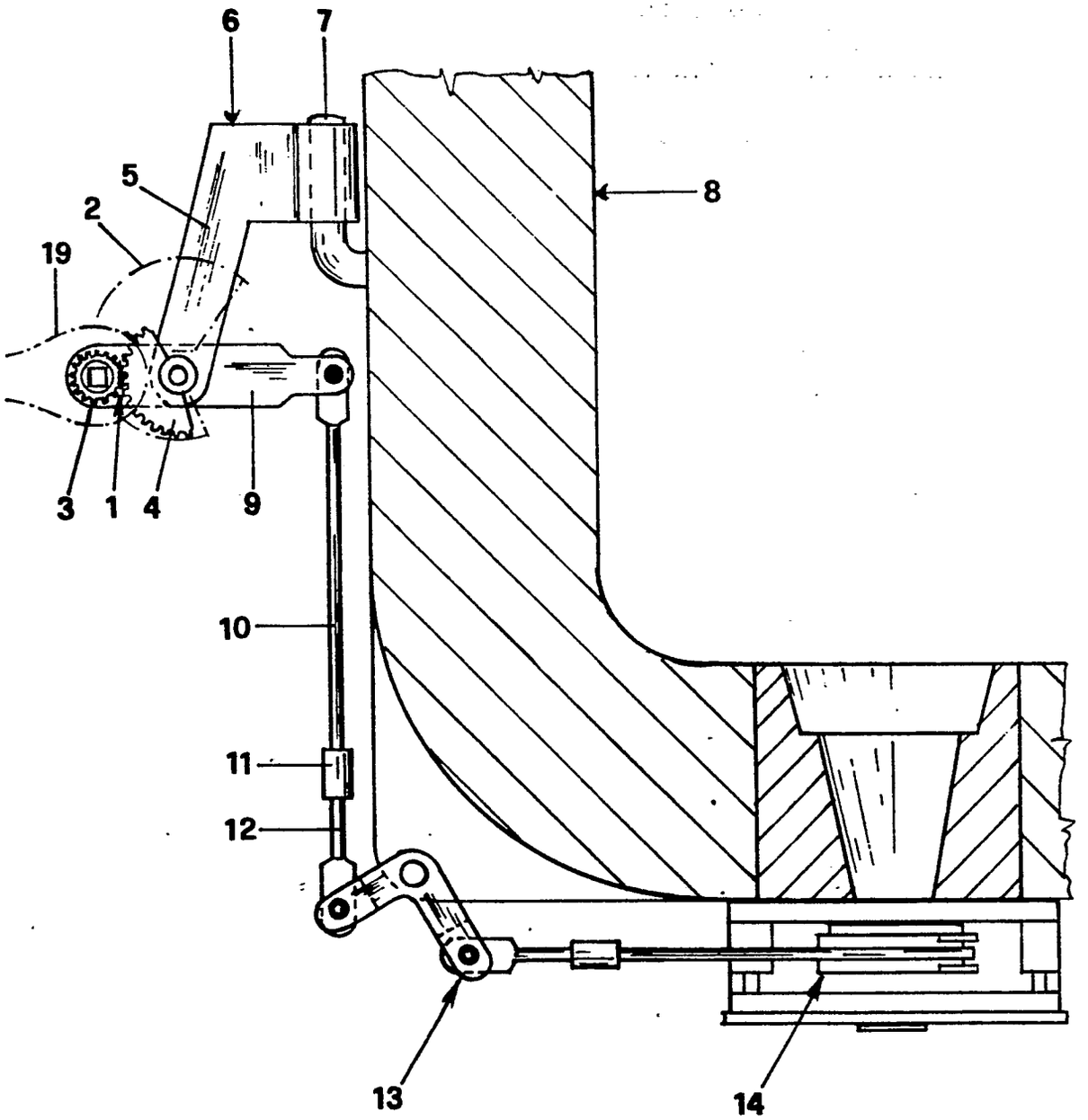
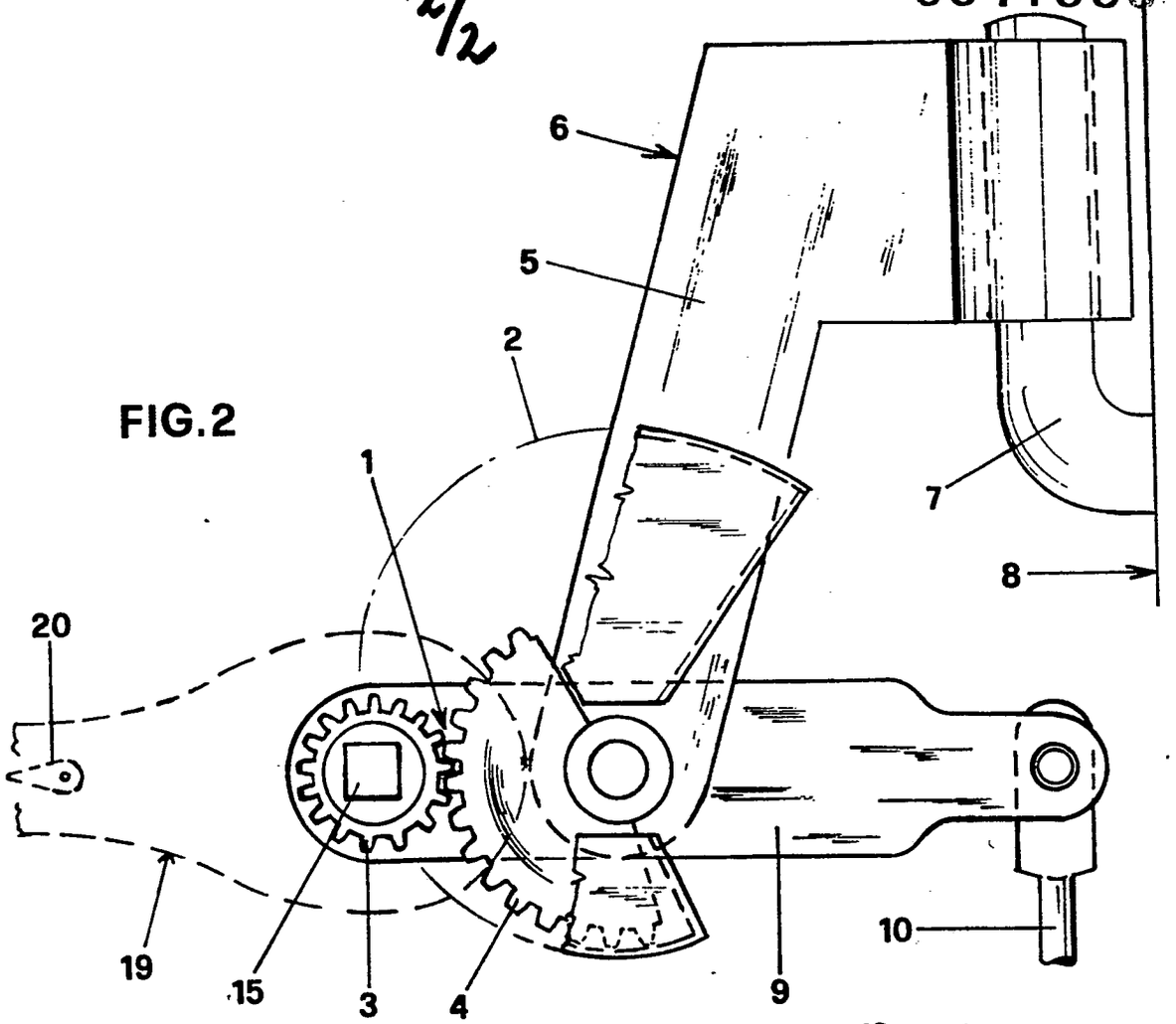


FIG. 1

FIG.2



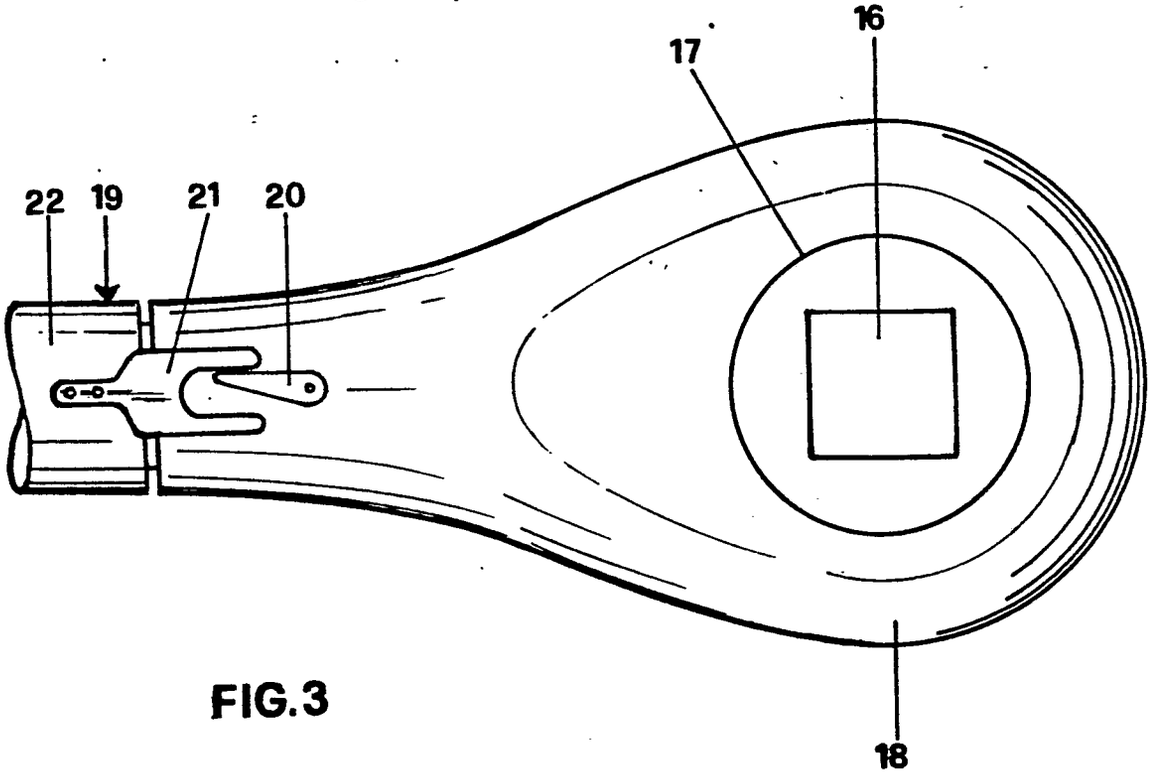


FIG.3

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European Patent Office

Application number
EP 81 20 0829

EUROPEAN SEARCH REPORT

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
	FR - A - 2 380 834 (USS ENGINEERS) * figure 1; page 6 *	1-6
	FR - A - 2 420 388 (VESUVIUS) * figures; claims *	1
	IRON AND STEEL, vol. 43, no. 2, April 1970, J.D. SHARP: "LADLES-Essential steel plant equipment.. Part III-teeming control techniques", pages 85-89 * page 87, right-hand column, last paragraph to page 84, left-hand column, first paragraphe *	1
	FR - A - 2 259 670 (GREGOIRE) * the whole content *	1
	US - A - 1 441 340 (GOLDBERG) * the whole content *	1
A	US - A - 2 138 331 (FERRARI)	
A/D	IT - A - 983 505 (ACCIAIERIE E FERRIERE)	

CLASSIFICATION OF THE APPLICATION (Int. Cl.³)

B 22 D 41/08
B 25 B 13/46

TECHNICAL FIELDS SEARCHED (Int. Cl.³)

B 22 D
B 25 B

CATEGORY OF CITED DOCUMENTS

X: particularly relevant
A: technological background
O: non-written disclosure
P: intermediate document
T: theory or principle underlying the invention
E: conflicting application
D: document cited in the application
L: citation for other reasons

&: member of the same patent family, corresponding document

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	01.12.1981	OBERWALLENEY