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(54) MOULDING MACHINE FOR BRICKS OR THE LIKE.

(57) A moulding machine for bricks or the like, wherein moulding is accomplished by filling raw material for the bricks in a mould (1) and moulding the material between upper and lower plungers (2,3) applied with pressure. A mould base (4) has a U-shaped configuration opened at its front side. The moulding machine is so assembled that when the mould (1) is raised, its cross section taken through a collar will not interfere with the cross-section of the mould base (4), whereby the mold (1) and the upper and lower plungers (2,3) are assembled. The assembly is free to telescope through the opening of the base (4). Thus, the moulding machine allows mould exchange to be effected more rapidly and more accurately than with the conventional moulding machine.

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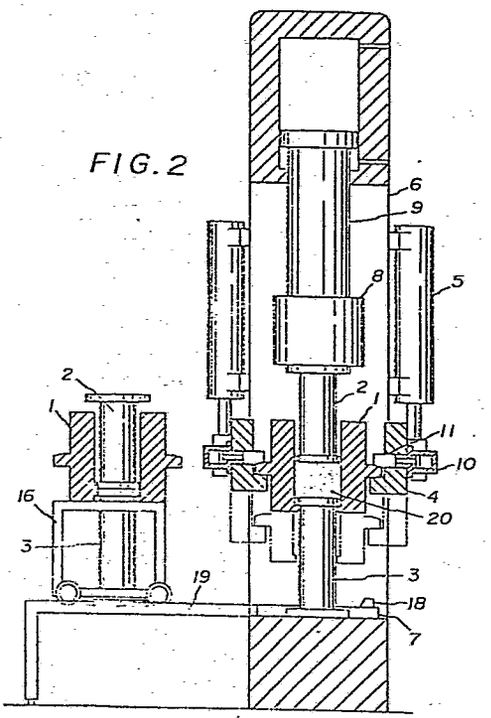
FIG. 2



Brick Forming Machine

This invention relates to a forming machine for bricks, etc.

The invention provides a new concept in reducing the excessively long time required for changing metallic molds in the conventional brick forming machines in order to achieve higher efficiency in brick production.

Technical Background

In a conventional brick forming machine, the metallic mold sits on the metallic mold support and receives the brick material into its inside. The upper plunger is driven by the hydraulic cylinder placed on the upper center of the machine to press the brick material in the metallic mold between itself and the stationary lower plunger. The metallic mold support is driven by the hydraulic cylinders mounted on the right and left columns of the machine to fasten the metallic mold while the brick is being pressed.

Everytime formed bricks are changed in their shape or size, the metallic mold, upper and lower plungers have to be changed. While they are changed, the forming operation is interrupted, and the time meeded for the change is long. The production efficiency is, therefore, low in general with the conventional brick forming machines.

Disclosure of Invention

In the present invention a new technical concept for the

forming machines for bricks, etc. is presented, in which a combination of metallic mold and upper and lower plungers with a certain dimension can be together rapidly put into the metallic mold support and also withdrawn to introduce into the metallic mold support a new different combination of metallic mold and upper and lower plungers.

The forming machine for bricks, etc. according to the invention is described in detail by way of embodiments of the invention.

Fig. 1 is the partially cross-sectional elevation of an embodiment of the invention;

Fig. 2 is the side elevation of another embodiment with also partial cross-section;

Fig. 3 is the cross section of Fig. 1 on the line III-III;

Fig. 4 is the persepctive view of the whole metallic mold support; and

Fig. 5 is the plan view of the metallic mold transfer truck.

In Fig. 1, Fig.2 and Fig. 3, the metallic mold (1) receives brick material thrown into it and it sits on the metallic mold support (4). The upper plunger (2) is driven by the hydraulic cylinders (9) mounted on the upper frame of the machine through the pusher block (8) to press the material downwards in the metallic mold (1) between itself and the lower plunger (3) that is stationary. There are the holes (13) in the bottom face of the metallic mold support (4), and the protruding pins (12) of the

metallic mold fit into the holes (13) to position the metallic mold (1) properly. In the embodiment of Fig. 2 there are two pairs of wedges (11) provided in front of and at the back of the metallic mold (1). Those wedges are driven by the hydraulic cylinders (10) to advance and retreat. When they advance and engage the inclined faces of the protrusions on the front and rear sides of the metallic mold (1), they fix it by pressing it down.

In the embodiments of the invention in Fig. 1 and Fig. 2, the metallic mold (1), metallic mold support (4) and plungers (2) and (3) are of such dimension as to form a group of components fitted together, and they are as a whole placed in and out of the metallic molds support (4) rapidly as described below, which saves time wasted for changing the metallic mold (1) and plungers (2) and (3) in the conventional forming machines for bricks, etc.

In a preferred embodiment of the invention, the metallic mold support (4) is shaped a square frame with its one side open like the letter U laid flat on its face. The metallic mold (1), upper and lower plungers (2) and (3) forming a combination of componetns are put together beforehand in the operation of the machine and they are placed inside the metallic mold support (4), and after the forming operation they are withdrawn through the opening. At the position of the metallic molds support (4) as shown by the broken lines in Fig. 1, the protrusions of the metallic mold (1) are above it and the upper and lower plungers (2) and (3) which have in common the center line of the metallic mold (1) and the

metallic mold (1) can freely move on the transfer truck (16) in the direction taht is perpendicular to the sheet of paper of the figure. When the metallic mold support (4) is raised, the bottom flange of the metallic mold support (4) will contact the protrusions of the metallic mold (1).

On the other hand in Fig. 1 and Fig. 2 the transfer truck (16) has the upward protruding pins (15), and they fit into the holes (14) of the metallic mold (1) to position it correctly. The lower end of the transfer truck (16) has rollers (17), which rolls back and forth on the transfer rails (19) and the positioning rails (7). The transfer truck is also shaped as shown in Fig. 5 like the letter U laid flat on its face to give an opening for the lower plunger (3) to pass through.

According to the construction of the preferred embodiments in Fig. 1 and Fig. 2 and above described, the metallic mold (1) and the upper and lower plungers (2) and (3) to replace the old ones move on the transfer truck (16) through the openining of the U-shaped metallic mold support (4) into the metallimc mold support (4) and their center line is aligned with the center line of the metallic mold support (4) and the transfer truck (16) stops at the correct position by the stopper (18) placed on the positioning rails (7).

Next, the metallic mold support (4) is raised by the hydraulic cylinders (5). In the ascending of the metallic mold support (4) the engagement of the pins (12) and the holes (13) guides the

protrusions of the metallic mold (1) to place it correctly on the metallic mold support (4). With further ascending of the metallic mold support (4), the metallic pattern (1) and the upper and lower plungers (2) and (3) are lifted off the transfer truck (16), and the truck (16) is shifted to the left in Fig. 2 to be out of the machine.

The metallic mold (1) on the support (4) is fastened to it by the advance of the hydraulic cylinders (10) and wedges (11), and after this the metallic mold support (4) is lifted up to mount the upper plunger (2) on to the pressure block (8). Then the metallic mold support (4) is lowered until the bottom of the lower plunger hits the bottom face of the frame (6). With the lower plunger (3) on the frame (6), the former is fixed on the latter with the bolts, etc. This concludes the installation of a new metallic mold and the plungers. The removal of the metallic mold (1) out of the machine follows the steps as described above for the installation of a new one in the reverse order.

It can be easily seen that it is not an easy task to move the metallic molds (1) and upper and lower plungers (2) and (3) individually avoiding interference of the body of the machine and to position them correctly at the prescribed places. On the other hand the merits listed below are obtainable according to the invention:

1. The metallic pattern and the upper and lower plungers are

assembled with their center lines in alignment at a place out of the machine.

2. Positioning of the metallic mold and upper and lower plungers can be effected automatically and accurately.

3. The fastening with bolt the upper and lower plungers to the frame is simple.

It will be apparent from the above description that the invention provides a forming machine for bricks, etc. and its benefits realized in actual operation are epoch making.

CLAIM:

A forming machine for bricks, etc. comprising the metallic mold for receiving their material, the up-and-down going metallic mold support which supports said metallic mold, and the upper and lower plungers which press and form said material between them in said metallic mold, characterized in that said metallic mold support is shaped the letter U laid flat on its face to have one of its four sides opened, and the metallic mold in which the upper and lower plungers are slidably fitted in can freely go through said opening in and out of alignment with the center line of said metallic mold.

FIG. 1

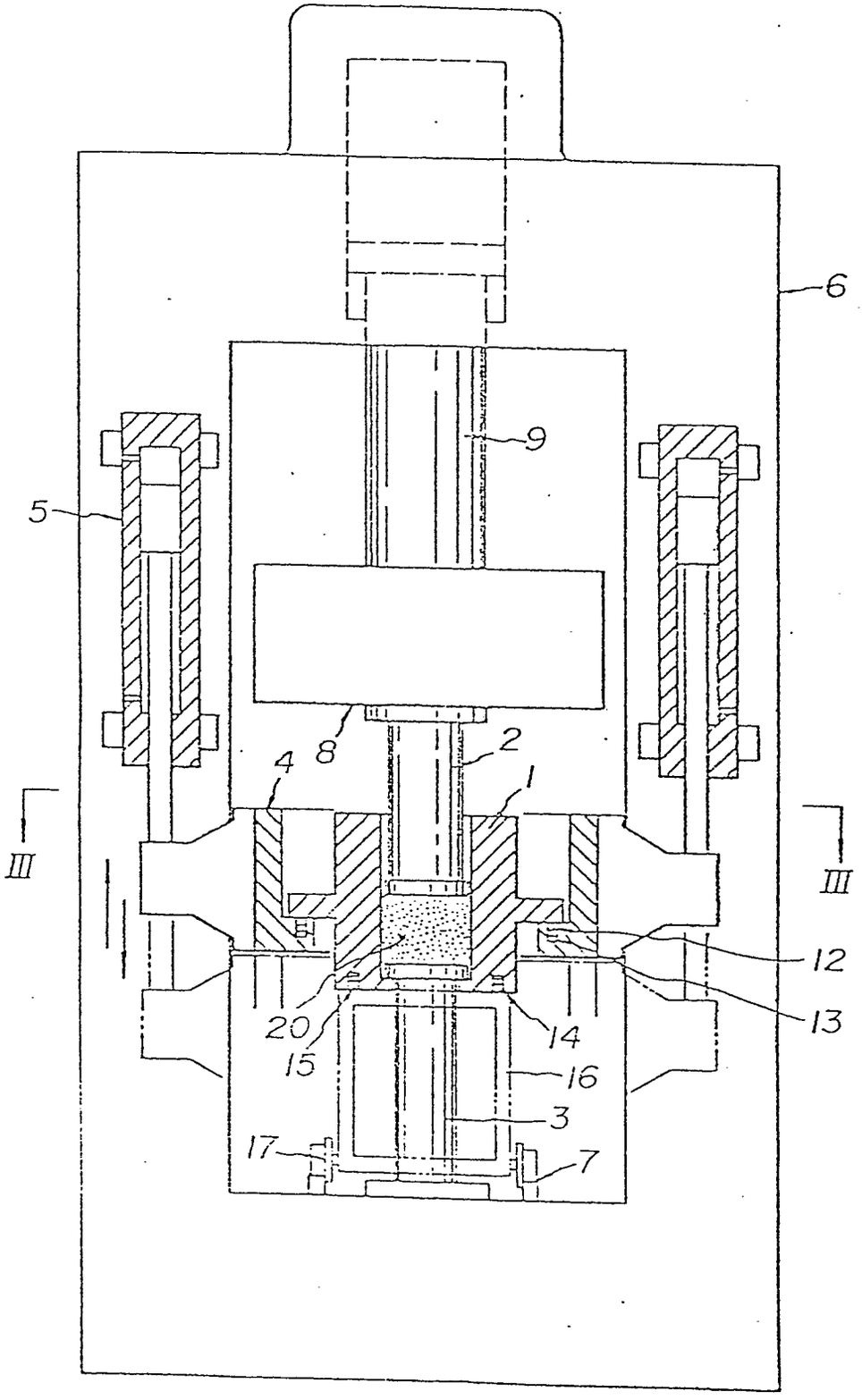


FIG. 2

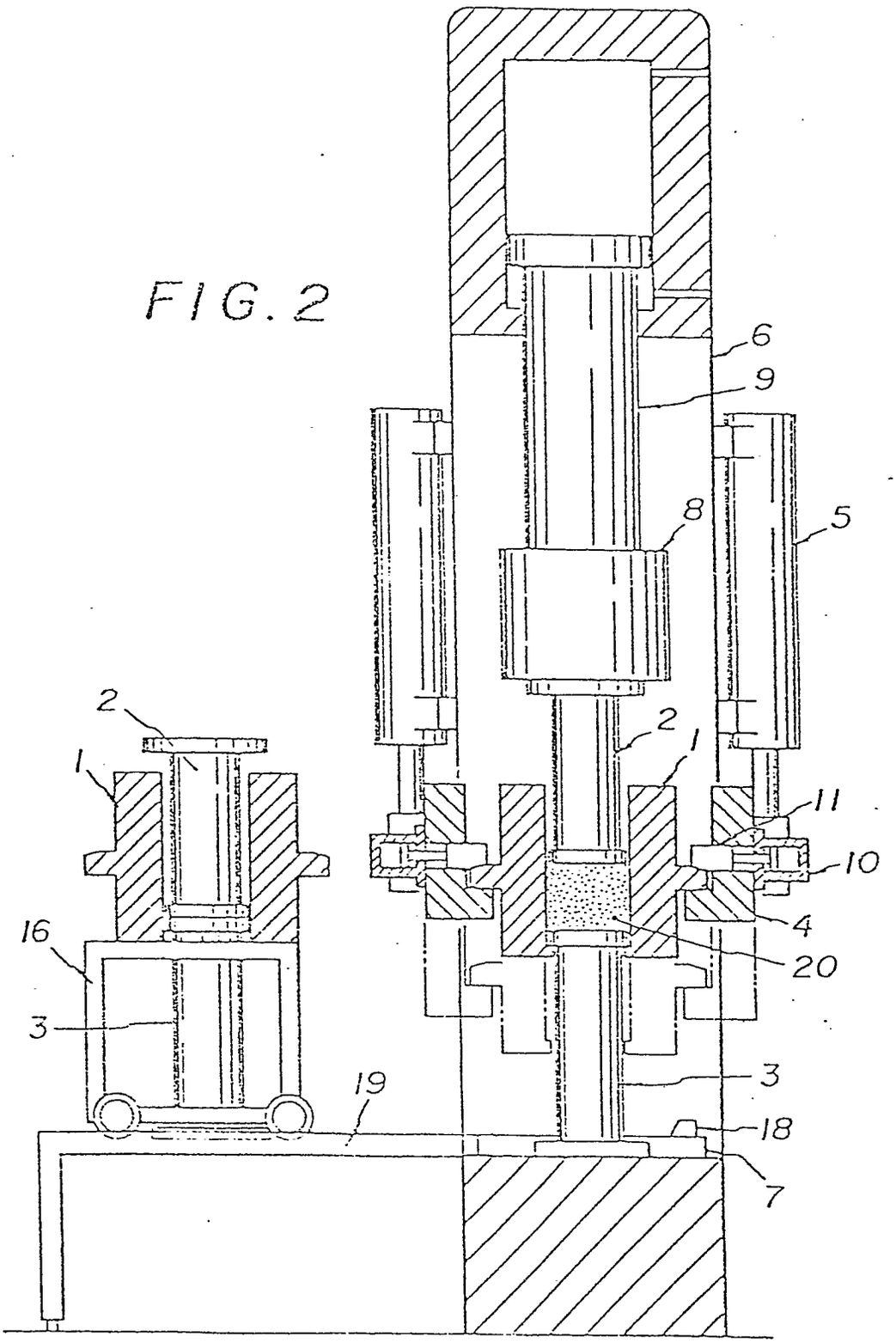


FIG. 3

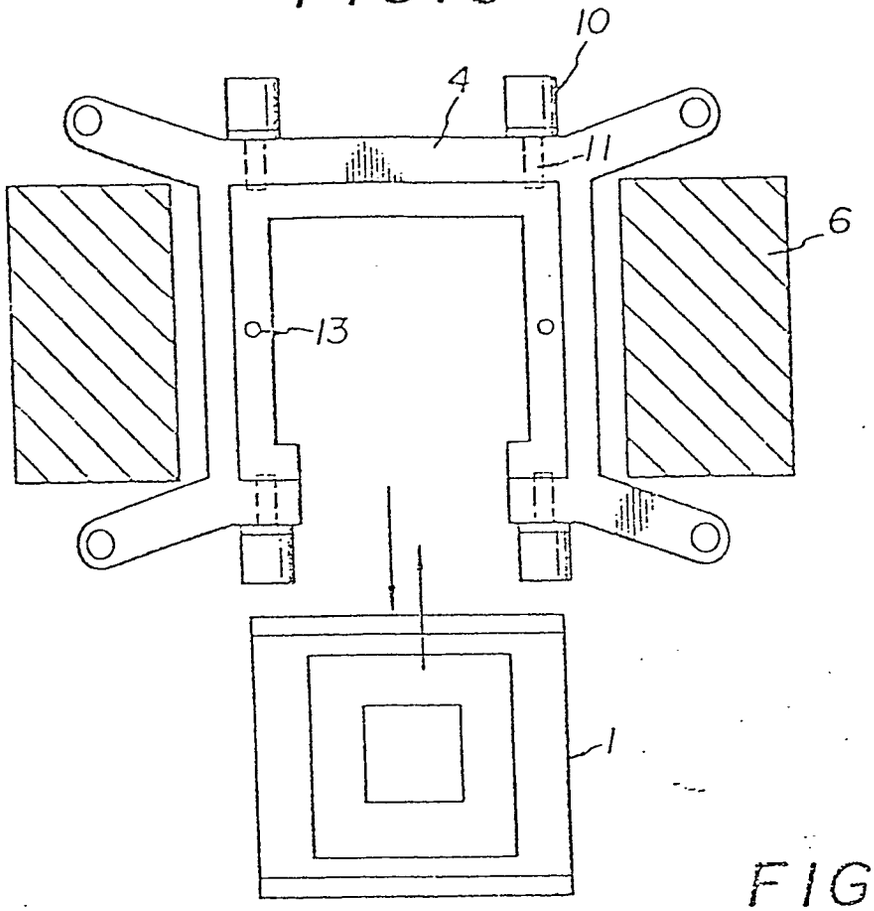


FIG. 5

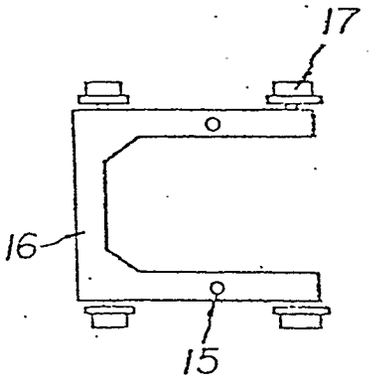
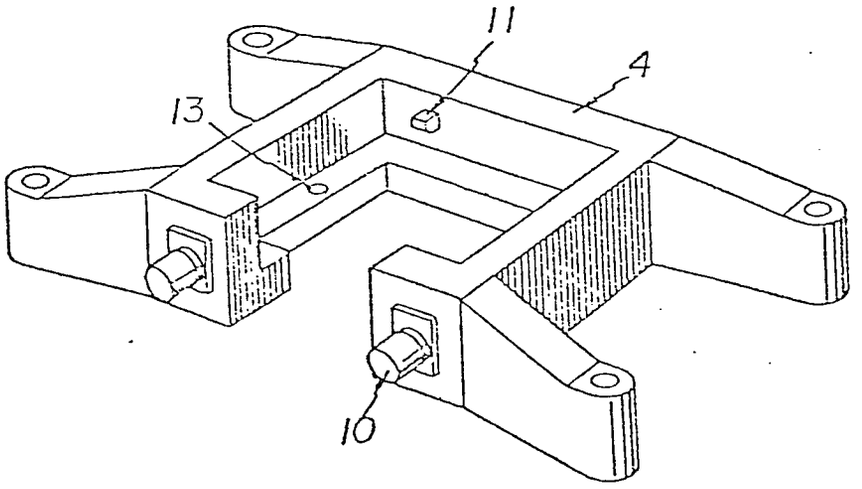


FIG. 4



INTERNATIONAL SEARCH REPORT

International Application No PCT/JP79/00324

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [3]

According to International Patent Classification (IPC) or to both National Classification and IPC

Int. Cl.[3] B28B 3/02

II. FIELDS SEARCHED

Minimum Documentation Searched [4]

Classification System	Classification Symbols
IPC	B28B3/00, 3/02, 3/04, 3/06, 3/08, 3/10, B30B11/00, 11/02, 11/04, 11/06, 15/00, 15/02 B21D37/04, 37/14 B22F3/00, 3/02, 3/04, 3/06, 3/08

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched [6]

Jitsuyo Shinan Koho 1920 - 1979

Kokai Jitsuyo Shinan Koho 1971 - 1979

III. DOCUMENTS CONSIDERED TO BE RELEVANT [14]

Category *	Citation of Document, [16] with indication, where appropriate, of the relevant passages [17]	Relevant to Claim No. [18]
A	US, A, 3,335,657 1967-8-15 The Minster Machine Company	1
A	US, A, 3,794,458 1974-2-26 Mitsuishi Fukai Tekkosho, Ltd.	1
A	US, A, 4,140,449 1979-2-20 Yoshizuka Seiki Co., Ltd.	1
A	JP, A, 48-31567 1973-4-25 Hitachi Shipbuilding & Engineering Co.,Ltd.	1
A	JP, Y2, 52-42132 1977-9-24 Aida Engineering Kabushiki Kaisha	1

* Special categories of cited documents: [15]

"A" document defining the general state of the art

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but on or after the priority date claimed

"T" later document published on or after the international filing date or priority date and not in conflict with the application, but cited to understand the principle or theory underlying the invention

"X" document of particular relevance

IV. CERTIFICATION

Date of the Actual Completion of the International Search [2]	Date of Mailing of this International Search Report [3]
April 14, 1980 (14.04.80)	April 21, 1980 (21.04.80)
International Searching Authority [1]	Signature of Authorized Officer [20]
Japanese Patent Office	