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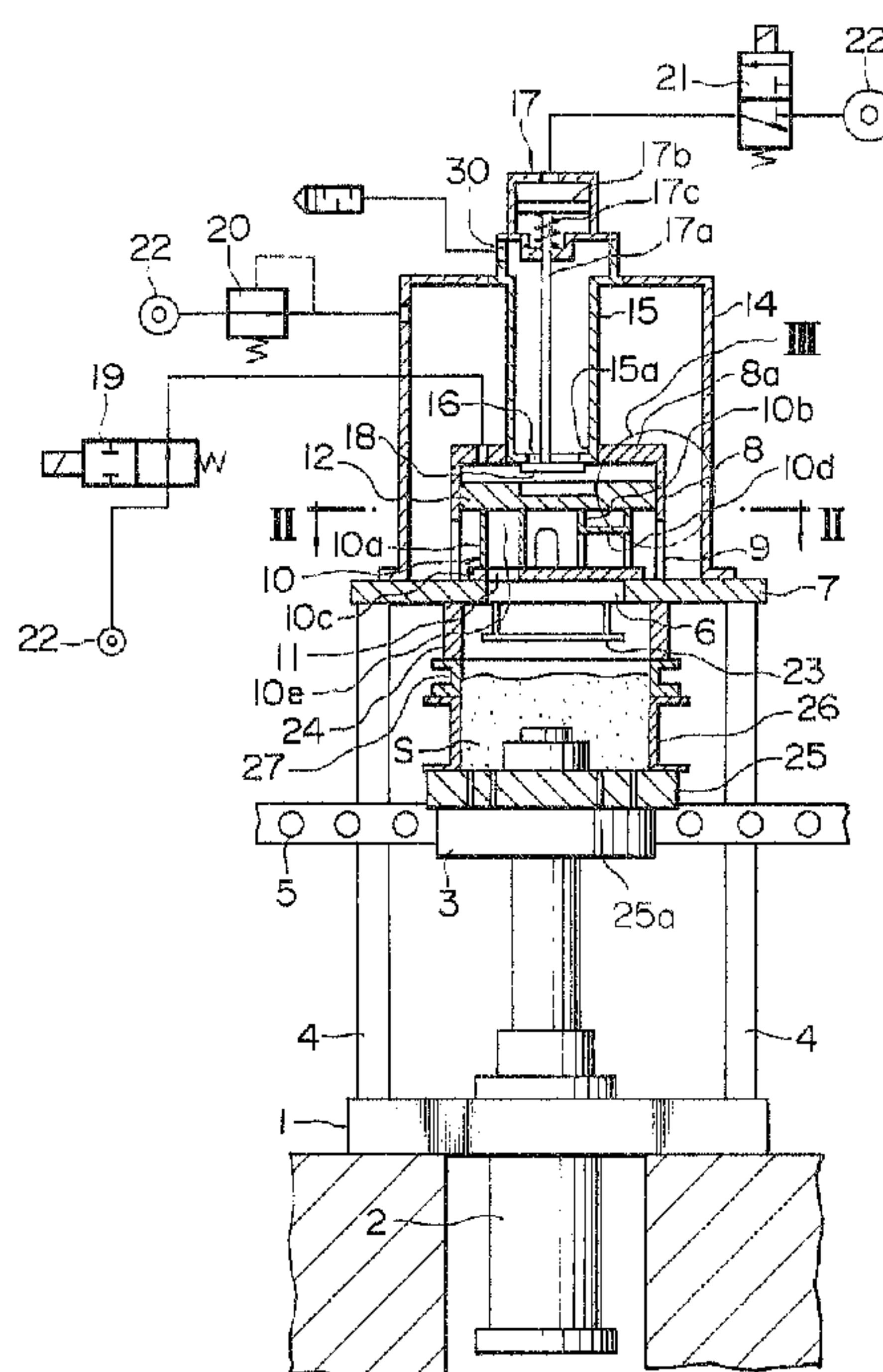
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(54) Titre : SOUFFLEUR D'AIR COMPRIME POUR APPAREIL DE MOULAGE EN SABLE VERT

(54) Title: COMPRESSED AIR BLOWING APPARATUS FOR USE IN GREEN SAND MOLD MOLDING FACILITY



(57) Abrégé/Abstract:

A compressed air blowing apparatus for supplying compressed air to molding sand placed in a flask is arranged in such a manner that its compressed air reservoir tank is constituted by a surface-plate frame and a cover, the frame having a compressed-air cutlet part which can be opened/closed by a sectioning device and a piston which can be vertically moved. The sectioning device is constituted by concentrically disposed large and small cylindrical members by a cover member secured to the large and small cylindrical members having air feed holes formed between said large cylindrical member and said small cylindrical member and by connecting duct for communicating the outside of the cylindrical member with the inside of the small cylindrical members. As an alternative to this, the sectioning device is composed of a cylindrical member extending vertically and having a spur-like cross-sectional shape and a cover member hermetically secured to the lower end portion of the cylindrical member and having a spur-like air feed hole communicated with an inside space of the cylindrical member. When the piston is moved upwards, compressed air in the compressed air reservoir tank is quickly discharged by a large quantity through the outlet port via the sectioning device.



ABSTRACT OF THE DISCLOSURE

A compressed air blowing apparatus for supplying compressed air to molding sand placed in a flask is arranged in such a manner that its compressed air reservoir tank is constituted by a surface-plate frame and a cover, the frame having a compressed-air outlet port which can be opened/closed by a sectioning device and a piston which can be vertically moved. The sectioning device is constituted by concentrically disposed large and small cylindrical members by a cover member secured to the large and small cylindrical members having air feed holes formed between said large cylindrical member and said small cylindrical member and by connecting duct for communicating the outside of the cylindrical member with the inside of the small cylindrical members. As an alternative to this, the sectioning device is composed of a cylindrical member extending vertically and having a spur-like cross-sectional shape and a cover member hermetically secured to the lower end portion of the cylindrical member and having a spur-like air feed hole communicated with an inside space of the cylindrical member. When the piston is moved upwards, compressed air in the compressed air reservoir tank is quickly discharged by a large quantity through the outlet port via the sectioning device.

1 BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

The present invention relates to an apparatus for quickly blowing a large quantity of compressed air to the surface of molding sand for use in a green sand mold molding facility in such a manner that compressed air is blown to the surface of the molding sand present in a mold flask to penetrate the molding sand before compressed air is discharged from a pattern plate so as to previously compress the molding sand before the molding sand is further compressed.

RELATED ART STATEMENT

A green sand mold molding facility has been disclosed in Japanese Utility Model Laid-Open No. 1-80247. According to this disclosure, the green sand mold molding facility is arranged in such a manner that a cover member and a compressed air reserving tank having a compressed air outlet on the bottom plate thereof are disposed above a table for lifting a pattern plate on which a flask is placed. Furthermore, the above-described outlet is arranged in such a manner that it is opened/closed by a valve which is moved upwards/downwards when an air pressure cylinder performs extension/retraction of its piston rod. In addition,

1 molding sand is injected into the flask before the upper
end opening formed in the flask is closed by a cover
member and as well as the tank is positioned on the
cover member before the air pressure cylinder is
5 operated to open the outlet formed in the bottom plate
of the tank. As a result, compressed air in the tank is
blown to the flask via the cover member to compress the
molding sand and as well as penetrate the molding sand
before the compressed air is discharged from the pattern
10 plate. Then, compaction is performed by using a squeeze
plate to compact and solidify the molding sand so that
the green sand mold is molded.

In a green sand mold molding facility of the
above described type, a large quantity of compressed air
15 must be quickly blown to the molding said placed in the
flask. However, since the air pressure cylinder is
communicated with a compressed air source via pipes, a
switch valve and the like, the resistance caused by a
residual compressed air which is inevitably present in
20 the conduit and the inherent resistance of the pipe line
causes, at the time of the operation of the air pressure
cylinder, the operational speed to be lowered. As a
result, the outlet cannot be opened at high speed to
quickly blow the large quantity of compressed air,
25 causing a problem in that the green sand mold molding
facility cannot exhibit a high molding performance.

It is preferable that compressed air is
introduced from the compressed air tank into the flask

1 via a large-diameter cylindrical member. In order to
achieve this, a large-diameter opening/closing valve
must be provided for the cylindrical member to operate
the opening/closing valve at a high speed. In order to
5 operate the above-described opening/closing valve,
excessively large power source must be provided.
Furthermore, if a small gap is formed between the
opening/closing valve and its seating portion at the
time of initiation of the valve opening operation,
10 compressed air is undesirably introduced through the
above-described gap into the flask. Therefore, there
arises another problem in that compressed air blown into
the flask cannot be diffused equally and thereby the
molding sand cannot be compacted down uniformly.

15 SUMMARY OF THE INVENTION

Accordingly, an object of the present
invention is to provide an apparatus capable of quickly
blowing a large quantity of compressed air into a flask
placed on a pattern plate and accommodating molding
20 sand.

According to one aspect of the present
invention, there is provided a compressed air blowing
apparatus including: a frame having an air outlet port
formed for supplying compressed air into a flask; a
25 cylindrical sectioning device disposed on said frame,
having, in an end portion thereof, an air feed hole
communicated with said air outlet port and having, in

1 another end portion thereof, an opening communicated
with said air feed hole; a cylinder disposed on said
frame to surround said sectioning device; a piston
capable of sliding in said cylinder; a first compressed
5 air supply device having a compressed air reservoir tank
for supplying compressed air to a first chamber which is
formed on one side of said piston in said cylinder and
in which said sectioning device is disposed; a second
compressed air supply device for urging said piston to
10 hermetically close said opening by supplying compressed
air to second chamber formed on the other side of said
piston in said cylinder; an exhaust hole for communicat-
ing said second chamber with the outside; and a valve
for opening/closing said exhaust hole whereby, when said
15 valve opens said exhaust hole, said piston pushed by
compressed air supplied from said first compressed air
supply device slides to open said opening and thereby
compressed air supplied from said first compressed air
supply device is introduced into said sectioning device
20 through said opening before it is blown into said flask
through said outlet port, characterized in that: a large
and a small cylindrical members concentrically disposed
and included in said sectioning device, wherein said
opening is defined as an annular opening by end portions
25 of said cylindrical members and including a plurality of
connecting ducts which establish a communication between
the outside of said large cylindrical member and the
inside of said small cylindrical member and which extend

1 in the radial direction, whereby compressed air supplied
from said first compressed air supply device is
introduced into said opening from both the outside of
said large cylindrical member and the inside of said
5 small cylindrical member when said piston slides away
from said opening.

According to another aspect of the present
invention, there is provided a compressed air blowing
apparatus including: a frame having an air outlet port
10 formed for supplying compressed air into a flask; a
cylindrical sectioning device disposed on said frame
and, having, in an end portion thereof, an air feed hole
communicated with said air outlet port and having, in
another end portion thereof, an opening communicated
15 with said air feed hole; a cylinder disposed on said
frame to surround said sectioning device; a piston
capable of sliding in said cylinder to hermetically
close said opening formed in said sectioning device; a
first compressed air supply device having a compressed
20 air reservoir tank for supplying compressed air to a
first chamber which is formed on one side of said piston
in said cylinder and in which said sectioning device is
disposed; a second compressed air supply device for
urging said piston to hermetically close said opening by
25 supplying compressed air to a second chamber formed on
the other side of said piston in said cylinder; an
exhaust hole for communicating said second chamber with
the outside; a valve for opening/closing said exhaust

1 hole whereby, when said valve opens said exhaust hole,
said piston pushed by compressed air supplied from said
first compressed air supply device slides to open said
opening and thereby compressed air supplied from said
5 first compressed air supply device is introduced into
said sectioning device through said opening before it
is blown into said flask through said outlet port,
characterized by a cylindrical member an end portion of
which defined said opening and which is provided in
10 said sectioning device, wherein said cylindrical member
has a plurality of troughs extending in an axial
direction thereof and arranged in its circumferential
direction, said troughs projecting inwardly.

Other and further objects, features and
15 advantages of the invention will be apparent more fully
from the following description.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a front elevational cross-sectional
view which illustrates a first embodiment of the present
20 invention and from which a portion is cut out;

Fig. 2 is an enlarged view taken along line
II-II of Fig. 1;

Fig. 3 is a detailed view which illustrates
a portion III shown in Fig. 1;

25 Fig. 4 is a partly-sectioned front elevational
view of a secone embodiment of the present invention;

1 Fig. 5 is an enlarged view taken along line V-
V of Fig. 4; and

 Fig. 6 is a detailed view which illustrates a
portion VI shown in Fig. 4.

5 DESCRIPTION OF PREFERRED EMBODIMENTS

First Embodiment

 A first embodiment of the present invention
will now be described with reference to the drawings.
As shown in Fig. 1, a table 3 is, via a cylinder 2
10 facing upwards, disposed at the central portion of a
surface-plate frame 1 in such a manner that the table 3
is able to move upwards/downwards. Furthermore,
supporting columns 4 are erected at the four corners of
the frame 1 in such a manner that a roller conveyer 5
15 having a flange laterally extending is disposed at an
intermediate portion of the supporting columns 4 and a
surface-plate frame 7 having, at the central portion
thereof, a compressed air outlet port 6 is disposed at
the top end portions of the supporting columns 4. On
20 the upper surface of the surface-plate frame 7, a
cylinder 8 extending vertically and having its top end
portion closed by a cover 8a is secured, surrounding the
top end portion of the outlet part 6, the cylinder 8
having air supply holes 9 in the lower portion thereof.
25 At a position on the top surface of the surface-plate
frame 7 and inside the cylinder 8, there is disposed a
sectioning device 10 capable of efficiently supplying

1 compressed air in a cover 14 which will be detailed
hereinbelow to the outlet port 6. The sectioning device
10 comprises cylindrical members 10a and 10b positioned
vertically and concentrically to each other and having
5 large and small diameters and a cover member 10c secured
to the lower end portions of the two cylindrical members
10a and 10b and having a plurality of air feed holes 11
formed between the large and small cylindrical diameter
members 10a and 10b, the air feed holes 11 being formed
10 in a fan-like shape (see Fig. 2). Each air feed hole 11
faces the outlet port 6. Furthermore, the outer surface
of the large cylindrical member 10a and the inner
surface of the small cylindrical member 10b are
communicated with and connected to each other by a
15 plurality of connecting ducts 10d as shown in Fig. 2.
The ducts 10d establish connection between the inside of
the small cylindrical member 10b and the outside of the
large cylindrical member 10a. The two top end portions
of the large cylindrical member 10a and the small
20 cylindrical member 10b are opened, defining an opening
10e.

A piston 12 is disposed above the sectioning
device 10 in the cylinder 8, so as to be slidable in the
vertical direction, the piston 12 being made of a
25 synthetic resin and thereby being lightweight. Further-
more, the piston 12 is arranged in such a manner that it
can be brought into contact with the top end portions of
the large and the small cylindrical members 10a and 10b

1 of the sectioning device 10 in a hermetical manner when
it is moved downward. In addition, a seal 13 is, as
shown in Fig. 3, fitted is a groove 12a formed in the
outer peripheral surface of the piston 12. The piston
5 12 has a recess 12b formed in the body outer peripheral
surface thereof and annular recesses 12c and 12d on the
top and the lower surfaces thereof in such a manner that
thickness T defined between the bottom surfaces of the
top and lower recesses 12c and 12d is smaller than width
10 B of the recess 12b. As a result, when the piston 12
having a thermal expansion coefficient which is larger
than that of the cylinder 8 is expanded at an increased
temperature, the top and the lower surfaces of the
piston 12 can warps inwards, thereby preventing
15 occurrence of an unfavorable problem.

Furthermore, a cover 14 is, as shown in Fig.
1, hermetically fastened to the top surface of the
surface-plate frame 7, surrounding the cylinder 8, the
cover 14 constituting a compressed air reservoir tank in
20 cooperation with the surface-plate frame 7. In
addition, a cylindrical exhaust pipe 15 is hermetically
fastened to the central portion of the ceiling of the
cover 14, the exhaust pipe 15 vertically penetrating the
ceiling and extending downwards. The exhaust pipe 15
25 hermetically penetrates the cover 8a of the cylinder 8,
the exhaust pipe 15 having a second exhaust hole 30 in
the upper portion thereof and a bottom plate 15a at the
lower end portion thereof. The bottom plate 15a has a

1 large-diameter first exhaust hole 16. In addition, a
cylinder 17 facing downwards is fastened to the top end
surface of the exhaust pipe 15, while a valve 18 capable
of closing the above-described first exhaust hole 16
5 underneath the latter is fastened to the lower end
portion of a piston rod of the piston 17b in the
cylinder 17, the piston 17b is urged upwards by a coil
spring 17c.

The upper chamber above the piston 12 of the
10 cylinder 8 and an upper portion of the cylinder 17 are
respectively communicated with a compressed air source
22 via opening/closing valve 19 and a 3-port 2-position
switch valve 21, respectively. Further, the inside of
the cover 14 is communicated with the air source 22 by
15 way of a reducing valve 20.

Referring to Fig. 1, reference numeral 23
represents an air diffusion plate secured to the lower
surface of the surface-plate frame 7, 24 represents a
frame fastened to the surface-plate frame 7 in such a
20 manner that it surrounds the air diffusion plate 23, 25
represents a pattern plate having a bent hole, 26
represents a flask and 27 represents a cheek flask.

Then, the operation of the apparatus thus-
constituted will now be described. The switch valve 21
25 is switched to the position disconnected from the
compressed air source 22. The opening/closing valve 19
is opened to the position connected to the compressed
air sources 22 and the reducing valve 20 is adjusted to

1 set the pressure of compressed air to a predetermined
value, and then preferentially supply it to the inside
of the cover 14. In this state, molding sand S is
supplied into the flask 26 and the cheek flask 27 on the
5 pattern plate 25, and, the molding sand S is conveyed to
a position above the table 3 by the roller conveyer 5.
Then, the cylinder 2 is extended to move the table 3
upward so that the cheek flask 27 is brought into
contact with the frame 24. Then, the opening/closing
10 valve 29 is closed to stop the supply of compressed air
into the chamber above the piston 12 in the cylinder 8.
Then, the switch valve 21 is switched, causing the
cylinder 17 to extend its piston rod 17a. As a result,
the valve 18 is moved downwards so that the first
15 exhaust hole 16 is opened.

When the first exhaust hole 16 is opened,
compressed air in the chamber above the piston 12 in the
cylinder 8 is discharged outside after it has passed
through the first exhaust hole 16, the exhaust pipe 15
20 and the second exhaust hole 30. Therefore, the pressure
in the chamber above the piston 12 in the cylinder 8 is
lowered. Furthermore, the pressure of compressed air
effects on the outer surface of the large cylindrical
member 10a at a portion of the lower surface of the
25 piston 12 and the inner portion of the small cylindrical
member 10b. As a result, the piston 12 is pushed
upwards at high speed so that the opening 10e between
the large and the small cylindrical members 10a and 10b

1 of the sectioning device 10 is opened. Therefore,
compressed air present around the large cylindrical
member 10a and that present in the small cylindrical
member 10b are, through the opening 10e of the same,
5 introduced into an annular space formed by the above-
described cylindrical members 10a and 10b. Since
compressed air has been introduced into the small
cylindrical member 10b through the air feed ducts 10d in
the above-described state, a large quantity of
10 compressed air is quickly introduced into the annular
space present between the large and the small
cylindrical members 10a and 10b from the inside and
outside thereof.

Compressed air introduced into the annular
15 space between the large and the small cylindrical
members 10a and 10b passes through the air feed holes 11
and then is blown quickly by a large quantity into the
flasks 26, 27. Then, it is diffused by the air
diffusion plate 23 to compress the molding sand S, and
20 penetrates the molding sand before it is discharged
through the bent hole 25a formed in the pattern plate
25. As a result, the molding sand S is compressed.
After the molding sand S has been compressed, the
cylinder 17 is retracted by switching the switch valve
25 21 so as to close the first exhaust hole 16 by means of
the valve 18. Then, the table 3 or the like is moved
downwards by the retracting operation of the cylinder 2.
Then, compressed air is supplied to the chamber above

1 the piston 12 in the cylinder 8 by opening the
opening/closing valve 19 so as to move the piston 12
downward. As a result, the piston 12 is brought into
contact with the upper surfaces of the large and the
5 small cylindrical members 10a and 10b. Therefore, the
opening 10e between the large and small cylindrical
members 10a and 10b of the sectioning device 10 is
closed. The molding sand S, which has been compressed
is conveyed to the next station where it is further
10 properly compressed. Thus, one cycle of the operation
of the apparatus according to the present invention is
completed.

Second Embodiment

Then, a second embodiment of the present
15 invention will now be described with reference to the
drawings. As shown in Fig. 4, a table 53 is, via a
cylinder 52 facing upwards, disposed at the central
portion of a frame 51 in such a manner that the table 53
is able to move upwards/downwards. Furthermore,
20 supporting columns 54 are erected at the four corners of
the frame 51 in such a manner that a roller conveyer 55
extending horizontally is disposed at an intermediate
portion of the supporting columns 54 and a surface-plate
frame 57 having, at the central portion thereof, a
25 compressed air outlet port 56 is disposed at the top end
portions of the supporting columns 54. On the upper
surface of the frame surface-plate 57, a cylinder 58
extending vertically and having the top end portion

1 closed by a cover 58a is secured, surrounding the top
end portion of the outlet port 56, the cylinder 58
having air supply holes 59 in the lower body thereof.
At a position on the top surface of the surface-plate
5 frame 57 and inside the cylinder 58, there is disposed a
sectioning device 60 capable of efficiently supplying
compressed air in a cover 64 which will be detailed
hereinbelow, to the outlet port 56. As shown in Fig. 5,
the sectioning device 60 comprises a cylindrical member
10 60a extending vertically and having a multiplicity of
troughs 60d which extend vertically, the horizontal
cross sectional shape of the cylindrical member 60a
thereby being formed in a spur-like shape. The
sectioning device 60 further comprises a cover member
15 60b hermetically secured to the lower end portion of the
cylindrical member 60a and having a spur-like air feed
hole 61 which is communicated with the inside portion of
the cylindrical member 60a. The air feed hole 61 faces
the outlet port 56.

20 Similarly to the first embodiment, a piston 62
is disposed above the sectioning device 60 in the
cylinder 58 so as to be slidable in the vertical
direction, the piston 62 being made of a synthetic resin
and thereby being lightweight. Furthermore, the piston
25 62 is arranged in such a manner that it can be brought
into contact with the top end portion of the cylindrical
member 60a of the sectioning device 60 in a hermetical
manner when it is moved downwardn. In addition, a seal

1 63 is, as shown in Fig. 6, fitted in a groove 62a formed
in the outer peripheral surface of the piston 62. The
piston 62 has an annular recess 62b formed in the outer
peripheral surface thereof and annular recesses 62c and
5 62d on the top and the lower surfaces thereof in such a
manner that a thickness T defined between the bottom
surfaces of the top and the lower recesses 62c and 62d
is made to be smaller than width B of the recess 62b.
As a result, when the piston 62 having a thermal
10 expansion coefficient which is larger than that of the
cylinder 58 is expanded at an increased temperature, the
top and lower surfaces of the piston 62 can warp
inwards, thereby preventing occurrence of an unfavorable
problem.

15 Furthermore, a cover 64 is, as shown in Fig.
4, hermetically fastened to the top surface of the
surface-plate frame 57, surrounding the cylinder 58, the
cover 64 defining therein a compressed air reservoir
tank in cooperation with the surface-plate frame 57. In
20 addition, a cylindrical exhaust pipe 65 is hermetically
fastened to the central portion of the ceiling of the
cover 64, the exhaust pipe 65 vertically penetrating the
ceiling and extending downwards. The exhaust pipe 65
hermetically penetrates the cover 58a of the cylinder
25 58, the exhaust pipe 65 having a second exhaust hole 80
in the upper portion thereof and a bottom plate 65a at
the lower end portion thereof. The bottom plate 65a has
a large-diameter first exhaust hole 66. In addition, a

1 cylinder 67 facing downwards is fastened to the top end
surface of the exhaust pipe 65, while a valve 68 capable
of closing the above-described first exhaust hole 66
underneath thereof is fastened to the lower end portion
5 of the piston rod 67a of the piston 67b in the cylinder
67, the piston 67b is urged upwards by a coil spring
67c.

The upper chamber above the piston 62 of the
cylinder 58, and the chamber above the piston 62 in the
10 cylinder 67 are respectively communicated with a
compressed air source 72 via an opening/closing valve
69, and a 3-port 2-position switch valve 71. Further,
the inside of the cover 64 is also communicated with the
compressed air source 72 by way of a reducing valve 71.

15 Referring to Fig. 4, reference numeral 73
represents an air diffusion plate secured to the lower
surface of the surface-plate frame 57, 74 represents a
frame fastened to the surface-plate frame 57 in such a
manner that it surrounds the air diffusion plate 73, 75
20 represents a pattern plate having a bent hole, 76
presents a flask and 77 represents a cheek flask.

Then, the operation of the apparatus thus-
constituted will now be described. The switch valve 71
is switched to the position disconnected from the
25 compressed air source 72. The opening/closing valve 69
is opened to the position connected to the compressed
air source 72 and the reducing valve 70 is adjusted to
control compressed air to a predetermined pressure

1 level. In this state, molding sand S is supplied into
the flask 76 and the cheek flask 77 on the pattern plate
75, and then, the molding sand S is conveyed to a
position above the table 53 by the roller conveyer 55.
5 Then, the cylinder 52 is extended to move the table 53
upward so that the cheek flask 77 is brought into
contact with the flask 76. Then, the opening/closing
valve 69 is closed to stop the supply of compressed air
into the chamber above the piston 62 of the cylinder 58.
10 Then, the switch valve 71 is switched over to cause the
piston 67b extend downwards. As a result, the valve 68
is moved downwards so that the first exhaust hole 66 is
opened.

When the first exhaust hole 66 is opened,
15 compressed air in the chamber above the piston 62 in the
cylinder 58 is discharged outside after it has passed
through the first exhaust hole 66, the exhaust pipe 65
and the second exhaust hole 80. Therefore, the pressure
in the chamber above the piston 62 in the cylinder 58 is
20 lowered. Furthermore, since compressed air in the cover
64 has been introduced into the troughes 60d formed in
the cylindrical member 60a of the sectioning device 60,
the lower surface of the piston 62 receives the pressure
of compressed air most efficently. As a result, the
25 piston 62 is pushed upwards at a high speed so that the
opening 60e of the cylindrical member 60a is opened.
Therefore, compressed air is, through a multiplicity of
the trough 60d formed in the cylindrical member 60a,

1 introduced into the cylindrical member 60a along the,
top end portion of the surrounding wall. Therefore, a
large quantity of compressed air is quickly blown
through the air feed hole 61 after it has passed through
5 the cylindrical member 60a.

Compressed air flown from the air feed holes
61 is diffused by the air diffusion plate 73 to compress
the molding sand S and as well as the compressed air
penetrates the molding sand before it is discharged
10 through the bent hole 75a formed in the pattern plate
75. As a result, the molding sand S is compressed.
After the molding sand S has been compressed, the
cylinder 67 is retracted by switching the switch valve
21 to close the first exhaust hole 66 by means of the
15 valve 68. Then, the table 53 and the like are moved
downwards by the retracting operation of the cylinder
52. Then, compressed air is supplied to the chamber
above the cylinder 58 by opening 60e the opening/closing
valve 69 so as to move the piston 62 downward. As a
20 result, the piston 62 is brought into contact with the
upper surface of the cylindrical member 60a and thereby
the opening 60e is closed. The molding sand S, which
has been previously compressed, is conveyed to the next
station where it is further properly compressed. Thus,
25 one cycle of the operation of the apparatus according to
the present invention is completed.

Although the invention has been described in
its preferred form with a certain degree of particular-

1 ly, it is understood that the present disclosure of the
preferred form has been changed in the details of
construction and the combination and arrangement of
parts may be resorted to without departing from the
5 spirit and the scope of the invention as hereinafter
claimed.

WHAT IS CLAIMED IS;

1. A compressed air blowing apparatus including:
 - a frame having an air outlet port for supplying compressed air into a flask;
 - a cylindrical sectioning device disposed on said frame, having, in an end portion thereof, an air feed hole communicated with said air outlet port and having, in another end portion thereof, an opening communicated with said air feed hole;
 - a cylinder disposed on said frame to surround said sectioning device;
 - a piston capable of sliding in said cylinder;
 - a first compressed air supply device having a compressed air reservoir tank for supplying compressed air to a first chamber which is formed on one side of said piston in said cylinder and in which said sectioning device is disposed;
 - a second compressed air supply device for urging said piston to hermetically close said opening by supplying compressed air to second chamber formed on the other side of said piston in said cylinder;
 - an exhaust hole for communicating said second chamber with the outside; and
 - a valve for opening/closing said exhaust hole whereby, when said valve opens said exhaust hole, said piston pushed by compressed air supplied from said first compressed air supply device slides to open said opening and thereby compressed air supplied from said first

compressed air supply device is introduced into said sectioning device through said opening before it is blown into said flask through said outlet port, characterized by:

a large and a small cylindrical members concentrically disposed and included in said sectioning device, wherein said opening is defined as an annular opening by end portions of said cylindrical members, and including a plurality of connecting ducts which establish a communication between the outside of said large cylindrical member and the inside of said small cylindrical member and which extend the radial direction, whereby compressed air supplied from said first compressed air supply device is introduced into said opening from both outside of said large cylindrical member and inside of said small cylindrical member when said piston slides away from said opening.

2. A compressed air blowing apparatus including:

a frame having an air outlet port formed for supplying compressed air into a flask;

a cylindrical sectioning device disposed on said frame and, having, in an end portion thereof, an air feed hole communicated with said air outlet port and having, in another end portion thereof, an opening communicated with said air feed hole;

a cylinder disposed on said frame to surround said sectioning device;

a piston capable of sliding in said cylinder to hermetically close said opening formed in said sectioning device;

a first compressed air supply device having a compressed air reservoir tank for supplying compressed air to a first chamber which is formed on one side of said piston in said cylinder and in which said sectioning device is disposed;

a second compressed air supply device for urging said piston to hermetically close said opening by supplying compressed air to a second chamber formed on the other side of said piston in said cylinder;

an exhaust hole for communicating said second chamber with the outside;

a valve for opening/closing said exhaust hole whereby, when said valve opens said exhaust hole, said piston pushed by compressed air supplied from said first compressed air supply device slides to open said opening and thereby compressed air supplied from said first compressed air supply device is introduced into said sectioning device through said opening before it is blown into said flask through said outlet port, characterized by a cylindrical member an end portion of which defined said opening and which is provided in said sectioning device, wherein said cylindrical member has a plurality of troughs extending in an axial direction thereof and arranged in its circumferential direction, said troughes projecting inward.

3. A compressed air blowing apparatus for use in a green mold molding facility and acting to supply compressed air to molding sand supplied in a flask, said compressed air blowing apparatus comprising:

a surface-plate frame capable of closing an opening formed in a top end portion of said flask and having a compressed air outlet port formed into a through hole which faces said top end opening;

a cylinder fastened to the upper surface of said frame in such a manner that said outlet port is positioned inside thereof, extending vertically and formed in a cylindrical shape having a top end portion closed by a cover and having an exhaust hole formed in said cover and an air supply hole formed in a lower portion of the cylinder;

a sectioning device placed in said cylinder on said frame and acting so as to supply compressed air to said outlet port;

a piston placed in said cylinder above said sectioning device for sliding vertically and contacting with a top end portion of said sectioning device in a hermetical manner;

a cover hermetically fastened to the upper surface of said frame to surround said cylinder and constituting a compressed air reservoir tank in cooperation with said frame, the compressed air reservoir tank being communicated with a compressed air source via pressure regulating valve;

an exhaust pipe having a lower end portion hermetically fastened to said cover of said cylinder to surround the first exhaust hole formed in said cover, and a top end portion communicated with the outside;

a valve disposed in such a manner that it is able to move vertically so as to open/close said first exhaust hole; and

an opening/closing valve disposed at a position between a chamber formed above said piston in said cylinder and said compressed air source, wherein said sectioning device is constituted by large and small cylindrical members formed vertically and disposed substantially concentrically by a cover member hermetically secured to a lower end portions of said large and small cylindrical members and having a plurality of air feed holes formed between said large cylindrical member and said small cylindrical member and by connecting ducts for communicating and connecting said large cylindrical member and said small cylindrical member.

4. A compressed air blowing apparatus for use in a green sand mold molding facility according to Claim 3, wherein said piston is made of a synthetic resin, a first annular recesses is formed at the outer peripheral surface of said piston, upper lower annular recesses are formed in the peripheral portions of top and lower surfaces of said piston and the thickness defined between bottom surfaces of said upper and lower annular

recesses is smaller than the width of said first annular recess.

5. A compressed air blowing apparatus for use in a green sand mold molding facility and acting to supply compressed air to molding sand supplied in a flask, said compressed air blowing apparatus comprising:

a surface-plate frame capable of closing an opening formed in a top end portion of said flask and having a compressed air outlet port formed into a through hole which faces said top end opening;

a cylinder fastened to the upper surface of said frame in such a manner that said outlet port is positioned inside thereof, formed vertically and having a top end portion closed by a cover and having a first exhaust hole formed in said cover and an air supply hole formed in a lower portion of the cylinder;

a sectioning device placed in said cylinder on said frame and acting so as to supply compressed air to said outlet port;

a piston placed in said cylinder above said sectioning device for sliding vertically and contacting with a top end portion of said sectioning device in a hermetical manner;

a cover hermetically fastened to the upper surface of said frame to surround said cylinder and constituting a compressed air reservoir tank in cooperation with said frame, the compressed air reservoir tank being communicated with a compressed air

source via a pressure regulating valve;

an exhaust pipe having a lower end portion hermetically fastened to said cover of said cylinder to surround the first exhaust hole formed in said cover and a top end portion communicated with the outside;

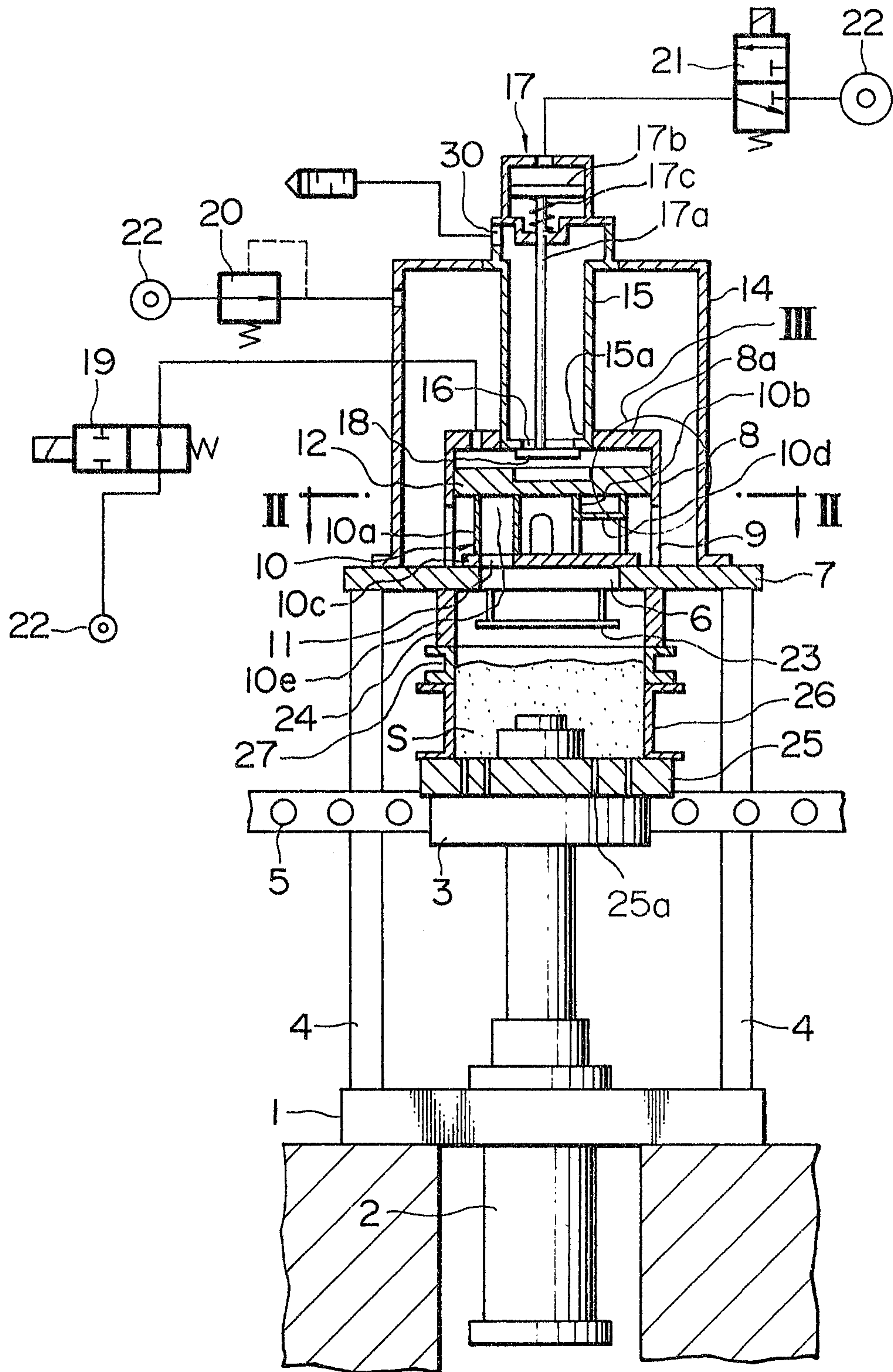
a valve disposed in such a manner that it is able to move vertically so as to open/close said first exhaust hole; and

an opening/closing valve disposed at a position between a chamber formed above said piston in said cylinder and said compressed air source, wherein said sectioning device is constituted by a cylindrical member extending vertically and having the horizontal cross sectional shape which is formed into a spur-like shape and a cover member hermetically secured to a lower end portion of said cylindrical member and having an air feed hole which is communicated with an inside space of said cylindrical member.

6. A compressed air blowing apparatus for use in a green sand mold molding facility according to Claim 5, wherein said piston is made of a synthetic resin, a first annular recess is formed at the outer peripheral surface of said piston, an upper annular and a lower annular recesses are formed in the peripheral portions of top and lower surfaces of said piston and the thickness defined between bottom surfaces of said upper and lower recesses is smaller than the width of said first annular recess.

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FIG. 1



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FIG. 2

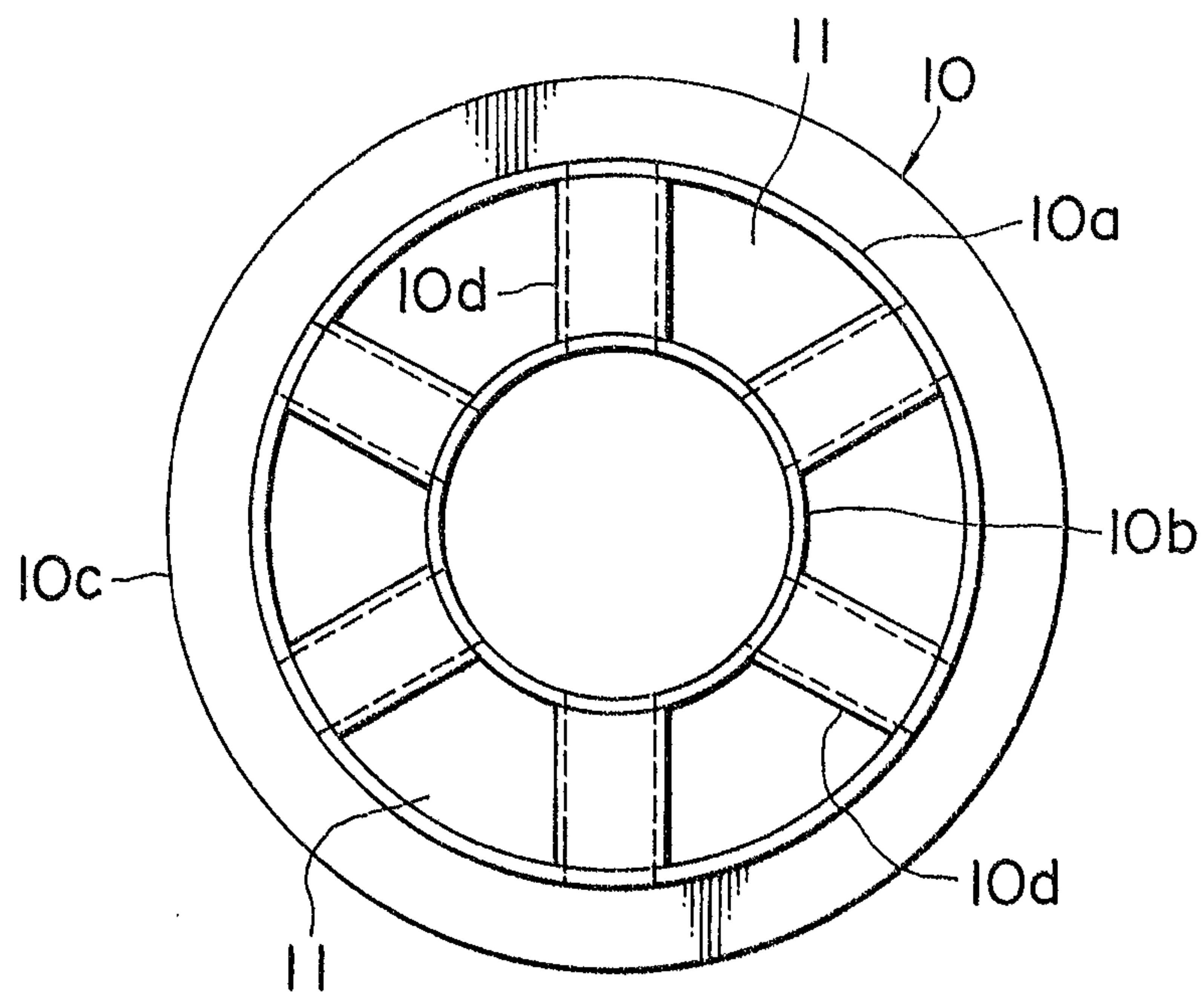
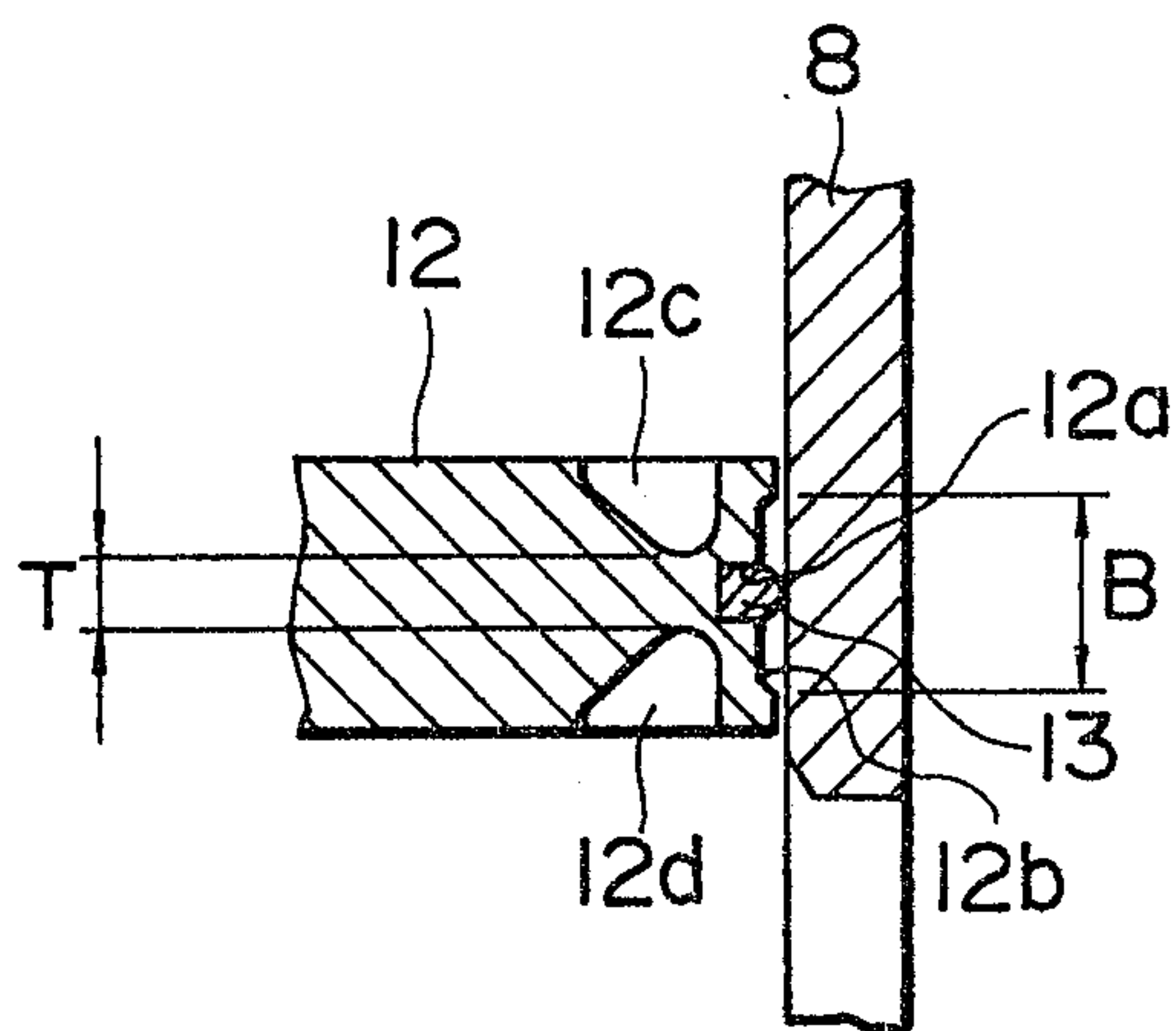
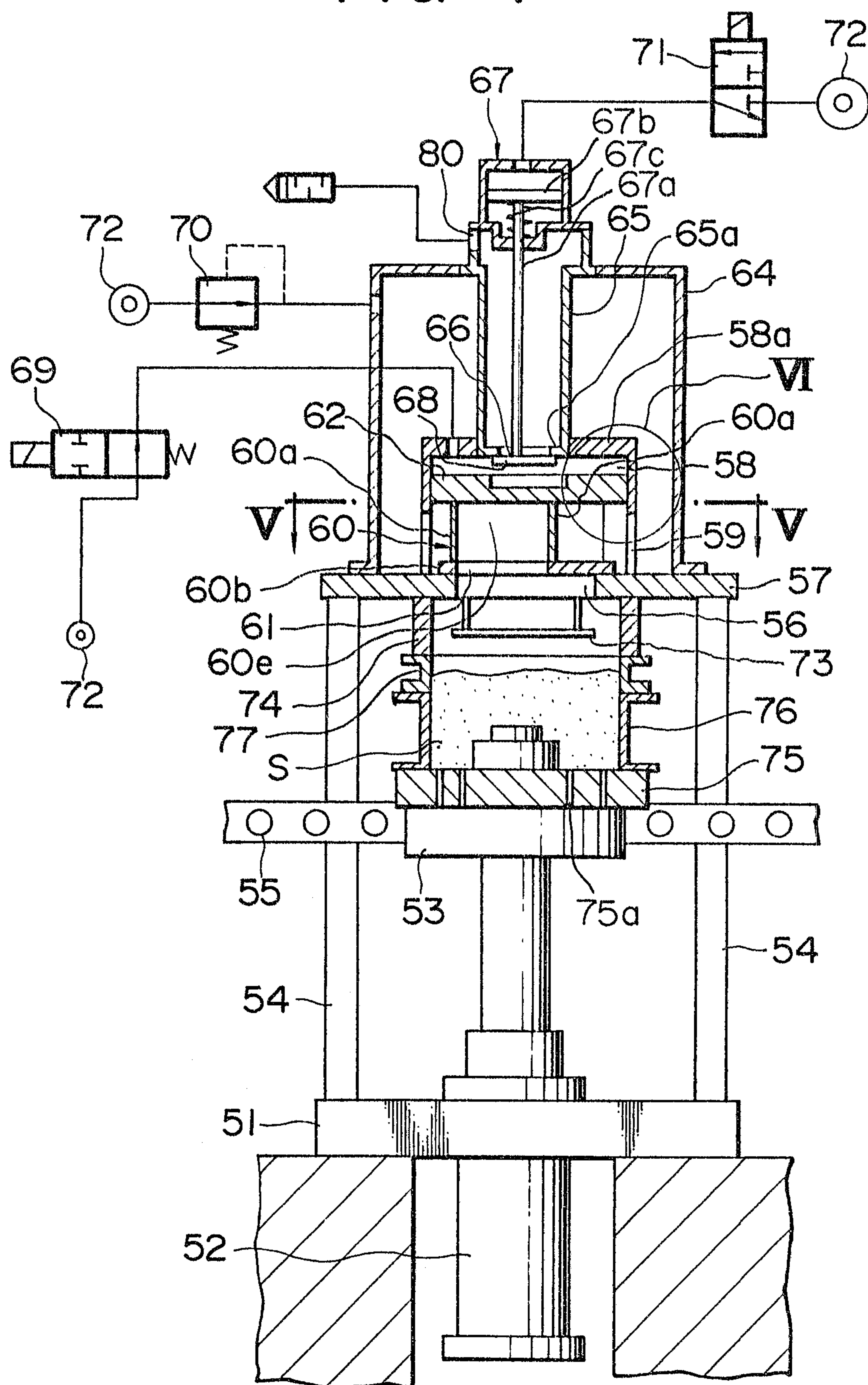


FIG. 3



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FIG. 4



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FIG. 5

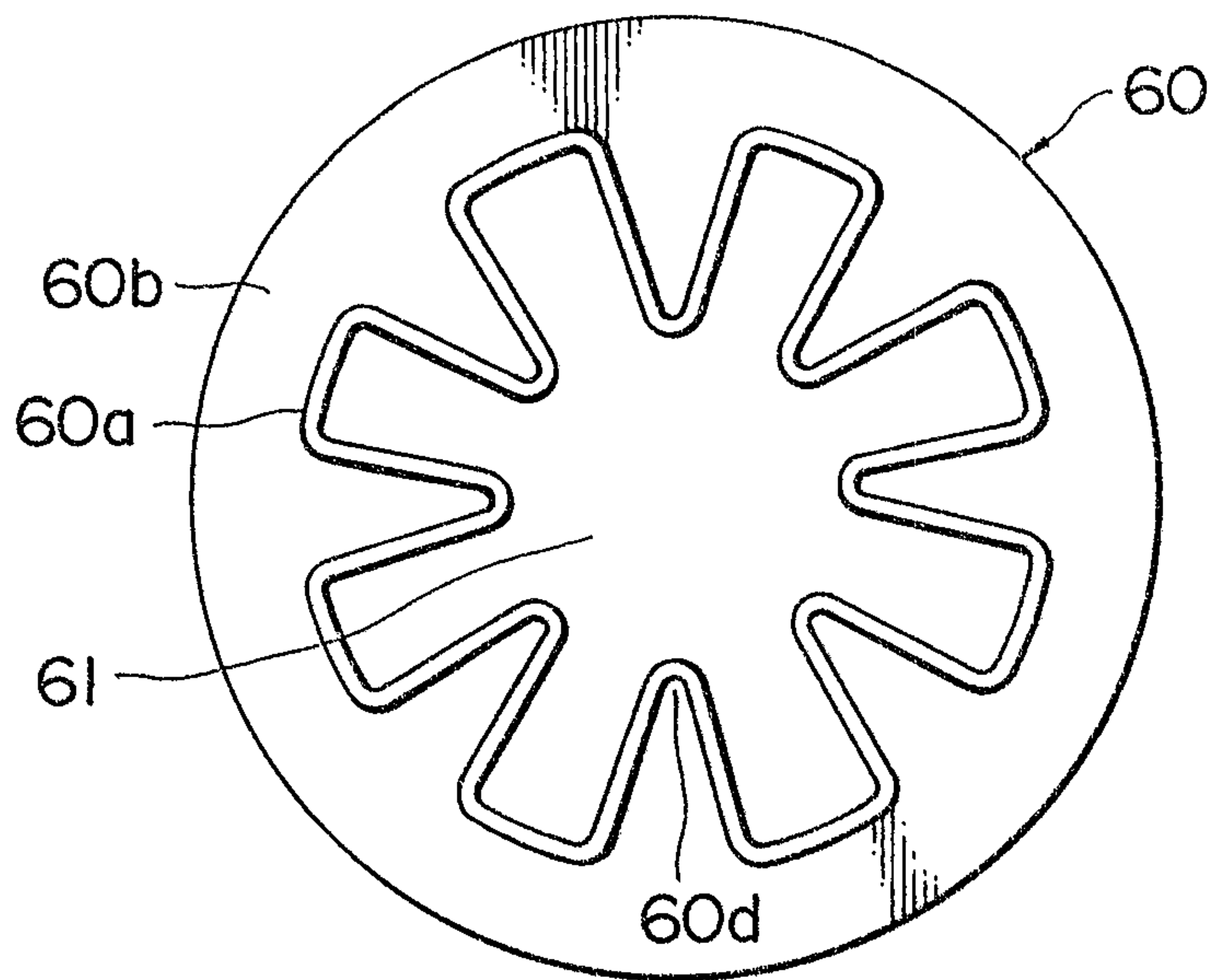
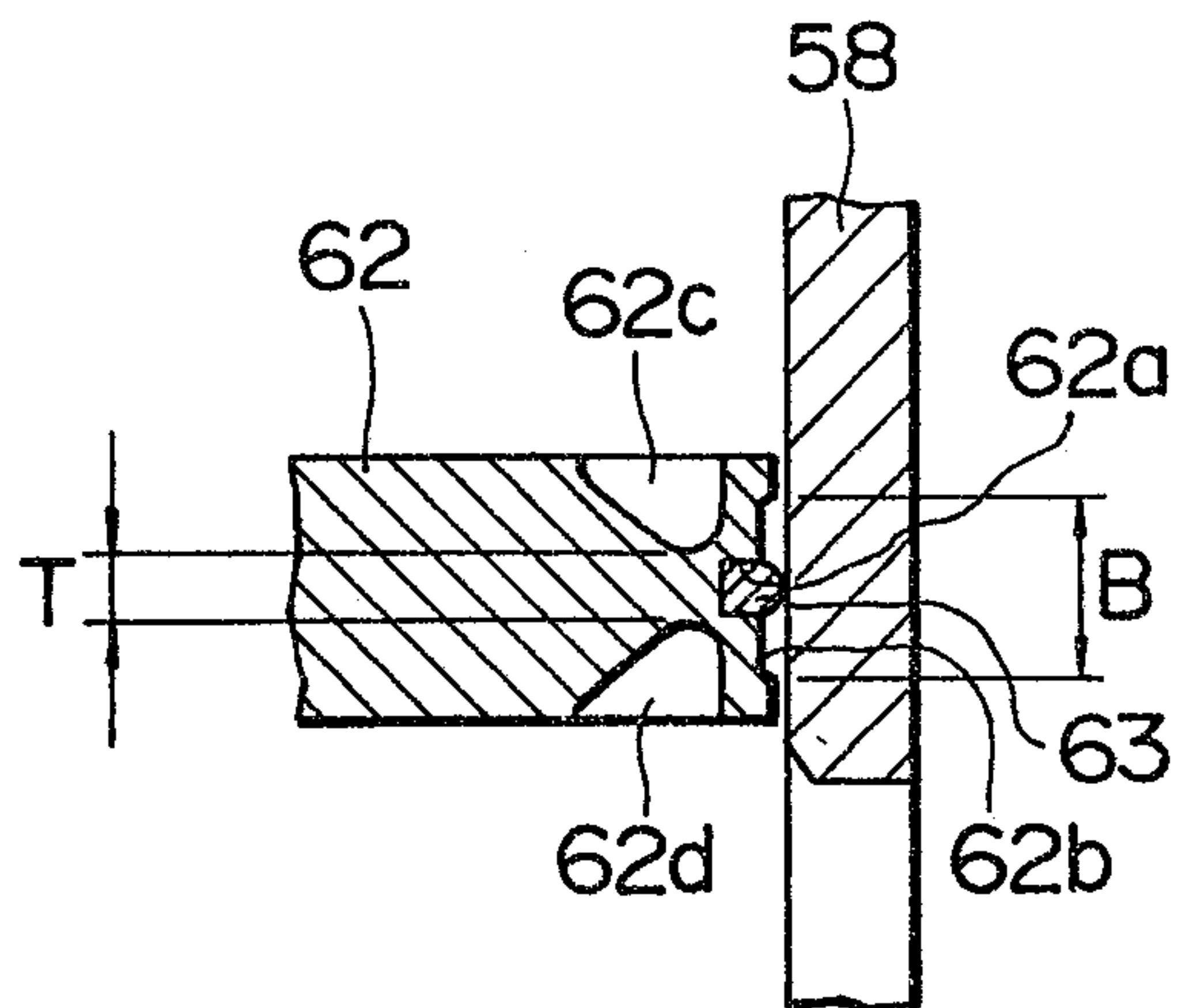


FIG. 6



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