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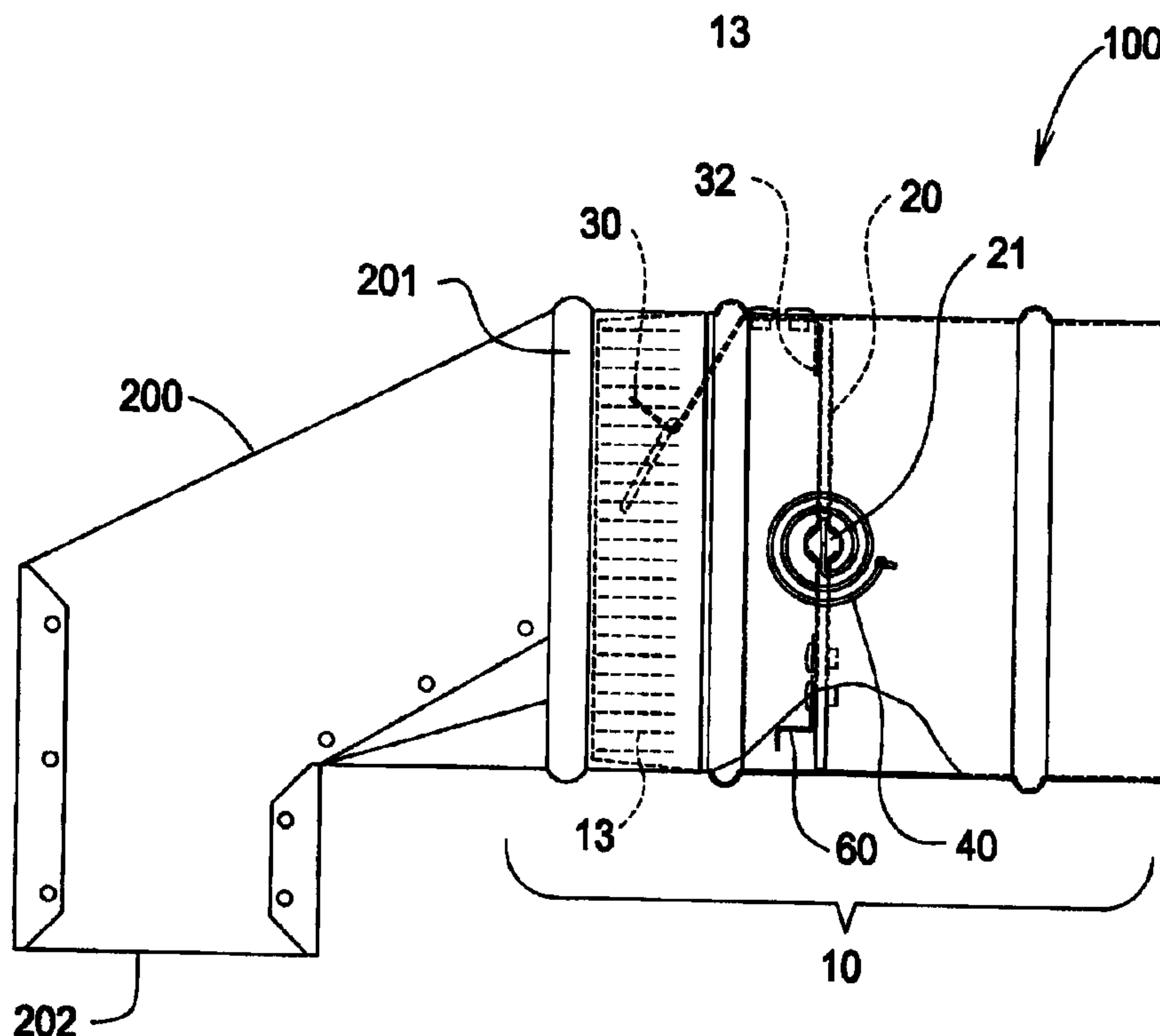
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(54) Titre : REGISTRE COUPE-FEU

(54) Title: FIRE DAMPER



(57) **Abrégé/Abstract:**

A fire damper comprising a housing, a louver member rotationally engaged within the housing, the louver member having a substantially gas tight seal with the housing when the louver member is in a closed position, a biasing member disposed outside of the housing and engaged with the louver member for moving the louver member from an open position and holding the louver member in the closed position, a temperature sensitive member releaseably connected to the louver member, the temperature sensitive member for releasing the louver member from the open position at a predetermined temperature, and the louver member further comprising insulation material to control heat transfer through the louver member for a predetermined period of time.



Abstract

A fire damper comprising a housing, a louver member rotationally engaged within the housing, the louver member having a substantially gas tight seal with the housing when
5 the louver member is in a closed position, a biasing member disposed outside of the housing and engaged with the louver member for moving the louver member from an open position and holding the louver member in the closed position, a temperature sensitive member releaseably connected to the
10 louver member, the temperature sensitive member for releasing the louver member from the open position at a predetermined temperature, and the louver member further comprising insulation material to control heat transfer through the louver member for a predetermined period of
15 time.

Docket Number RUS07-045

Title

Fire Damper

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Field of the Invention

The invention relates to a fire damper, and more particularly, to a fire damper having a fusible link, and a normally open, thermally insulated rotating louver connected to an external biasing member.

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Background of the Invention

Fire dampers are used to seal an air handling system from a space experiencing a fire, thereby preventing any backflow of oxygen to the space through the ductwork.

15 Sealing the ductwork deprives the fire of oxygen.

Fire dampers may generally comprise louvers, but, such louvers comprise simple metallic sheets. Such construction adversely affects the period of time that the louver, and thereby the fire damper, can resist failure caused by hot
20 gases from a fire.

Representative of the art is US patent no. 4,559,867 to VanBecelaere (1985) which discloses a transversely circular fire damper having a butterfly type blade operated by a jack shaft spaced longitudinally of the housing from
25 the blade axle. Linkage including an "over center" stop rotates the blade in one direction by operation of a motor coupled with the shaft. A clutch in the form of a pair of relatively telescoped members secured together with entectic solder is connected with the jack shaft and the
30 motor so that the shaft is released from the motor when the

ambient temperature reaches a point high enough to melt the solder. The jack shaft is spring biased in a direction to close the damper blade under such condition.

What is needed is a fire damper having a fusible link,
5 and a normally open, thermally insulated rotating louver connected to an external biasing member. The present invention meets this need.

Summary of the Invention

10 The primary aspect of the invention is to provide a fire damper having a fusible link, and a normally open, thermally insulated rotating louver connected to an external biasing member.

Other aspects of the invention will be pointed out or
15 made obvious by the following description of the invention and the accompanying drawings.

The invention comprises a fire damper comprising a housing, a louver member rotationally engaged within the housing, the louver member having a substantially gas tight
20 seal with the housing when the louver member is in a closed position, a biasing member disposed outside of the housing and engaged with the louver member for moving the louver member from an open position and holding the louver member in the closed position, a temperature sensitive member
25 releaseably connected to the louver member, the temperature sensitive member for releasing the louver member from the open position at a predetermined temperature, and the louver member further comprising insulation material to control heat transfer through the louver member for a
30 predetermined period of time.

Brief Description of the Drawings

The accompanying drawings, which are incorporated in and form a part of the specification, illustrate preferred embodiments of the present invention, and together with a description, serve to explain the principles of the invention.

Fig. 1 is a side view of the fire damper.

Fig. 2 is a side view within the fire damper.

Fig. 3 is a front elevation view of the fire damper.

10 Fig. 4(a) is a front detail of the louver member.

Fig. 4(b) is a side view of the louver member.

Fig. 5 is a detail of the fusible link connector.

Fig. 6 is a detail of the louver member member connector.

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Detailed Description of the Preferred Embodiment

Fig. 1 is a side view of the fire damper. Fire damper 100 comprises a housing 10. Housing 10 comprises metallic ductwork known in the art, for example, galvanized 22 gauge. In the present embodiment, the housing is circular.

20 Disposed within housing 10 is louver member 20. Louver member 20 is mounted to a shaft 21. Shaft 21 rotates within housing 10. Rotation of shaft 21 allows louver member 20 to pivot between an open position and a closed position.

25 Member 60 is attached to louver member 20 and is used to connect louver member 20 to temperature sensitive connector 31, see Fig. 2.

30 Louver member 20 is shown in the closed position in Fig. 1. In the closed position louver member 20 provides a substantially gas tight seal for a predetermined

temperature, and at a differential pressure of up to 15 inches of water.

5 Biasing member 40 is engaged between shaft 21 and housing 10. Biasing member 40 biases louver member 20 toward the closed position as is shown in Fig. 1. Biasing member 40 may comprise a coil spring, flat band (watch) spring, torsion spring or other spring known in the art. Biasing member 40 is disposed outside of housing 10. Once louver member 20 is closed biasing member 40 prevents the
10 louver member 20 from opening.

 Duct portion 200 is a transition piece that is used to connect fire damper 10 to other system ductwork in a building space. Duct portion 200 is connected at end 201 to the housing 10 and at end 202 to a room or HVAC system
15 (not shown). End 201 has a circular form for connecting to the fire damper. End 202 may be rectangular, circular, oval or any other required shape to connect to an HVAC system (not shown), for example thought a room ceiling. Crimps 13 in housing 10 facilitate engagement of housing 10
20 with end 201.

 Fig. 2 is a side view within the fire damper. Louver member 20 is shown in the normally open position. Air flow is shown in relation to the fire damper.

 Disposed between louver member 20 and portion 30 is
25 the temperature sensitive connector 31. Louver member 20 is held in the normally open position by the temperature sensitive connector 31 which is connected to portion 30. Portion 30 is connected to housing 10. Temperature sensitive connector 31 is also known as a fusible link.

30 Connector 31 is known in the art. Connector 31 is designed to melt at a predetermined temperature, for example approximately 165°F. The range may extend to any

known in the art, for example, up to approximately 286°F. The connector 31 is used to hold louver member 20 open during normal operation. However, in the case of a high temperature gas or fire in the room or duct to which the damper is connected, the fusible link melts at the predetermined temperature. When it melts biasing member 40 immediately closes louver member 20 to prevent passage of hot gases through the fire damper.

Fig. 3 is a front elevation view of the fire damper. Shaft 21 extends across housing 10 and louver member 20 and rotationally engages bearings 11, 12 in housing 10. Portion 30 extends from housing 10.

Fig. 4(a) is a front detail of the louver member. Louver member 20 is connected to shaft 21. Louver member 20 comprises a first portion 23 and a second portion 24. First portion 23 and second portion 24 are arranged in parallel to form a sandwich with insulation material 50 disposed between them. Fasteners 22 are used to hold portions 23, 24 together. Fasteners 22 may comprise screws, pins, rivets, or spot welds.

Fig. 4(b) is a side view of the louver member. Portions 23 and 24 form parallel layers. Portions 23 and 24 each comprise metal, for example, galvanized steel. Disposed between portion 23 and 24 is insulation material 50. Insulation material 50 is intended to provide a time dependent barrier to high temperatures that are imposed upon louver member 20 during a fire event. The insulation material resists penetration of the high temperatures and combustion gases into the ductwork downstream of the fire damper louver 20. This also prevents backflow of oxygen to a fire burning upstream of the fire damper.

By way of example, the fire damper prevents flow of high temperature gases through the closed fire damper louver member for at least 60 minutes when exposed to a gas temperature of approximately 950° C.

5 Insulation material 50 comprises either fiberglass, mineral wool, ceramic or other suitable material known in the art. For example, the insulation material may include ceramic fiber material such as Fiberfrax™ from Sohio Carborundum.

10 The insulation material thickness in the present embodiment is approximately 3mm, although thicknesses in excess of 7mm may be used with good results. The thickness of the insulation material may be adjusted depending upon the operational requirements of the fire damper.

15 The insulation material also acts as a seal 51 between the edge of louver member 20 and the housing 10, thereby preventing hot gas flow around the louver member 20 when in the closed position.

20 The dimensions provided in this specification are only examples and are not intended to limit the size or range which may be used in the invention.

25 Fig. 5 is a detail of the fusible link connector. Portion 30 is mounted to an inner surface of housing 10 with portion 31. Portion 32 acts as a stop for louver member 20 when louver member 20 is in the closed position, see Fig. 2.

30 Fig. 6 is a detail of the louver member connector. Connector 60 is attached to portion 24. Temperature sensitive connector 31 is connected between end 61 and end 33 or portion 30. When connector 31 melts, biasing member 40 causes shaft 21 and thereby louver member 20 to rotate,

thereby closing the fire damper. The fire damper stays closed by application of upstream gas pressure and by action of the biasing member 40.

5 Although a form of the invention has been described herein, it will be obvious to those skilled in the art that variations may be made in the construction and relation of parts without departing from the spirit and scope of the invention described herein.

Claims

I claim:

1. A fire damper comprising:

5 a housing;

a louver member rotationally engaged within the housing, the louver member having a substantially gas tight seal with the housing when the louver member is in a closed position;

10 a biasing member disposed outside of the housing and engaged with the louver member for moving the louver member from an open position and holding the louver member in the closed position;

15 a temperature sensitive member releaseably connected to the louver member, the temperature sensitive member for releasing the louver member from the open position at a predetermined temperature; and

20 the louver member further comprising insulation material to control heat transfer through the louver member for a predetermined period of time.

2. The fire damper as in claim 1, wherein the louver member comprises a first portion and a second portion with the insulation material disposed therebetween.

25

3. The fire damper as in claim 1, wherein the biasing member comprises a flat band spring.

30 4. The fire damper as in claim 1, wherein the housing further comprises a transition means for connecting to ductwork.

5. The fire damper as in claim 1, wherein the housing comprises metal.

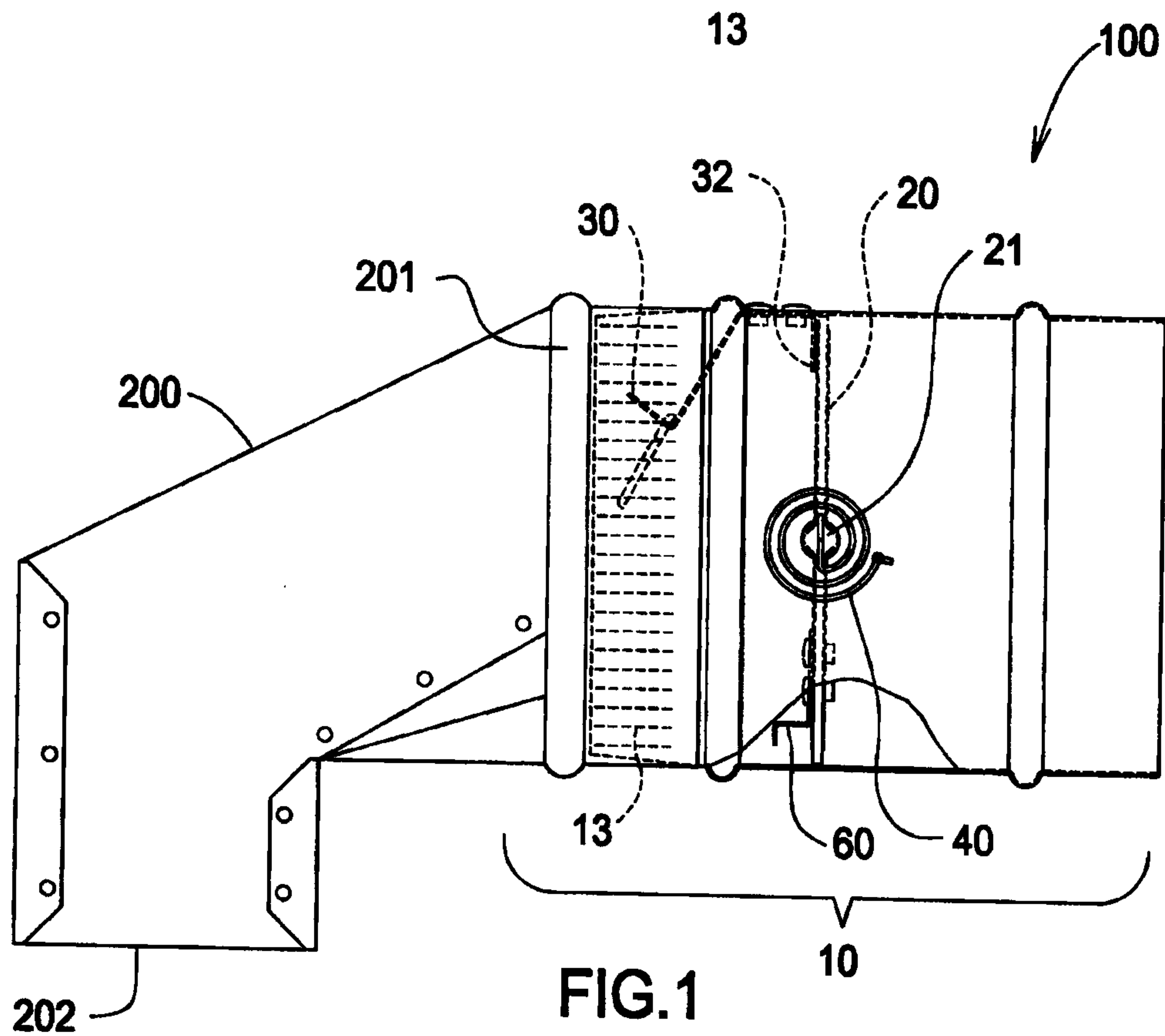
6. The fire damper as in claim 1, wherein the temperature
5 sensitive member melts in the range of approximately 165° F to approximately 286° F.

7. The fire damper as in claim 1 further comprising a stop on the housing that is engageable with the louver member
10 whereby the louver member can be held in a predetermined closed position which is substantially gas tight.

8. The fire damper as in claim 1, wherein the fire damper louver member is normally open allowing gas flow
15 therethrough.

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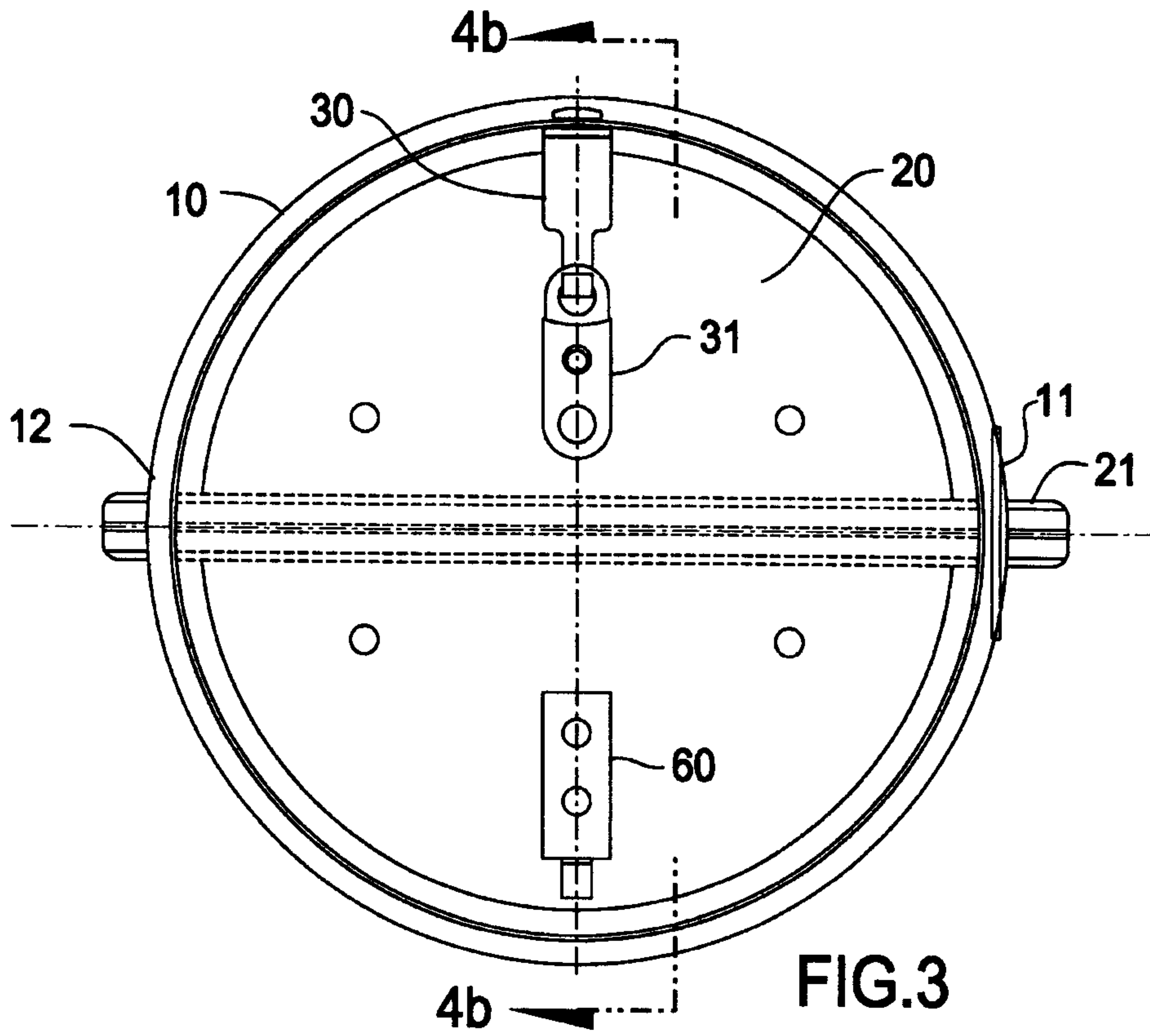


FIG. 3

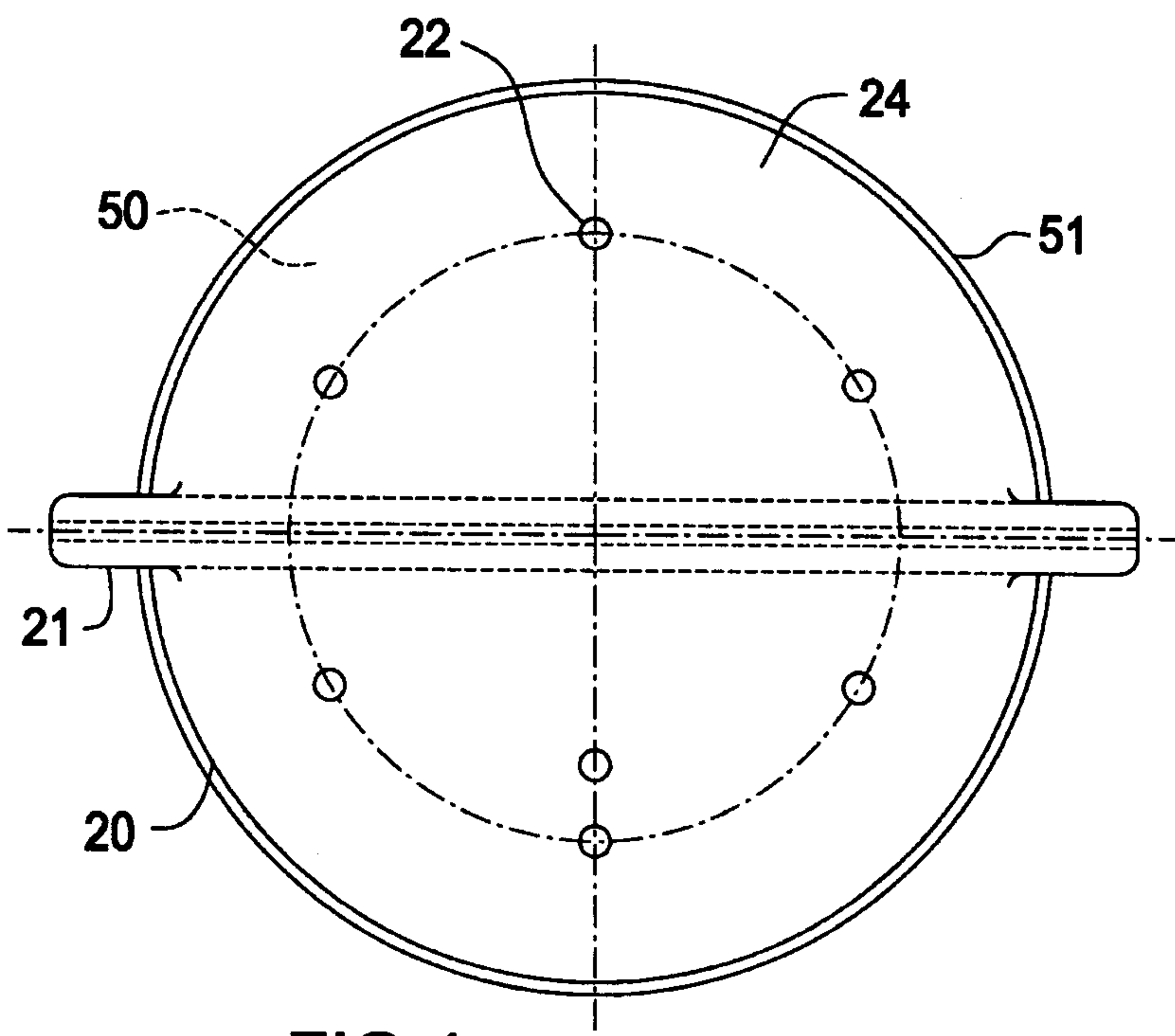


FIG. 4a

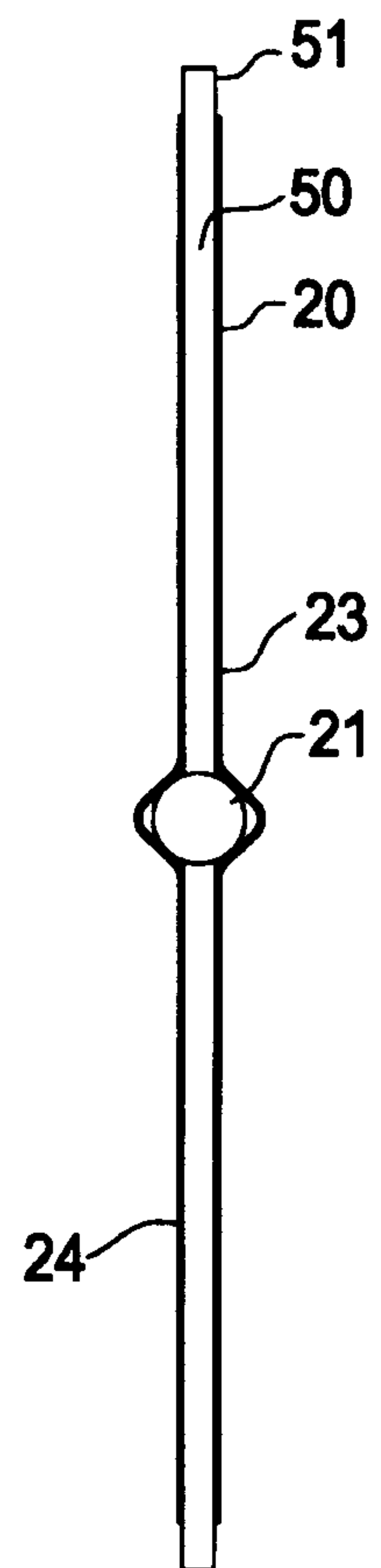


FIG. 4b

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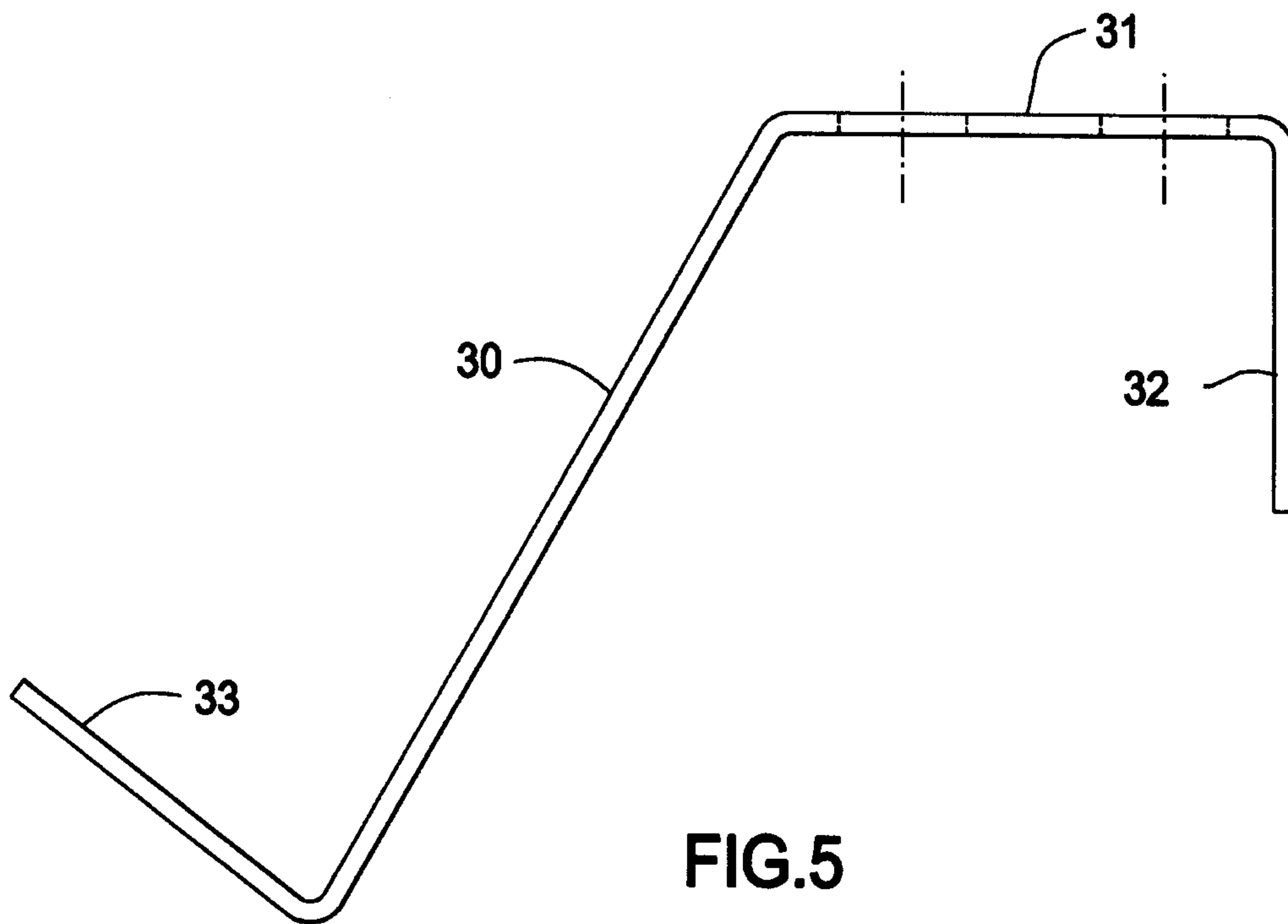
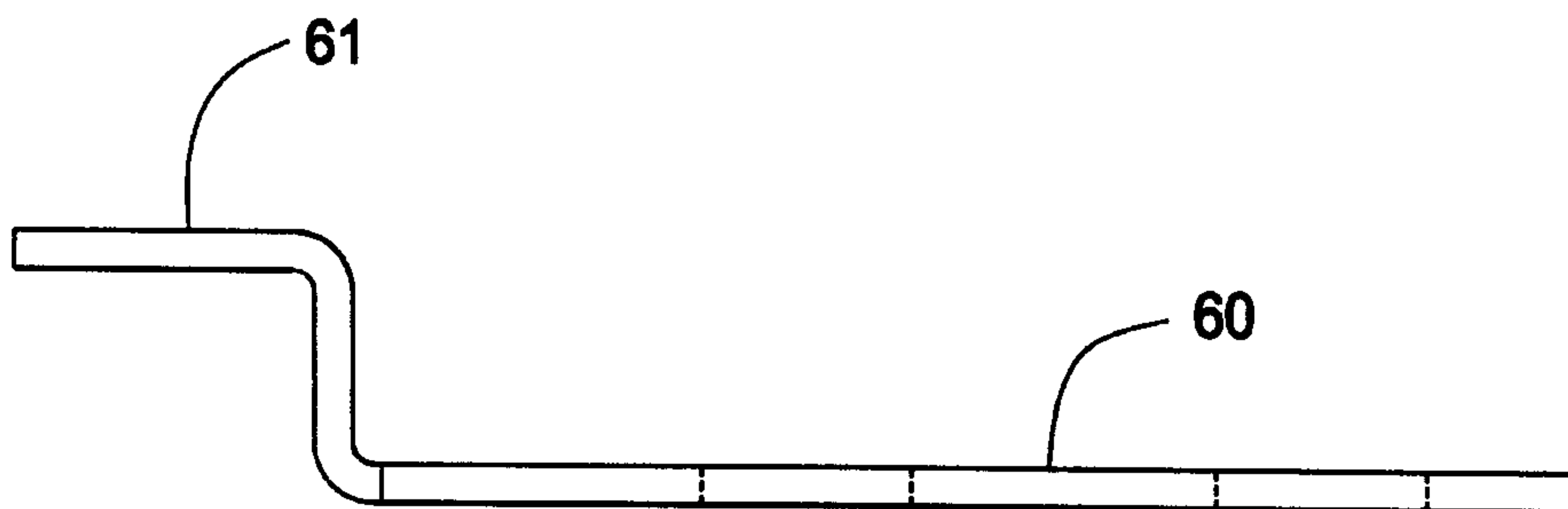


FIG. 6



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