Dec. 31, 1957 G. M. GLIDDEN 2,818,066

TRANSFER MASK

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Fig. 1

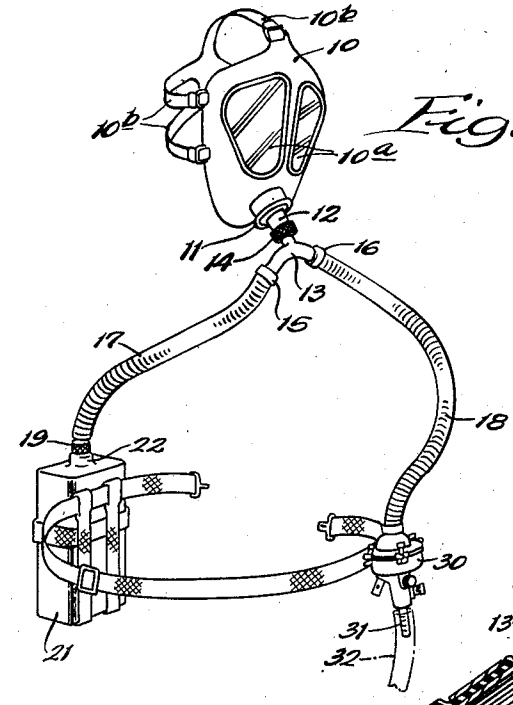
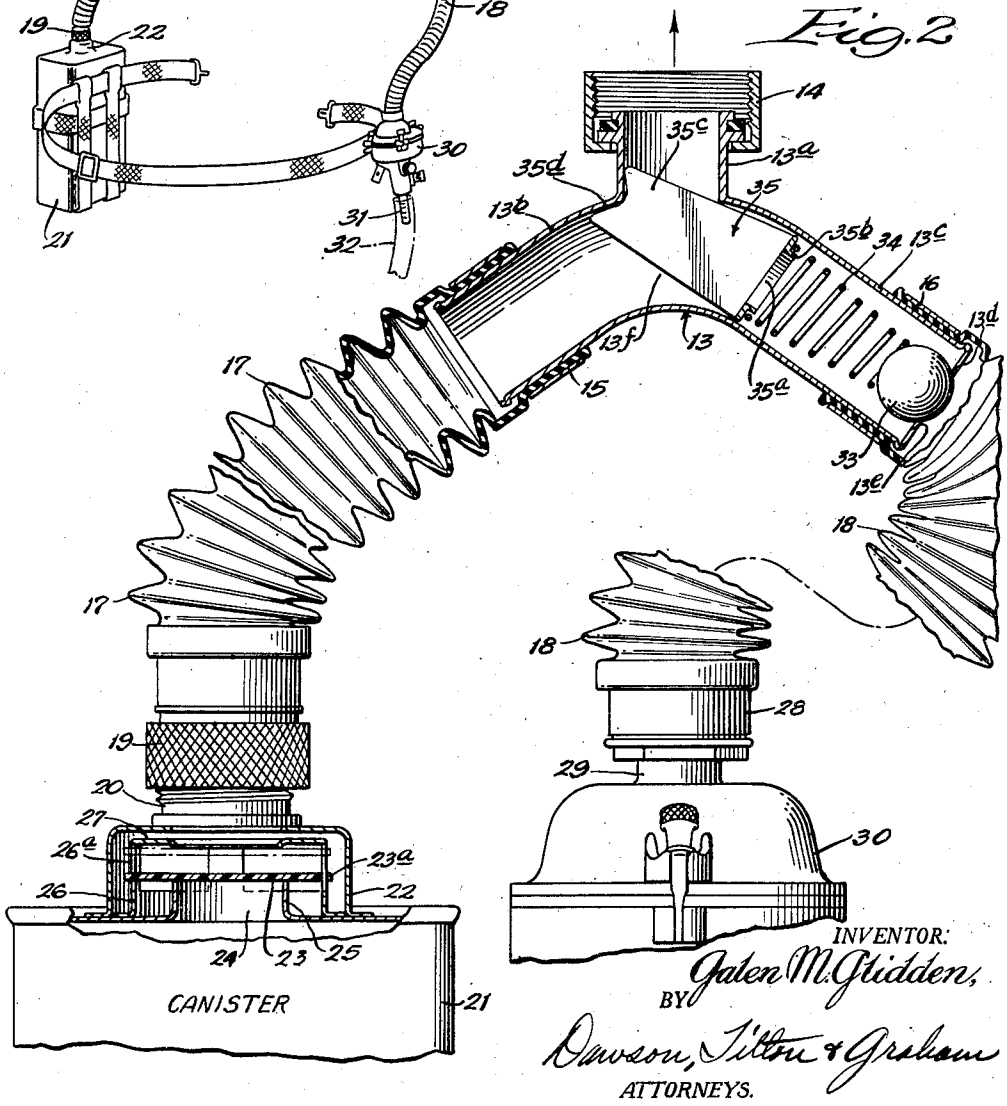


Fig. 2



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TRANSFER MASK

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This invention relates to a transfer mask, that is, it relates to a mask which is particularly adapted for transferring from one compressed air supply to another while providing the wearer with another source of air during the transition interval. The transfer mask of this invention also has other applications and uses, such as providing protection against failure of a compressed air supply, etc.

The wearer of a compressed air mask is somewhat confined in his movements, since the mask must be connected to a compressed air supply. This has proven to be a rather serious limitation in the industrial use of compressed air masks, since workers very frequently wish to move about within the contaminated areas of the plant over rather large rooms and even from room to room. While the mask can be readily disconnected from a compressed air supply and reconnected to another source of compressed air at a different point, it has been necessary for the wearer to hold his breath during the transfer interval, which is not only uncomfortable to the wearer but seriously limits the distance of movement between sources of compressed air. Further, there is also the problem of having a failure in the supply of compressed air, which leaves the worker without any source of air for breathing.

It is therefore a general object of this invention to provide a mask which substantially overcomes the problems and difficulties set out above. More specifically, it is an object of this invention to provide a mask which is adapted for transferring from one source of compressed air to another, and it is therefore referred to herein as a transfer mask. Still another object is to provide a transfer mask of the character described which provides an auxiliary air supply for use during the transfer interval when the mask is not connected to a compressed air supply. In this connection, it is a specific object to provide a means for automatically connecting the mask to the auxiliary source of air whenever it is disconnected from the source of compressed air. A still further object is to provide a mask which as a safety feature is provided with means supplying atmospheric air whenever the supply of compressed air is terminated, whether by a failure in the compressed air supply or by disconnecting the mask from the source of compressed air. Further objects and advantages will appear as the specification proceeds.

This invention is shown in an illustrative embodiment in the accompanying drawing, in which—

Fig. 1 is a perspective view of a transfer mask embodying the present invention, and Fig. 2 is a front elevational view of part of the equipment shown in Fig. 1, illustrating the details of construction by partial sectional view where such details are important for the purposes of this invention.

The transfer mask illustrated in the drawing includes a face piece **10** with the usual eye pieces **10***a* and head straps **10***b*. Face piece **10** is also provided with a valve-controlled outlet at **11**, the outlet being concentric to the inlet at **12**. This particular concentric arrangement of the inlet and outlet, however, forms no part of the present

invention and is not essential to the objects of this invention.

In accordance with this invention, a conduit means is provided extending from the gas mask inlet and dividing into two branches. In the embodiment shown in the drawing, the leg **13***a* of a Y connector **13** is coupled to an extension of inlet **12** by means of a coupling nut **14**. To each of the arms **13***b* and **13***c* of Y connector **13** there is clamped respectively at **15** and **16** a flexible conduit or corrugated hose **17** and **18**.

One of the branches of the conduit extending from face piece **10** is connected to a canister of the type employed for supplying decontaminated atmospheric air to a gas mask face piece, while the other branch of the conduit is connected to a source of compressed air. In the illustration given, the lower end of hose **17** is equipped with an attachment nut **19** dimensioned to be received on the externally threaded outlet nipple **20** of a gas mask canister **21**. Obviously, other standard connections can be used with equal facility. The conduit branch provided by hose **17** together with canister **21** provide a passage for the intake of atmospheric air.

In accordance with this invention a flutter-type outlet check valve is interposed in the atmospheric air intake passage constructed and arranged so that a slight negative pressure within the face piece will open the valve and permit air to flow inwardly through the intake passage. This can be readily accomplished as in the illustration given, where the canister **21** is provided at its top with a head **22** having a disc **23** therein acting as a flutter-type outlet check valve. Specifically, as shown in Fig. 2, disc **23** closes the passage **24** from canister **21** by seating on the top of outlet neck **25** and lifting above the top of neck **25** to open the passage into hose **17**. A slotted shell **26** is also provided about disc **23** for guiding its upward and downward movements, projections **23***a* on disc **23** extending into slots **26***a* of shell **26**. At its top shell **26** provides an inwardly extending flange **27** to limit the upward movement of disc **23**. Other flutter valve assemblies for gas mask canisters can be employed, as is well known in the art.

The other branch of the conduit provided by Y connector arm **13***c* and hose **18** is adapted to be connected to a source of compressed air. As shown in the drawing, the lower end of hose **18** is secured to the outlet nipple **29** of a cartridge-type air filter **30** by means of a releasable clamp **28**. As shown more clearly in Fig. 1, a plug-type hose connector **31** extends from the inlet end of filter unit **30** and is adapted to be inserted in the end of a compressed air supply hose **32** while being readily disengageable therefrom. Air filter unit **30** can be omitted, if desired.

Within the compressed air intake passage there is interposed, in accordance with this invention, a spring-biased outlet check valve which is constructed and arranged so that it will be opened by a positive pressure in the compressed air intake passage downstream from the spring-biased valve. While this spring-biased valve can be located anywhere in the compressed air intake passage, it has been found to be advantageous to place it in arm **13***c* of Y connector **13**, as illustrated more clearly in Fig. 2.

In the illustration given, the lower end of arm **13***c* is provided with an inwardly extending flange **13***d* providing an annular valve seat **13***e*. A ball valve **33** within leg **13***a* is dimensioned and arranged to rest on seat **13***e* and thereby close the compressed air intake passage while being movable away from the valve seat to open the passage. A compression spring **34** is also provided within arm **13***c* with its lower end bearing against ball valve **33** and urging it onto seat **13***e*. Preferably, compression spring **34**, as illustrated, extends toward the throat **13***f* of Y connector **13**, and a removable clip **35** is seated in throat **13***f* and

arranged to maintain spring **34** under compression. In the illustration given, clip **35** is U-shaped. At the bottom of the U between the legs thereof there is provided an opening **35***a* above the upper end of spring **34**. The bottom of U-shaped clip **35** is also provided with a downwardly extending lip **35***b* providing a seat for the upper end of spring **34**. The legs **35***c* of clip **35** are notched at **35***d* to engage the wall corner between leg **13***a* and arm **13***b* of Y connector **13**. With this construction clip **35**, spring **34** and ball valve **33** can be easily inserted and removed from Y connector **13**.

Operation

In the normal operation of a transfer mask constructed in accordance with this invention, the wearer will be receiving air from a source of compressed air, and only in emergencies or during an interval of time in which the wearer is moving from one source of compressed air to another will atmospheric air be supplied to the mask. It is an important feature of the mask, however, that the atmospheric air will automatically become available whenever the compressed air supply fails or the mask is disconnected therefrom. This can be made clearer by considering the following discussion of the embodiment illustrated in the drawing.

Compressed air is supplied through hose **32**. It will pass through the cartridge filter within filter unit **30**, and thence into hose **18**, thereby exerting a positive pressure against ball valve **33** sufficient to unseat the ball valve and permit the compressed air to flow continuously into and through face piece **10**. Usually a positive pressure of .6 to .8 inch of water will be maintained within the face piece, and the compressed air will be supplied at a corresponding higher pressure, allowing for slight pressure losses in the supply conduit. It will be understood, of course, that compression spring **34** should be a rather light spring which can be readily compressed by a small positive pressure.

When the compressed air is being supplied as already described, not only will there be a positive pressure within the face piece but this pressure will extend into hose **17** down to the flutter valve within the atmospheric air intake passage. Specifically, the positive pressure within hose **17** will force disc **23** downwardly against the top of neck **25**, thus closing the atmospheric air intake passage. As long as a positive pressure is maintained above disc **23** or other flutter-type outlet check valve, the valve will remain closed, and this condition will prevail as long as compressed air continues to be supplied to the face piece.

However, when compressed air is no longer supplied to the compressed air intake passage, ball valve **33** will automatically close, since it is spring biased to a closed position by compression spring **34**. When this occurs, the continued inhalation of air by the wearer of the mask will create a slight negative pressure within the face piece which will extend down to the flutter valve within the atmospheric intake passage and cause this valve to automatically open. More specifically, a slight negative pressure thus created above disc **23** will cause this disc **23** to rise and open the outlet passage **24** from canister **21**. Thus, atmospheric air will be admitted to the face piece through the atmospheric air intake passage, after being decontaminated by flowing through canister **21**. This will permit the wearer to continue breathing normally until the mask is again supplied with compressed air, at which time ball valve **33** will automatically open and disc valve **23** will automatically be closed.

While in the foregoing specification this invention has been described in relation to a specific embodiment thereof and many details have been set forth for purpose of illustration, it will be apparent to those skilled in the art that this invention is susceptible to other embodiments and that many of the details set forth herein can be varied widely without departing from the basic concepts of the invention.

I claim:

1. A transfer mask, comprising a face piece having a valve-controlled outlet and an inlet, a canister for use with said face piece, a Y connector having its leg connected to said face piece inlet, a separate hose section connected to each of the arms of said Y connector, the lower end of one of said hoses being adapted for connection to a source of compressed air and the lower end of the other of said hoses communicating with said canister, said canister having a check valve associated therewith, and a spring-biased outlet check valve positioned within the arm of said Y connector which is connected to said compressed air hose section, said spring-bias valve including an inwardly extending flange associated with the arm of said Y connector providing a portion of the compressed air intake passage, said inwardly extending flange providing a valve seat, valve means within said connector leg dimensioned and arranged to rest on said valve seat and close the compressed air intake passage, and spring means arranged to urge said valve seat against said seat and extending within said arm toward the throat of said Y connector.

2. A transfer mask, comprising a face piece having a valve-controlled outlet and an inlet, a canister for use with said face piece, a Y connector having its leg connected to said face piece inlet, a separate hose section connected to each of the arms of said Y connector, the lower end of one of said hoses being adapted for connection to a source of compressed air and the lower end of the other of said hoses communicating with said canister, said canister having a check valve associated therewith, and a spring-biased outlet check valve positioned within the arm of said Y connector which provides a portion of the compressed air intake passage, said spring-biased valve including an inwardly extending flange associated with the said arm of said Y connector, said inwardly extending flange providing an annular valve seat, a ball within said connector arm dimensioned and arranged to rest on said valve seat and close the compressed air intake passage, a compression spring arranged to urge said ball against said seat and extending within said arm toward the throat of said Y connector, and a removable clip within the throat of said Y connector arranged to maintain said spring under compression.

3. A device for converting an ordinary gas mask to a transfer mask, comprising a Y connector having a leg adapted to be connected to the inlet of a gas mask face piece, said connector also providing two arms adapted to be connected respectively to a compressed air supply hose and to an atmospheric air supply hose, a spring-biased outlet check valve positioned within the arm of said Y connector which is adapted for connection to said compressed air supply hose, said spring-biased valve including an inwardly extending flange associated with the arm of said Y connector within which said check valve is positioned, said inwardly extending flange providing an annular valve seat, a ball within said last-mentioned connector arm dimensioned and arranged to rest on said valve seat and close the said last-mentioned arm, a compression spring arranged to urge said ball against said seat and extending within said last-mentioned arm toward the throat of said Y connector, and a removable clip within the throat of said Y connector arranged to maintain said spring under compression.

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