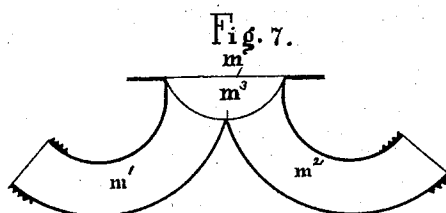
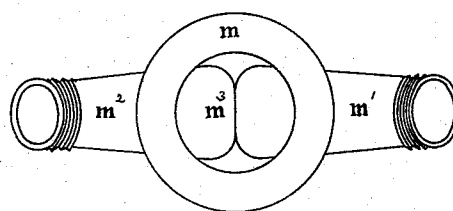
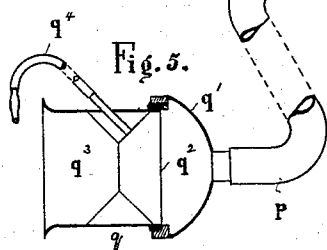
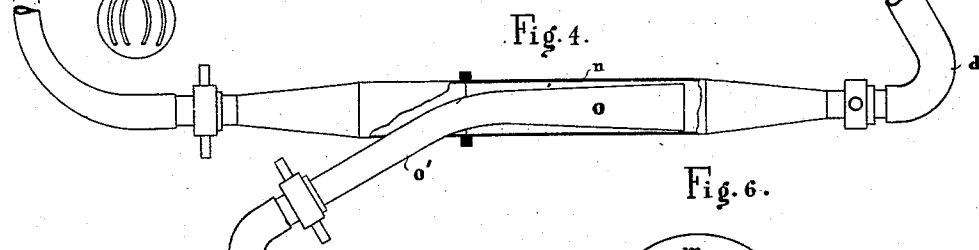
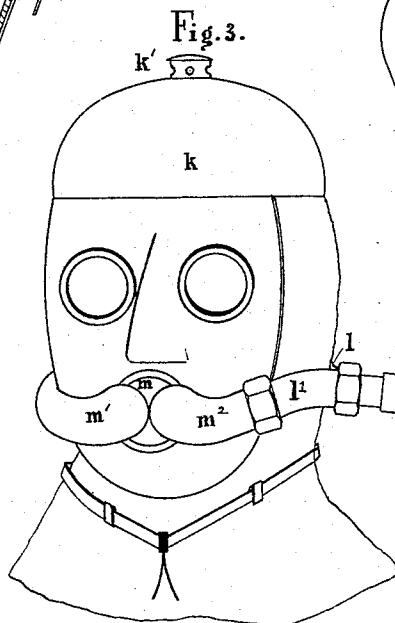
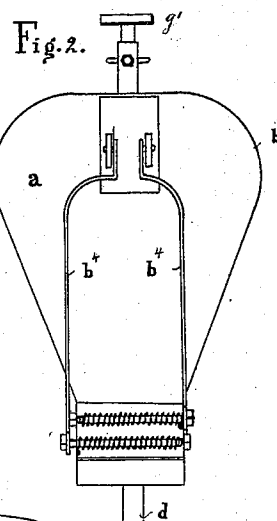
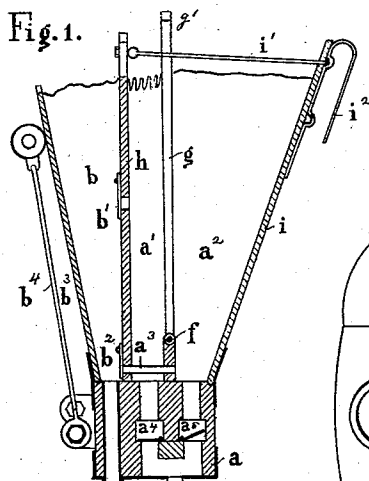


(No Model.)

C. G. M. REICHEL.
SMOKE HELMET.

No. 571,018.

Patented Nov. 10, 1896.



Witnesses:
William Schulz.
Frederick Seibel.

Inventor:
Carl Gustav Maximilian Reichel
by his attorneys,
Roderick B. Wilson

UNITED STATES PATENT OFFICE.

CARL GUSTAV MAXIMILIAN REICHEL, OF ALTONA, GERMANY.

SMOKE-HELMET.

SPECIFICATION forming part of Letters Patent No. 571,018, dated November 10, 1896.

Application filed November 13, 1895. Serial No. 568,801. (No model.)

To all whom it may concern:

Be it known that I, CARL GUSTAV MAXIMILIAN REICHEL, residing at Altona, Germany, have invented new and useful Improvements in Smoke or Diving Helmets, of which the following is a specification.

The very favorable reception and general employment of the Altona smoke-helmet on König's system by fire-brigades and fire-corps of all kinds, in breweries, chemical works, &c., is a striking proof of the utility of the said helmet. It, however, possesses the disadvantage that in the case of great distances or when long lengths of hose are used the person working in the smoke or other noxious gases is not able to communicate with the outer world, so as to give information as to the state of affairs at the place at which he is situated or to receive orders or instructions. This drawback is felt in particular in the case of large fires in warehouses, on board ship, &c., because the superintendent or other person directing the operations is generally without any or at least has very little knowledge as to the place of origin and the cause of the fire, and he cannot, therefore, give any instructions to the person who is working inside the region of the conflagration. For such purposes the telephone has been employed, as in the case of divers, but it has not been found suitable in this case and its use has often led to misunderstanding.

Now the present invention has for its object to obviate the drawback above referred to and to provide a reliable means of communication between persons at a considerable distance from one another; for example, between a fireman and his superintendent or between a diver and the occupants of a boat or other vessel.

Apparatus according to my invention is illustrated in the accompanying drawings. It comprises a double-acting bellows, Figures 1 and 2, or other air-supplying device, the smoke-helmet or diver's helmet, Fig. 3, connected therewith by means of a flexible pipe, and a tube, Fig. 4, which is inserted in the flexible pipe between the said two parts and which is connected by means of a separate flexible pipe with the mechanical telephone, Fig. 5. The mouthpiece on the mask of the smoke-helmet is illustrated in Fig. 6 in

rear elevation and in Fig. 7 in horizontal section.

A continuous and uniform current of air is produced by means of the double-acting bellows *a*, Figs. 1 and 2, which is provided with a wind-chest *b*, suction-tube *c*, and delivery-tube *d*. The bellows *a* is divided by means of a movable partition *g* (that is adapted to oscillate about the pivot *f*) into two compartments *a'* *a*², of which the former, *a'*, communicates with the wind-chest *b* through delivery-valve *b'*, and the compartment *a*² communicates with *b* through the passage *a*³ and delivery-valve *b*². The wall *h* is firmly fixed to the lower part of the bellows, while the wall *i*, on the contrary, is hinged, as shown, and can be adjusted relatively to the wall *h* by means of the rod *i'*. The wall *i* is made capable of movement only to enable the entire bellows to be folded together into the smallest possible compass for facility of transport. In use the bellows are suspended by a hook *v*² from the belt of one of the persons desiring to communicate with one another, and the partition *g* is moved slowly to and fro by means of the handle *g'*. The air which is thus caused to enter through the suction-valves *a*⁴ and *a*⁵ is pressed out of the chambers *a'* and *a*² through the delivery-valve *b'* and valve *b*² into the wind-chest.

With the object of equalizing the pressure the wind-chest is constantly compressed by means of two spring-arms *b*⁴, which act upon the movable outer wall *b*³ of the wind-chest, the ends of the spring-arms sliding on the said wall *b*³ and being provided with rollers for the purpose of reducing the friction. From the wind-chest the air flows through the delivery-tube *d* to the helmet *k*, Fig. 3.

The helmet illustrated is the well-known König's smoke-helmet, the soft-leather hood of which is drawn tightly around the neck of the wearer by means of a strap or cord. The delivery-tube divides at the rear of the helmet into two ends *l l'*, which are connected separately to the mouthpiece *m*, fitted on the mask.

The mouthpiece, Figs. 3, 6, and 7, is fixed to the mask of the smoke-helmet by means of a flange (or other suitable device) and consists of a hemispherical or funnel-shaped chamber, into which the pipe ends *m'* and *m*²

open in such a manner that their outer walls form a common central sharp-edged partition m^3 inside the chamber. This construction of mouthpiece has been found by numerous experiments to be advantageous, because not only can all words spoken into it be clearly heard outside, but also all words spoken from outside through the mouthpiece into the helmet can be clearly heard by the wearer.

The tube n , arranged between the two parts of the delivery-pipe d , Fig. 4, is enlarged in the middle and diminishes at its ends to the size of the said pipes. Inside the enlarged portion there is provided a conical nozzle-shaped tube o , the narrower end of which is connected by means of the branch pipe o' and the flexible pipe p with the mechanical telephone q , Fig. 5. The latter consists of the shell q' , connected to p , the membrane or diaphragm q^2 , and the trumpet-mouth q^3 . The diaphragm shuts off the branch piping o' p and the shell q' from the outside, so that the air pressed in by the bellows toward the smoke-helmet can escape only through the blow-off valve k' on the latter.

The trumpet or mouthpiece q^3 may also have connected to it a special hearing-tube q^4 , which terminates in a small tube made of glass, vulcanized rubber, or the like, that is inserted in the ear of the user, who then employs the mouthpiece for speaking purposes only. The messages spoken into the trumpet are transmitted by the current of air produced by the bellows and reach the ear of the wearer of the helmet, so as to be readily heard by him without necessitating the provision of special ear-trumpets in the helmet. Vice versa, all the words spoken in the helmet into its mouthpiece are rendered so clearly audible by the diaphragm that after very slight

practice no mistakes are likely to occur in the hearing and understanding of the transmitted sounds.

By arranging a number of branch pipes on the tube n or a number of tubes n with one or more branch pipes o' in the flexible piping a number of persons at different points can place themselves in communication with the person wearing the helmet. This is of great advantage with flexible tubing of over forty meters in length, because, for instance, in the case of a fire in a large warehouse the superintendent or other person in charge is enabled to give orders to and receive information from the fireman from any desired point. The flexible suction-pipe c is of great value, because it enables pure air to be taken from any suitable point, and considerably shortens the delivery-pipe.

What I claim is—

1. The combination of a helmet having a vent, with a bellows, a connecting main tube, a mechanical telephone, and a branch tube secured to the mechanical telephone and having a nozzle that enters the main tube, substantially as specified.

2. The combination of a helmet, with a bellows having a pair of compression-chambers, an intermediate movable partition, a windchest having a hinged wall, and a pivoted spring-arm having a friction-roller that bears against said hinged wall, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CARL GUSTAV MAXIMILIAN REICHEL.

Witnesses:

W. T. E. KOCH,
HEINRICH EGGERS.