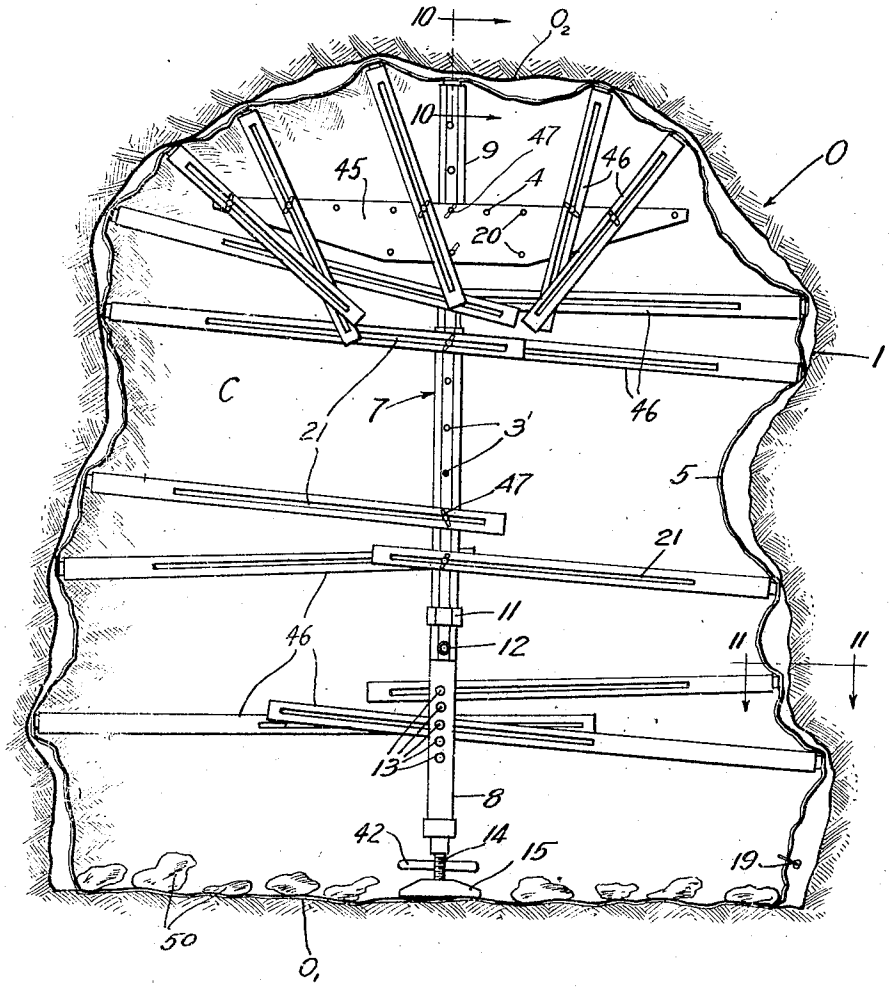
June 24, 1930. V. T. BERNER 1,766,324

BRATTICE

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Fig. 1.



INVENTOR.
Vernon T. Berner
BY Arthur P. Knight and
Alfred W. Knight
ATTORNEYS

June 24, 1930. V. T. BERNER 1,766,324

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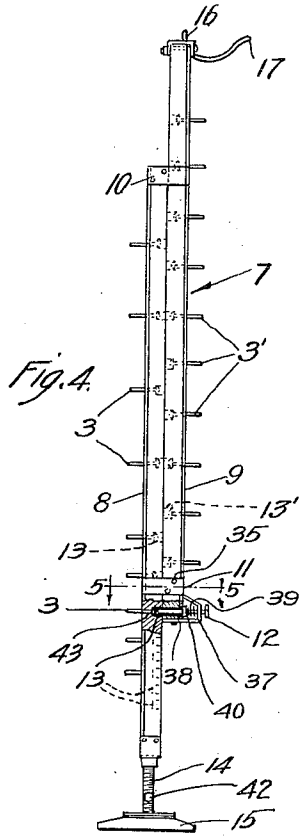


Fig.4.

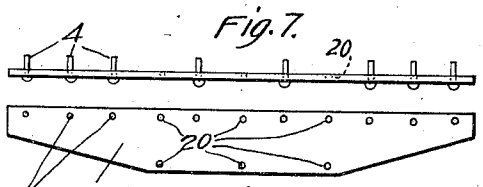


Fig.7. Fig.6.

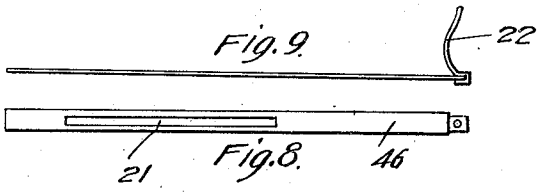


Fig.9. Fig.8.

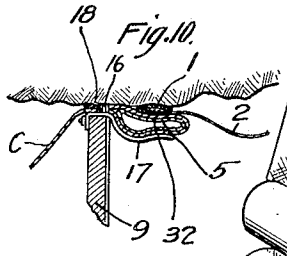


Fig.10.

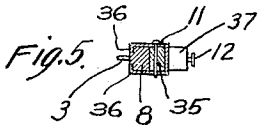


Fig.5.

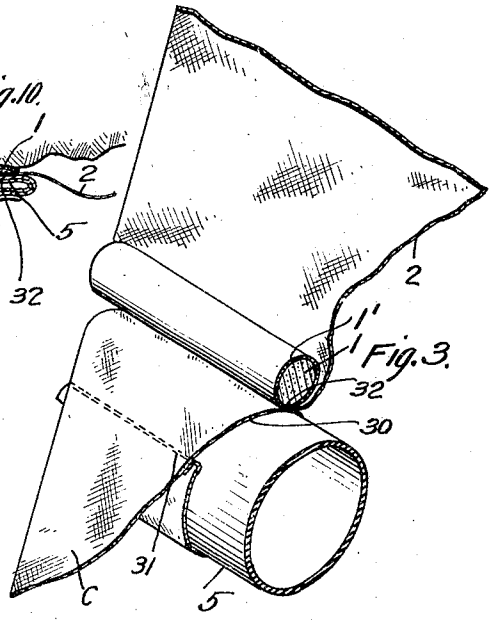


Fig.3.

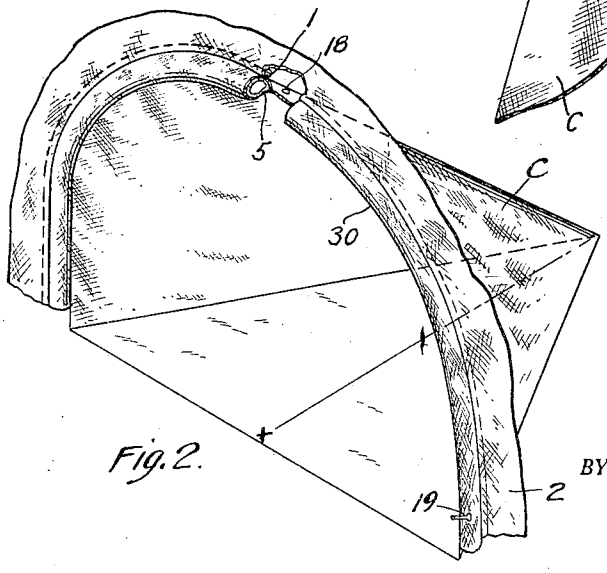


Fig.2.

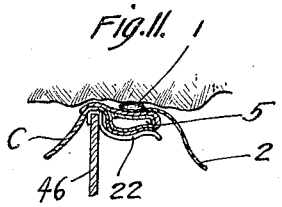


Fig.11.

INVENTOR.
Vernon T. Berner
BY Arthur P. Knight and
Alfred W. Knight
ATTORNEYS

Patented June 24, 1930 1,766,324

UNITED STATES PATENT OFFICE

VERNON T. BERNER, OF RAY, ARIZONA

BRATTICE

Application filed February 9, 1929. Serial No. 338,807.

This invention relates to an improved construction of a portable and adjustable knock-down brattice or partition for quickly and effectively closing and sealing openings, such as tunnels, drifts, shafts, and other openings in mines; flues in smelters and other industrial plants; and openings or passages of similar cross-section in buildings or structures of any kind.

The general purpose of such closing and sealing of openings, by whatever means effected, is the control of ventilation or the prevention of the passage of undesirable air currents carrying smoke, dust, or gases. The accomplishment of this purpose is of utmost importance in the fighting, control, and extinguishing of fires in mines, and in the safeguarding of life and property endangered by such fires. During mine fires, some of the results which can be accomplished, with greater or less success, by intelligent placing of canvas brattices, wooden bulkheads, barricades of loose rock or dirt, and makeshift stoppings of various kinds, are the following: The isolation of a burning area from the balance of the mine workings, or the restriction of the area to which the fire can spread; the smothering of the fire by cutting off the passage of fresh air to the burning area; the prevention of the entry of smoke and dangerous gases,—the products of combustion,—to parts of the mine where men are working, or to the routes of exit through which men must pass in escaping from the danger zone; the exclusion of poisonous gases and the conserving of the supply of good air in blind headings, where entrapped miners may be forced to take refuge; the safe-guarding of rescue parties, and the facilitating of the rescue work.

The principal object of my invention is to make possible the accomplishment of all the results above mentioned easily, quickly, and effectively.

Further and more particular objects of the invention are:

To provide a strong, light, portable brattice that can be carried to the place where it is to be erected and can be erected by one man when more help is not available;

To provide a brattice that can be erected by two men more quickly than any other type of brattice can be erected irrespective of the number of men employed in its erection;

To provide a brattice which is adaptable to any shape or irregularity of opening, and that by varying the sizes of its various parts or by increasing the number of units in the supporting frame work thereof, may be adapted to any size of opening which may reasonably be expected to be encountered;

To provide a brattice that requires no special skill for its erection, nor any tools or accessories other than a source of air or gas under pressure, such as a pneumatic pump or a small tank of compressed air or gas;

To provide a brattice whose erection involves a minimum risk of injury to those erecting it, since the work of erection does not require the use of hammers, axes and other tools in restricted space under poor light or in the presence of smoke, and frequently with the worker hampered by fire helmets and breathing apparatus, as is true with the brattice constructions now in common use;

To provide a brattice that includes, as an integral part of itself, every material necessary for making a partition or seal which is practically air tight; and

To provide a brattice that, when it has served its purpose in one place, may be quickly and easily removed without damage to itself, and may be used again and again thereafter as occasion may require.

The improved form of brattice according to my invention comprises essentially a flexible curtain member of farbic or the like of sufficient size to form a partition extending entirely across the area of any opening in which it may be desired to use the same, and adapted to fit at its edges against the walls of said opening, inflatable, flexible, tubular sealing means secured to or mounted adjacent the edges of said curtain member, and an adjustable supporting frame-work adapted to be placed in the opening to be closed and having a plurality of branches or arms which may be adjusted and extended so as to engage the edges of the curtain mem-

ber and the tubular sealing means at a plurality of points sufficiently close together to hold the same outwardly in substantially tight engagement with the walls of the opening.

The device also comprises other important and advantageous features whose construction and functions will be apparent from the following description of an exemplary form of the invention.

The accompanying drawings illustrate such an improved form of brattice and referring thereto:

Fig. 1 is a front elevation of the brattice as mounted in position in a mine tunnel.

Fig. 2 is a perspective view of the flexible curtain member with the tubular sealing means secured adjacent an edge thereof.

Fig. 3 is a perspective view on an enlarged scale of a portion of the edge of the curtain member with the flexible sealing means and the packing means secured thereto.

Fig. 4 is a side elevation of the adjustable standard of the supporting frame work.

Fig. 5 is a section on line 5—5 in Fig. 1.

Fig. 6 is a front elevation, and Fig. 7 a plan view, of the transverse yoke or bridge of the supporting frame work.

Fig. 8 is a front elevation, and Fig. 9 a plan view, of one of the spreader strips or adjustable arms of the frame work.

Fig. 10 is a section on line 10—10 in Fig. 1.

Fig. 11 is a section on line 11—11 in Fig. 1.

The curtain member shown at C in Fig. 2 may be made of canvas or other brattice cloth or in general of any fabric or other substantially impervious, flexible material of suitable strength. Said curtain member is shown as being generally conical in shape with its circumference at the larger end somewhat greater than that of the opening to be sealed. Adjacent the edge of the curtain, for about three fourths of its circumference, or in general for a sufficient length to extend throughout the top and side walls of the opening to be closed, the inflatable, tubular sealing means, shown in this case as comprising a rubber tube 5, is secured, as for example by carrying the edge of the curtain material around this inflatable member as shown at 30 and sewing the turned-back portion to the main portion of the curtain as indicated at 31, thus encasing said inflatable member. The rubber tube 5 is closed at each end but is provided, preferably near one end, with a valved inlet tube 19 similar to the inlet tube of the inner tube of a tire, through which it can be inflated by means of a tire pump or other penumatic pump or from containers filled with gas or air under pressure.

A roll or elongated packing member 1 of cotton, sponge rubber or other yielding packing material, preferably encased in a casing 1′ of cloth, felt, or the like, and a flap 2 of cloth, felt or the like, are also preferably sewed or otherwise secured to the edge portion of the curtain member as at 32. The purpose of the packing member 1 is to adjust itself to conform with the smaller irregularities of the surface at the top and sides of the opening when the tubular sealing member is inflated, while the purpose of the flap 2 is to provide a still further means for filling any small opening which may remain after the sealing member is fully inflated.

At the top of the curtain, and substantially midway between the ends of the sealing member and close to the sealing member. is a metal eyelet or grommet 18 for a purpose hereinafter explained.

The adjustable supporting framework may comprise a vertically adjustable or extensible upright support or standard 7 consisting, for example, of two elongated members 8 and 9 of hardwood or other suitable material slidably held together by the metal straps 10 and 11. The metal strap 11 may be secured to the member 9 as by means of bolts or pins 35 and may be provided with inwardly bent extremities 36 embracing the sides of the other frame member 8, while the other strap 10 may be similarly secured to the member 8 and slidably embrace the member 9, whereby said members are held together, but are free to slide longitudinally upon each other. Any suitable means may be provided for holding the members of the adjustable standard in adjusted position. For example, a pin 12 may be mounted in a bracket 37 at the lower end of the member 9, said pin passing through an opening 38 in said member and being adapted to engage at its inner end in any one of a plurality of vertically spaced openings 13 in the member 8. A spring 39 may be provided between bracket 37 and a collar or shoulder 40 on pin 12, tending to hold said pin inwardly in the opening 13 in which it is inserted. The frame member 8 is shown as mounted upon base 15 by means of a jack screw 14 turning loosely in said base and threaded into the lower portion of the member 8, said jack screw being provided with the usual arms 42 for manual operation thereof.

The standard members 8 and 9 are each provided with a plurality of vertically spaced projecting studs or pins 3 and 3′ respectively, which are shown as comprising threaded studs threadedly mounted in openings 43 in the respective members 8 and 9 and with their heads recessed into the enlarged openings 13 and 13′ in the respective members 8 and 9. The outer ends of said studs project beyond the faces of said frame members sufficiently to permit mounting of the remaining parts of the supporting framework thereon. Said other parts of the supporting framework may comprise a cross-piece or yoke 45 adapted to be adjustably mounted on the up-

right support 7, and a plurality of bars or spreader strips 46 adapted to be adjustably secured to said cross-piece and to said upright support.

The cross-piece 45 is shown as provided, for the purpose of adjustably mounting the same on the upright support, with a plurality of horizontally spaced pairs of openings 20, the openings of each pair being spaced apart vertically by a distance corresponding to the vertical spacing of the studs 3 or 3′ on the standard. In the particular construction shown the studs 3′ on member 9 are all spaced apart equally and the openings 20 of each pair, on cross-piece 45, are spaced to fit over any pair of adjacent studs on this member, while the studs 3 on member 8 are shown as being spaced relatively further apart at the upper portion and relatively closer together at the lower portion, but it will be understood that any suitable spacing of these studs may be provided, and that the openings 20 on the cross-piece may be spaced to fit over the studs on either of the members 8 or 9. The cross-piece 45 is also shown as provided with a plurality of projecting studs or pins 4 spaced horizontally thereon and secured thereto in any suitable manner.

The spreader strips 46 are preferably made up in several different lengths so as to fit different sized openings and also for use at different portions of the framework. Each of these strips is provided with a longitudinal slot 21 adapted to fit over any one of the studs 3, 3′, or 4 on either the standard members 8 or 9 or cross-piece 45 so as to be longitudinally adjustable or outwardly extensible thereon. Said studs may be provided with wing nuts 47 by means of which said spreader strips, as well as cross-piece 45, may be secured in adjusted position.

At the outer end of each spreader strip is provided a metal strap 22, secured thereto in any suitable manner, and formed in the shape of a hook as shown in Figs. 9 and 11 so as to engage the edge of the curtain member and the tubular sealing member and hold the same outwardly against the top and sides of the opening. A similar metal strap 17 is also provided at the top of the standard member 9, said strap being also formed as a hook, as shown in Figs. 4 and 10, for the purpose above mentioned. A pin or stud 16 is also provided at the top of said standard member, for engaging in the eyelet or grommet 18 in the curtain member.

The general procedure in erecting the above described brattice is as folows: The curtain member C is first laid down or spread out on the floor O_1 of the opening or passage to be sealed, said opening being indicated at O, and the upright support or standard 7 is placed thereon in vertical position, with its base 15 at approximately the mid-point of the lower edge of the curtain member, such mid-point being conveniently designated by a suitable mark on the curtain member, such as the mark x shown in Fig. 2. The eyelet or grommet 18 at the mid-point of the top of the curtain is slipped over the pin 16 in the top of the standard, with the hook 17 engaging beneath the edge portion of the curtain member and the tubular sealing member encased thereby, as shown in Fig. 10. The pin 12 is then withdrawn and movable member 9 of the standard is slid upwardly until its upper end comes close to the roof or top O_2 of the opening, and is then fixed at approximately this height by inserting the pin 12 into the nearest of the holes 13. The jack screw 14 is then screwed up by means of arms 42 so as to raise the standard 7 until its upper end engages the top of the opening, as shown in Fig. 10, so as to securely wedge said standard in position between the top and bottom of the opening.

The cross-piece or yoke 45 is then secured at a suitable height on the standard, by slipping a pair of openings 20 over a suitable pair of studs 3′ on the member 9, it being obvious that by suitably selecting the openings 20 and the studs 3′, any desired position of said cross-piece, either vertically or horizontally may be secured. Said cross-piece is then fastened rigidly in position as by wing nuts 47.

The various spreader pieces 46 of suitable lengths are then placed upon any desired ones of the studs 3 and 3′ on the standard and the studs 4 on the cross-piece, and the hooks 22 at the outer ends thereof brought into proper engagement with the edge portion of the curtain member and the tubular sealing member as shown for example in Fig. 11, and each spreader piece is then adjusted outwardly by means of the slot 21 until the tubular sealing member 5 and packing member 1 is held firmly against the side or top of the opening at the extremity of that particular spreader piece, which is then secured in this position by a wing nut 47. In this manner the tubular sealing member and the packing member, as well as the edges of the curtain member, are forced outwardly at a plurality of points against the walls of the opening and are quickly made to conform with the irregularities, depressions or projections in the sides or top of the opening.

The tubular sealing member is then inflated through the inlet tube 19 as above described, so as to provide sufficient pressure therein to force the portions thereof between the ends of the spreader strips, and the packing member carried thereby, outwardly into tight engagement with substantialy the entire length of the sides and top of the opening. Any small remaining openings may then be quickly and easily closed by stuffing into them the adjacent portions of the flap 2. It then re-

mains only to pile dirt, loose rock or any handy material upon the bottom of the curtain member, as indicated for example at 50 in Fig. 1, and the sealing off of the opening is then complete.

It will be evident that the erection of this brattice as above described can be easily and quickly effected by two men, and may in fact be done by one man with no difficulty, if required. It is also evident that the same is readily adjustable to different sized openings and to fit irregularities in the sides and top of the openings, and that when in position a substantialy gas tight seal is provided. Furthermore, the entire apparatus may be quickly and easily dismounted and carried to any desired position for erection.

I claim:

1. A brattice comprising a flexible curtain member, an inflated flexible tubular member engaging an edge portion of said curtain member, and an adjustable supporting frame adapted to hold said flexible tubular member and the side and top edge portions of the curtain member outwardly against the corresponding walls of an opening, the bottom edge portion of said curtain member being adapted to rest upon the bottom of said opening so as to complete the closure thereof.

2. A brattice comprising a flexible curtain member, inflatable flexible tubular means engaging said curtain member adjacent an edge thereof and extending throughout a considerable portion of the length of said edge, and an adjustable supporting frame having outwardly adjustable members adapted to engage said flexible tubular member at a plurality of points distributed throughout the length thereof.

3. A brattice comprising a flexible curtain member, an inflatable tubular member secured to said curtain member adjacent an edge thereof, and adjustable supporting means adapted to hold said inflatable tubular member and the edge of the curtain member outwardly against the walls of an opening.

4. A brattice comprising a flexible curtain member, an inflatable tubular member secured to said curtain member adjacent an edge thereof, means adapted to hold the edges of said curtain member outwardly against the walls of an opening, and a yielding packing member secured to the outside of the curtain member adjacent said inflatable tubular member so as to form a seal between the edges of the curtain member, together with said inflatable tubular member, and the walls of the opening.

5. A brattice comprising a flexible curtain member, an inflatable tubular member secured to said curtain member adjacent an edge thereof, a yielding packing member secured to the outside of the curtain member adjacent said edge thereof, and an adjustable supporting frame adapted to engage said edge of the curtain member and hold the same, together with said tubular member and said packing member, outwardly against the walls of an opening.

6. A brattice comprising a flexible curtain member, an inflatable flexible tubular member secured to an edge portion of said curtain member, a sealing flap also secured to said edge portion of said curtain member, and an adjustable supporting frame engaging said edge portion of the curtain member and the flexible tubular member so as to hold the same outwardly against the walls of an opening, said flap being adapted to close any small openings remaining between said edge portion of the curtain member and said walls of the opening.

7. A brattice comprising a curtain member extending substantially entirely across an opening, an inflated tubular sealing member adjacent the edge of said curtain member at the top and sides of said opening, a vertically extensible standard wedged between the top and bottom of said opening, the upper end of said standard engaging the edge portion of said curtain member and said sealing member to hold the same in engagement with the top of the opening, and outwardly extensible supporting members adjustably mounted on said standard and engaging the edge portion of said curtain member and said sealing member and holding the same in engagement with the top and side walls of the opening adjacent the outer ends of said supporting members.

In testimony whereof I have hereunto subscribed my name this 31st day of January, 1929.

VERNON T. BERNER.