Nov. 24, 1936. C. ENGELFRIED 2,061,936

MOUTH PROP

Filed Sept. 27, 1934

Fig. 1.

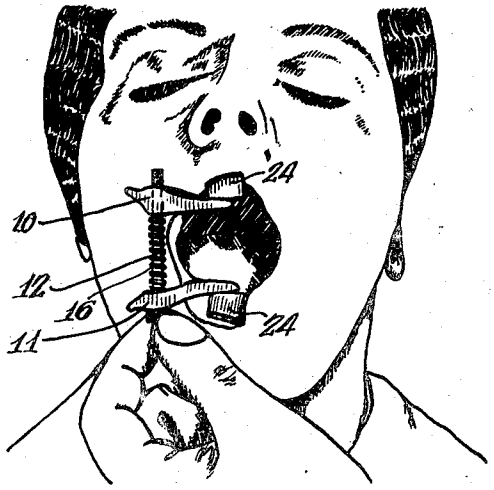


Fig. 2.

Fig. 3.

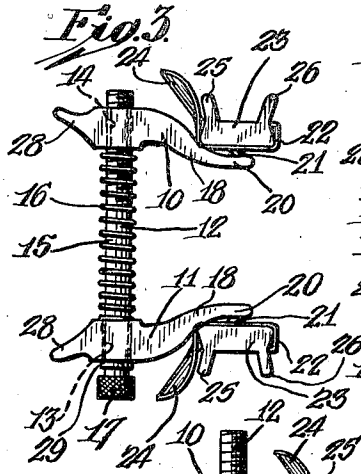


Fig. 4.

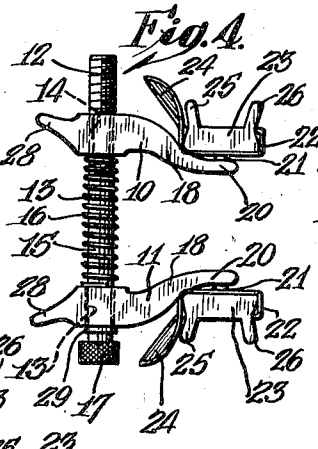


Fig. 7.

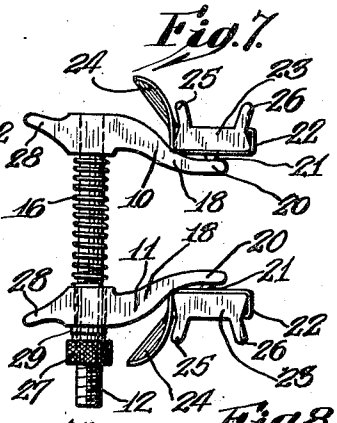


Fig. 5.

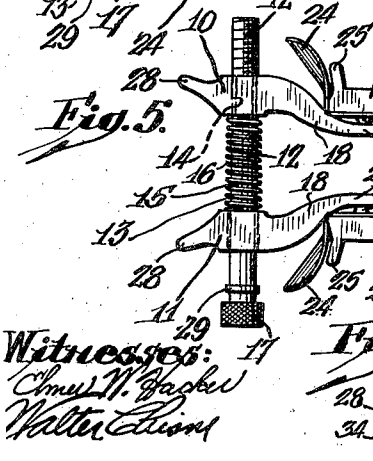


Fig. 6.

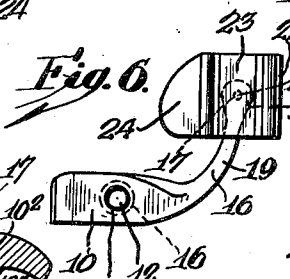


Fig. 8.

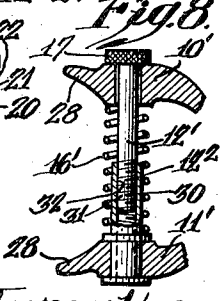
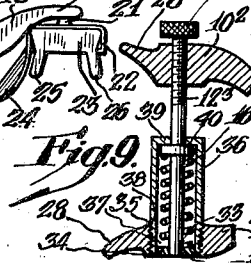


Fig. 9.



Witnesses:
Emil W. Zacke
Walter Thiem

Inventor
Charles Engelfried

Attorneys.

Patented Nov. 24, 1936 2,061,936

UNITED STATES PATENT OFFICE

2,061,936

MOUTH PROP

Charles Engelfried, Philadelphia, Pa., assignor to The J. Bird Moyer Company, Inc., Philadelphia, Pa., a corporation of Pennsylvania

Application September 27, 1934, Serial No. 745,663

8 Claims. (Cl. 128—12)

The present invention relates to an adjustable mouth prop for use by a dentist or throat surgeon to prop open the jaws of a patient for an operation on the teeth, tonsils, adenoids or the like. The general type of mouth prop to which my invention is applied, is the invention of Joseph A. N. Thibert.

A purpose of the invention is to positively adjust the maximum distance between jaw-engaging bars of a resilient mouth prop so as to suit the different jaws of different people or/and the jaws of the same person under different conditions.

A further purpose is to provide a screw threaded rod cooperating with the bars of a mouth prop to control the maximum distance between jaw-gripping members.

A further purpose is to provide an adjustable mouth prop, which, when placed in position between the jaws of a patient, regardless of whether the patient has a large or small mouth opening, will follow up the spontaneous muscular relaxing of the patient when subjected to a general anesthetic, such as nitrous oxide, or any other anesthetic. This spontaneous relaxing of the muscles at the attainment of anesthesia permits a spring to additionally open the mouth of the patient at the moment of complete anesthesia, thereby securing a wider opening of the mouth and more complete access to the affected parts, and at the same time providing a device which will have its maximum jaw spread predetermined before it is inserted between the jaws of a patient. When the patient has relaxed in the third stage of anesthesia, the muscular relaxation, which is one of the symptoms of anesthesia, permits the spring to urge the mouth open wider, or permits the operator to open the mouth wider, to be held open by the locking of the jaw prop and by the spring tending to push the jaws apart as far as the full extent of the predetermined set position.

The invention relates more particularly to that class of props in which the bars of the prop are resiliently pressed toward an ultimate limit of separation which the bars cannot exceed.

I have found that the requirements of service in a mouth prop are different not only with different sizes of normal mouth openings of different patients but also with the same patient according to whether he is to receive complete anesthesia or local anesthesia or is not to receive anesthesia at all.

Discomfort of the patient with excessive jaw opening makes it highly important that the extent of ultimate jaw opening shall be limited and that positive control of the maximum extent of opening of the jaws shall be within the ability of the operator. My invention is intended to supply this control.

The opening spring of a resilient jaw prop is desirably weak enough to avoid immediate or undue ultimate discomfort of the patient by reason of the resistance required to be exerted by the patient to the tendency of the jaws to spread, or by reason of the spread. In becoming fatigued the muscles gradually relax, thereby permitting the spring to spread the bars; and both the extent and rate of this spreading should be limited and should be under the control of the operator. For these reasons a further purpose is to control the extent and rate of opening of a jaw prop by mechanism within the easy reach of the operator, permitting step-by-step shiftings of the limits of spread of the prop.

I thus permit the operator to judge of the effect upon the jaw muscles of each previous step of extension of the limits of separation of the bars of the prop, keeping the opening movement and rate of movement within the constant control of the operating surgeon and permitting him to make very gradual adjustments. By my method the ultimate opening may be very accurately appraised and determined.

Further purposes will appear in the specification and in the claims.

I have elected to illustrate slightly different embodiments of but one main form of my prop, and have selected embodiments thereof at once easy and inexpensive to manufacture and which well illustrate the principles involved.

Figures 1 and 2 are front elevations illustrating a desirable embodiment of the device applied to a patient and respectively in different positions of use.

Figures 3, 4, and 5 are elevations to somewhat larger scale than in Figures 1 and 2. Figures 3 and 4 show the prop fully spread and are identical except that the bars are set to different limits. Figure 5 shows the prop with the setting of Figure 4 but with the bars relatively contracted for insertion between the jaws of a patient.

Figure 6 is a top plan view of the structure shown in Figures 3 to 5.

Figure 7 is a view corresponding generally to Figure 4 but showing a second embodiment.

Figure 8 is a fragmentary sectional view, partly in vertical section, illustrating a modification in which the adjusting rod is adapted to operate in a sleeve member.

Figure 9 is a fragmentary sectional view in vertical section illustrating a modification in which the spring is enclosed within a sleeve.

Like numerals refer to like parts in all figures.

Describing in illustration and not in limitation and referring to the drawing:

The prop shown in Figures 1–7 inclusive comprises bars 10 and 11 connected to slide one toward and away from the other along a threaded bolt 12. The bolt fits through a perforation 13 in the bar 11 and, as shown in Figures 3–6, inclusive, threads at 14 through the body of the bar.

A considerable portion of the length of the bolt is smooth in order to act as a guide for the bar 11 and further to support and allow free compression and expansion, along the smooth bolt portion 15 of a spring 16 which can be compressed by movement of the bar 11 toward the bar 10 and which then tends to expand until the bar 11 reaches the limit of bar movement here set by the knurled head 17. The head 17 affords turning means by which the adjustment of the bolt within bar 10 is effected to give different lengths of ultimate separation between bars 10 and 11.

It will be seen that the bars are free to turn relatively about the bolt as an axis, the bar 11 moving upon the bolt and the bar 10 carrying the bolt with it (although it will be evident that the bar 10 could be made to slide on the bolt and the bar 11 be threaded to the bolt) and that with contraction and expansion of the spring 16 the bars 10 and 11 may be compressed for insertion of the prop within the mouth opening and may expand therein to open the jaws of the patient.

The bars 10 and 11 are shown as relatively heavy at the bolt to take care of the additional stiffness required there and as offset one toward the other in the plane of the paper at 18. Moreover, as seen best in Figure 6, the bars are offset laterally at 19 and terminate in heads 20.

The heads carry pivot pins 21 (which may be integral) for the support of cushion holders 22 within which are located jaw cushions 23. The cushion holders are extended at 24 to form concaved lip guards whose concavities are in parallel with the concavities within the cushions 23.

The holders 22 may be of sheet metal and are cupped or balled inwardly at the pivot 21 to provide freedom of universal angular rocking movement at the pivots, permitting the holders and therefore the cushions to accommodate their positions to any normal variations of the teeth or jaws of different patients.

The cushions 23 preferably comprise rubber channels, whose sides flare outwardly at 25, 26.

The bars 10 and 11 are preferably opposite counterparts with the single exception that one makes sliding engagement with the bolt 12 while the other adjustably threads with respect to the bolt 12 at 14 in the form of Figures 3–6, but this arrangement is not essential since the bolt can be rigidly connected with the bar 10 as in Figure 7 with threading of the opposite end of the bar and adjustment by means of a nut 27 located upon this thread.

The mouth prop bars 10 and 11 may be locked on the bolt in any set position. The openings 13 of the bar 11 is desirably slightly larger than the bolt 12, so that normally the bar 11 can slide freely in or out along the bolt 12 against or under the action of the spring 16. The movement on the bolt 12 of the bar 10 away from or nearer to the bar 11 will of course alter the amount of resistance between the bars 10 and 11 provided by the loosening and tightening of the spring 16. At all times, the bars 10 and 11 will be forced apart until resistance is encountered by the spring 16, as for example by contact of the jaw cushions with the mouth of the patient or engagement of the bar extensions 28 by the fingers of the operator.

When pressure is applied to the jaw cushions, as for example, incident to the effort of the patient to close his mouth, the jaw prop does not close, but locks in the set position against the bolt 12. This locking takes place due to the tilting of bar 11 against the rod 12, so that a frictional engagement is made between the inner walls of the opening 13 and the portion 15 of the bolt. There is considerable leverage to cause frictional engagement between the walls of the opening 13 and the portion 15 of the bolt when closing pressure is applied by the mouth of the patient to the jaw cushions. It is then impossible for the patient to force the mouth prop closed notwithstanding that the patient may become rigid. Should the patient relax, however, the mouth prop opens farther, and locks against the rod in another position.

To release the mouth prop, it is merely necessary for the operator to press against the bar extensions 28, thus rocking or tilting the bar 11 with respect to the bolt 12. The operator can then slide the bar 11 along the bolt 12 far enough to allow for removal of the prop from the mouth of the patient.

The ultimate amount of spread of the bars 10 and 11 for insertion into a patient's mouth will be positively regulated and controlled by my invention.

Either the screw head 17 (Figure 4) or the nut 27 of Figure 7 can be turned to adjustably limit the extent to which the bar 11 can move under the pressure of the spring before the bar meets the stop. As will be seen, it makes no difference whether the stop 29 be carried rigidly with the bolt as in Figure 4 or by part of, or at any rate by the position of, the nut 27 in Figure 7.

These two forms of adjustment are shown with the purpose largely of giving breadth to the disclosure as to adjustment in order that the claims may not be restricted to any specific form.

As an aid in the initial compression of the spring in order that the bars may lie close enough together for insertion within the mouth, in some such position as Figure 5, suitable lugs 28 are provided which can be grasped by the finger and thumb of the operator and by which the prop may be handled during engagement with the mouth. With the release of these lugs, the cushions 23 are pressed against the teeth or jaws of the patient providing continued resilient pressure against the teeth or jaws tending to hold the jaws in extended position.

The operator may swing my prop from one side to the other side of a patient's mouth, without removing the prop from the mouth. This is shown in Figures 1 and 2. For example, in extracting all the teeth, the operator may operate successively on one side and then on the other side, shifting the mouth prop from one to the other of the positions of Figures 1 and 2, when changing sides, without rearranging the throat packs or removing and reversing the mouth prop. In using nitrous oxide, speed is a vital factor. In some cases shifting from one or the other of the positions of Figures 1 and 2 is not necessary, particularly because, if advantage be desired from the tilting of the bars, in allowing the bars to lie close to the mouth, while giving minimum metal within the mouth, the prop can be turned upside

down. Either character of bar direction or position can thus be secured with the bar at the right or left as desired or as required.

Without turning the prop upside down both of the positions shown in Figures 1 and 2 can be secured. Notwithstanding that the prop position in one of the Figures 1 and 2 may be regarded by some operators as an awkward prop position, much less desirable than can be secured by turning the prop upside down, it may nevertheless be more desirable to swing the prop from one of these positions to the other, where freedom of access is desired during the same operation at the other side of the mouth than at the side at which access was first desirable, than to replace the prop during the operation.

The bends of the prop seen at 18 in Figure 5 and at 19 in Figure 6, materially assist in giving as much free opening as possible for access to the point at which the operation is performed.

In Figure 8, I have illustrated a slight modification in an adjustment for the bolt 12'. In this form the bolt is somewhat shorter than that shown in Figures 1–7, inclusive, but the distance between the bars 10' and 11' is accounted for by the securing of a sleeve 30 in the bar 11' with a spring 16' surrounding both the bolt and the sleeve between the bars 10' and 11' tending to spread the bars farther apart at all times, and the bolt being capable of slidable movement with the bar 10'. The end of the bolt 12' is threaded at 12^2 to make adjustable connection at 31 with the interior threads 32 of the sleeve 30 to move the bars 10' and 11' closer together or farther apart as desired.

I have also illustrated another slight modification in Figure 9, which shows a bolt 12^3 threaded at one end into the bar 10^2, the other end 12^4 of the bolt 12^3 being free to slide through an opening 33 in an end plate 34 which is fastened in the open end 35 of an inverted cup 36, the cup being threaded at 37 into a threaded opening 38 in the bar 11^2. About the rod and inside the inverted cup a coiled spring 16^2 is located, which, at one of its ends, presses against the end plate 34 of the inverted cup. The other end of the spring 16^2 presses against a collar 40 fastened to the bolt 12^3, thereby tending to spread the bars 10^2 and 11^2 farther apart. The collar 40 engages the end 39 of the cup 36 when the spring urges the bars 10^2 and 11^2 away from each other, the interior of the end 39 acting as a stop.

The advantage of the form of Figure 9 is that the spring is enclosed within the inverted cup.

Whether this resilient pressure against the jaws be resisted by the patient or not, the relaxation of control over the jaws as anesthesia progresses will lead ultimately to the prop forcing the jaws open until the movable bar engages with the stop upon the guide bolt. Where there is no control over the ultimate extent of resilient opening, the forcing of the jaws to an average prop extension in some cases results in injury to the patient in that the jaws are so far opened as to affect the jaw muscles objectionably and to make it difficult or painful for the patient to close the jaws after the operation has been concluded.

Whether general anesthesia is to be attained or not, the jaw muscles initially would not relax without pain to such an extent as to permit the desirable ultimate degree of spreading. It may be quite desirable at this time not to have the resilient prop bars follow up the spread of the jaws to the extent of the ultimate desired opening; and the present prop permits the dentist or surgeon to set a preliminary limit of opening and, after it has been reached, to give any desired time spacing between the preliminary expansion of the jaws first provided and step-by-step or other extensions of the opening.

A short period of rest is thus permitted during which time there is no continued opening movement of the jaws, but which is thoroughly within the control of the operator by his control of the subsequent further opening of the bars of the prop.

Where general anesthesia takes place and the bars of the prop have not been expanded to the full limit corresponding with the stop setting, there is an immediate expansion of the bars to the limit, which expansion the relaxed jaw muscles are unable to stop. This sudden expansion of the prop may be used by the surgeon to disclose the moment when he may proceed with the operation in that general anesthesia is shown then to be complete.

In view of my invention and disclosure variations and modifications to meet individual whim or particular need will doubtless become evident to others skilled in the art, to obtain all or part of the benefits of my invention without copying the structure shown, and I, therefore, claim all such in so far as they fall within the reasonable spirit and scope of my invention.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:—

1. In a jaw prop, two adjustably spaced bars having inner and outer ends for position in use respectively inside and outside of the mouth of a patient, a bolt guide carried by one of the bars and slidable in the other of the bars throughout the entire range of adjustment, a stop on the bolt setting an outer limit to movement for any adjustment, screw means for adjusting the separation of the bars at which the stop is engaged, the adjusting member of the screw means being exposed at the exterior of the prop in all operating positions of the prop and a spring surrounding the bolt engaging the slidable bar and pressing the bars apart toward engagement.

2. In a jaw prop, two adjustably spaced bars having inner and outer ends for position in use respectively inside and outside of the mouth of a patient, a bolt guide carried by one of the bars and slidable in the other of the bars throughout the entire range of adjustment, a threaded adjustment including threads upon the bolt guide, the adjustable member being exposed at the exterior of the prop in operative conditions of the prop and a spring surrounding the bolt, engaging the slidable bar and pressing the bars apart toward engagement.

3. A mouth prop comprising bars terminating in tooth-engaging arms, spring means for tending to separate the arms and to permit them to be brought closer together, a support for the arms providing for relative movement between them subject to the spring action, a stop limiting the separation of the arms and a movable adjustment for the position of the stop, the movable member of the adjustment being exposed at the exterior of the prop in operative conditions of the prop whereby the ultimate limit of separation caused by the spring may be restricted and adjusted while the arms have the same range of position with all minor adjustments.

4. A mouth prop comprising bars terminating in tooth engaging arms and a connecting member

between the bars, along which one of the arms is movable, a spring located in use outside of the mouth for tending to separate the arms and to permit them to be brought closer together and adjustment means located in use outside of the mouth and having the part by which the adjustment is effected exposed in normal operative condition of the prop and effective for limiting the extent to which the bars may be separated with that adjustment.

5. A jaw prop comprising spaced guided bars having inner and outer ends positioned in use respectively inside and outside the mouth of a patient, means toward their outer ends resiliently pressing the members apart, adapting the inner ends to resiliently press against the upper and lower jaws of the patient and means for adjustably limiting the outward spreading of the jaws with respect to one another, the means being exposed at the exterior of the prop in operative conditions of the prop and thereby being accessible for adjustment.

6. In a jaw prop, spaced bars having inner and outer ends positioned in use respectively inside and outside the mouth of a patient, a bolt carried by one of the bars generally transverse to the bars at the outer ends thereof, having a shank making sliding connection with the other of the bars, the head of the bolt exposed in the completed prop, thus accessible for adjustment and acting as a stop limiting the relative spreading of the bars and the other end of the bolt adjustably threading the bar which carries it and a spring surrounding the bolt and resiliently pressing the bars apart.

7. In a jaw prop, spaced bars having inner and outer ends for operations respectively inside and outside the mouth of a patient, a bolt generally transverse to the bars at the outer ends thereof, carried by one of the bars and presenting sliding engagement to the other bar, and a nut on the bolt at a portion thereof beyond the said sliding engagement portion thereof and limiting the relative spread of the bars the nut being exposed at the exterior of the prop and thus freely accessible.

8. In a mouth prop, spaced mouth prop bars, jaw cushions on adjoining ends of the bars, a bolt and sleeve adjustably threaded into one another whereby turning one of them effects an adjustment, the bolt being connected to one bar and the sleeve being connected to the other bar and one of the bars being slidable with respect to the combination of the bolt and sleeve, that one of the bolt sleeve which is turned being exposed at the exterior of the prop in completed condition and thus accessible and a spring surrounding the bolt and sleeve and urging the bars away from one another to the limiting position permitted by the adjustment of the bolt and sleeve.

CHARLES ENGELFRIED.