J. F. KOEHLER.

MOUTH SPECULUM.

APPLICATION FILED AUG. 9, 1909.

964,110.

Patented July 12, 1910.

2 SHEETS—SHEET 1.

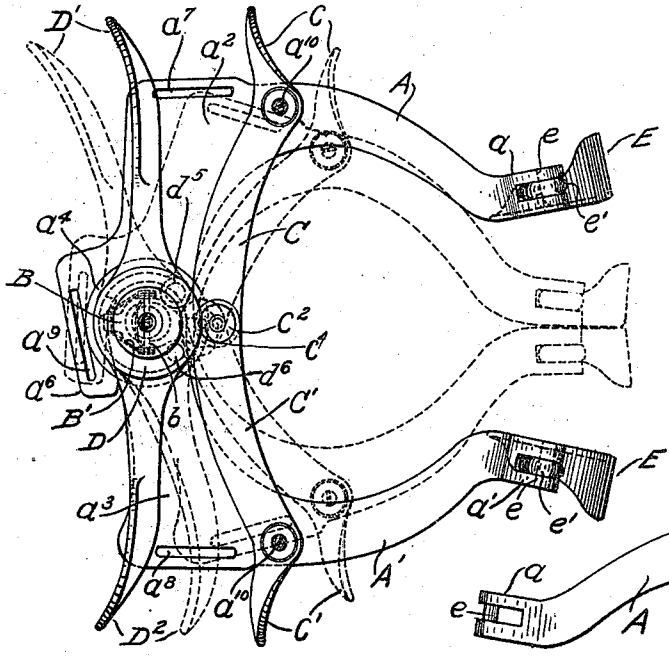

Fig. 1.

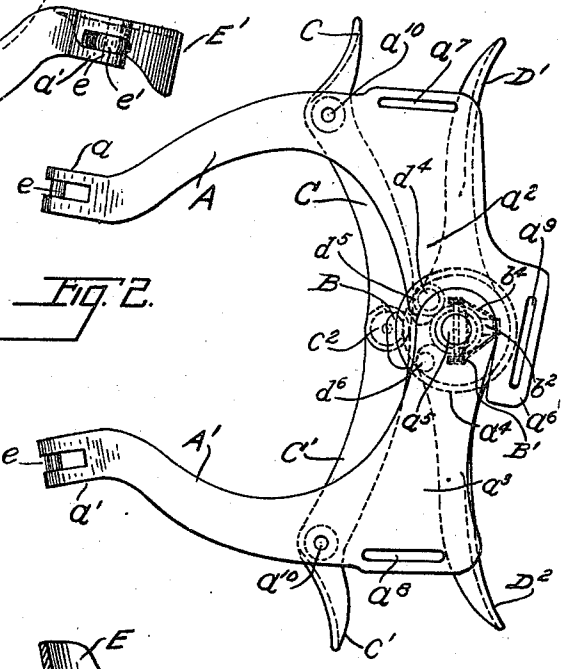

Fig. 2.

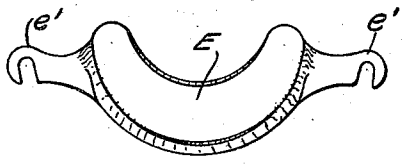

Fig. 3.

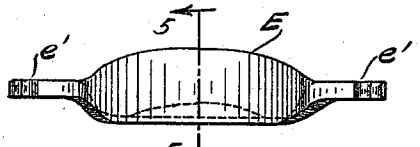

Fig. 4.

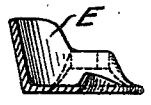

Fig. 5.

WITNESSES:

R. C. Brown.

Robt. Walter.

INVENTOR

John F. Koehler

BY

Robt. Klotz

ATTORNEY

THE NORRIS PETERS CO., WASHINGTON, D. C.

J. F. KOEHLER.

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2 SHEETS—SHEET 2.

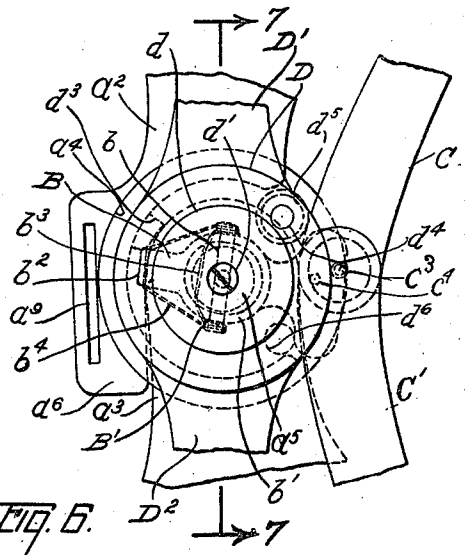

Fig. 6.

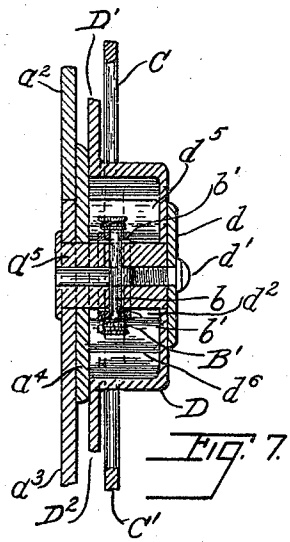

Fig. 7.

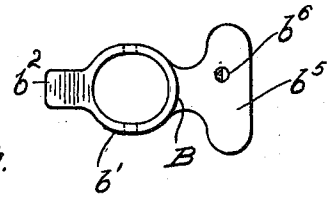

Fig. 8.

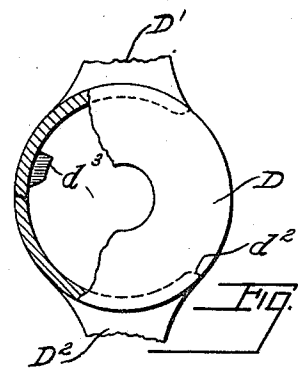

Fig. 10.

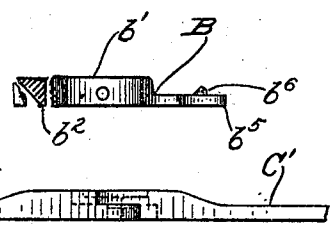

Fig. 9.

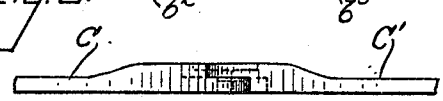

Fig. 12.

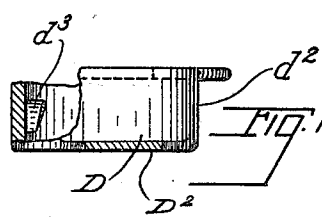

Fig. 11.

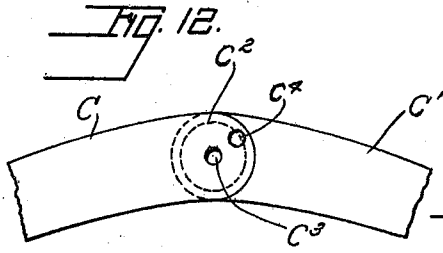

Fig. 13.

WITNESSES:

D. O. Swem

Robt. Walter

INVENTOR

John F. Koehler

BY Robt. Klotz

ATTORNEY

THE NORRIS PETERS CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOHN F. KOEHLER, OF SAWYER, MICHIGAN.

MOUTH-SPECULUM.

964,110. Specification of Letters Patent. Patented July 12, 1910.

Application filed August 9, 1909. Serial No. 512,009.

To all whom it may concern:

Be it known that I, JOHN F. KOEHLER, a citizen of the United States, and residing at Sawyer, in the county of Berrien and State of Michigan, have invented a new and useful Improvement in Mouth-Speculums, of which the following is a complete specification.

This invention relates to improvements in mouth speculums and more particularly to a mouth speculum adapted to control the closing of the animal's mouth.

Heretofore in devices of this class it has been difficult to close the jaw bars with sufficient slowness to prevent the animal's jaws from shutting together with such force as to break or otherwise injure the teeth. Furthermore it has not heretofore been possible to automatically lock the jaw bars in semi-open position when the device is being closed and thereby arrest their movement before injury can be done to the teeth.

The object of this invention is to provide a mouth speculum adapted to be locked to hold the jaws at varying distances apart, and so constructed that the jaws may be again closed without danger of their coming together with such force as to injure the teeth.

It is also an object of the invention to provide a locking mechanism for the jaw bars which is adapted to be automatically operated by the opening of said bars and automatically controlled by the operating levers when said bars are being closed.

It is a further object of the invention to provide a device of cheap and simple construction which will not readily get out of repair and which will be of sufficient strength to perform its functions without breakage.

The invention consists of the matters hereinafter described in the specification and more fully pointed out and defined in the appended claims.

In the drawings: Figure 1 is an outer side elevation of a device embodying my invention, showing in full lines the position of the parts when in open position, and in dotted lines the position of the parts when in closed position. Fig. 2 is an inner side elevation of the same with the jaw plates removed. Fig. 3 is a plan view of one of the jaw plates. Fig. 4 is a front elevation of the same. Fig. 5 is a section taken on line 5—5 of Fig. 4. Fig. 6 is an enlarged, fragmentary outer side elevation of the device. Fig. 7 is a section taken on line 7—7 of Fig. 6. Fig. 8 is an outer side elevation of the locking lever. Fig. 9 is a fragmentary plan view of the same, partly in section. Fig. 10 is a fragmentary plan view of the lock housing. Fig. 11 is a fragmentary side elevation of said housing. Fig. 12 is a fragmentary, rear elevation of the toggle levers. Fig. 13 is a fragmentary, inner side elevation of said levers.

As shown in said drawings: A and A′ indicate respectively the upper and lower jaw bars, which, as shown, are curved oppositely from near their forward ends a and a' to provide a sufficient opening between said bars, and the rear ends a^2 and a^3 thereof are turned toward each other and hinged or pivoted together. Said ends may be hinged together in any preferred manner but, as shown more clearly in Fig. 2, the end a^2 is provided with a circular notch and the end a^3 is rounded to fit therein so that they will lie in the same plane. An apertured, circular plate a^4 is rigidly engaged on the outer side of the end a^2 and overlaps the end a^3, and a pivot post or stud a^5 is rigidly engaged on the end a^3 and projects through and beyond said plate. A rearwardly and downwardly directed projection or abutment a^6 is provided on the end a^2 and extends rearwardly behind the end a^3 and by abutting against said end a^3 acts to limit the opening movement of the jaw bars. At the elbows in said bars A—A′ are slots a^7—a^8, in the former of which a strap may be secured to pass over the animal's nose, and in the latter of which a strap may be secured to pass under the animal's lower jaw, and the abutment a^6 is provided with a slot a^9 in which may be secured a strap to pass over the top of the animal's head. Said straps are secured at their opposite ends in a similar construction on the opposite side of the animal's head.

A locking lever B is pivoted on the pivot post a^5, at a distance from the plate a^4, by means of a pin b which extends transversely through said post and through the sides of a central yoke b' formed in said lever and through which the post a^5 extends, as shown more clearly in Figs. 6 to 9 inclusive. Any preferred means may be employed to normally hold the rear end b^2 of said lever in close proximity to said plate a^4. As shown, however, a spring B′ is coiled around the ends of the pin b and is provided with

loops b^3 and b^4, the former of which is engaged in a notch or other preferred means in the rear face of the post a^5, and the latter of which extends rearwardly and engages against the outer side of the end b^2 of said lever B, as shown in dotted lines in Figs. 2 and 6.

Pivoted on studs a^{10} projecting from the outer faces of the bars A—A′, forwardly of the slots a^7—a^8, are the toggle levers C—C′, which are provided at their outer ends, beyond said bars, with operating handles or arms c—c', respectively. The opposite ends or arms of said toggle levers curve rearwardly and overlap the forward end b^5 of said lever B, and are hinged together by means of a pivot pin c^2. Said toggle levers are provided adjacent their joint, and in the inner face thereof, with two sockets indicated by c^3 and c^4 respectively, the former of which, as shown more clearly in Fig. 13, is located at the axis of the pivot c^2, and the latter of which is located downwardly and rearwardly therefrom. On the outer face of the forward end b^5 of the lever B is a locking pin b^6, adapted when the jaw bars are open to their full extent to engage in the socket c^4, and lock said bars in open position. When said bars are being closed the joint of the toggle levers is forced rearwardly and when in approximately half open position said pin b^6 enters the socket c^3 and again locks the bars from further closing movement until said pin is withdrawn. When said jaw bars are in fully closed position said pin rests against the inner face of the toggle lever at a point slightly above and forwardly of the socket c^3. The locking pin b^6 is beveled on its rear side as shown in Figs. 8 and 9 and when the jaw bars are being opened the joint of the toggle lever moves forwardly so that when said pin enters the socket c^3 during such movement, it will automatically pass out again and enter the socket c^4 when the bars are fully opened.

A housing D is rotatively mounted on the pivot post a^5 and the inner side thereof, which is open, rests against the plate a^4. Said housing may be secured in place in any preferred manner, but, as shown, a washer d overlaps the end of said post and a portion of the outer face of said housing and a screw d' passes therethrough and has threaded engagement in the end of said post. For the purpose of partially rotating said housing it is provided on its upper side with an upwardly directed controlling lever D′, and on its lower side with a downwardly directed trip lever D^2, each of which extends beyond the adjacent jaw bar into position to be gripped in the same hand with the corresponding toggle lever C—C′. Said housing has an opening through its front side, as shown at d^2 in Figs. 7, 10 and 11, through which the forward end b^5 of the lever B projects, and for the purpose of operating said lever to throw the locking pin b^6 out of engagement with the sockets c^3—c^4, a downwardly and inwardly inclined cam block d^3 is rigidly engaged on the inner face of the rear wall of said housing, in position to enter behind the rear end b^2 of said lever, as said housing is rotated by a forward pull on the trip lever D^2. As said cam block enters behind said lever end b^2 it forces said end outwardly against the action of the spring B′, and thereby throws the forward end b^5 of said lever inwardly, carrying the pin b^6 out of engagement with the sockets. Journaled on a stud d^4 in the forward portion of said housing, and at the upper end of the opening d^2, is a roller d^5 which bears against the joint of the toggle levers C—C′ and, when the jaw bars A—A′ are in closed position, as shown in dotted lines in Fig. 1, and the operating lever D′ is moved forwardly, said roller acts to straighten the toggle and thereby force the jaw bars open. At the lower end of said opening d^2 in said housing is an abutment block d^6 adapted, when the trip lever D^2 is thrown forwardly to release the locking lever, to abut against the forward end of said lever and limit the movement of the housing in that direction.

The forward ends a and a' of said jaw bars are slotted and each is provided with a pin e to which may be removably secured one end of the upper and lower jaw plates E—E′ respectively. The other ends of said plates are of course secured to a similar set of bars at the opposite side of the animal's head. Said plates, as shown, are provided on each end with a hook e' adapted to be hooked onto said pins.

The operation is as follows: Two sets of said bars and their connections are employed, one on each side of the animal's head, and they are secured in place by straps, not shown, which are secured in the slots a^7—a^8—a^9. When the device is being attached the jaw bars are in closed position, as shown in dotted lines in Fig. 1, and the jaw plates are inserted between the animal's jaws with the upper front teeth resting in the plate E and the lower front teeth in the plate E′. When the jaw bars are in closed position the controlling lever D′ is in its rearmost position, as shown in dotted lines in Fig. 1, and the toggle levers are bent with their joint at its rearmost position, as also shown in dotted lines in said figure. When in that position the locking pin is resting against the face of the toggle levers, and as the levers D′ and C are gripped in the hand, the former is forced forwardly, thereby causing the toggle levers to straighten. As said levers straighten the jaw bars are forced apart and as they reach approximately their half open position the locking pin b^6 enters the socket

c^3. If it is desired to leave the jaw bars in that position the locking pin will prevent their closing. If not, then further forward movement of the lever D′ causes the locking pin to move out of said socket and enter the socket c^4 as the jaw bars reach their fully open position. When it is desired to close the jaw bars, the levers D′ and C are gripped in one hand and the trip lever D^2 is thrown forwardly with the other hand and by causing rotation of the housing, causes the cam block d^3 to move behind the lever end b^2, thereby releasing the locking pin from the socket c^4. The movement of the lever D^2 causes the lever D′ to begin its rearward movement before the lever C, which is held in the same hand, begins it forward movement, and the roller d^5 is thereby carried out of engagement with the toggle C—C′ before the latter is released by the locking pin. As the jaw bars begin to close, the grip on the lever D^2 is released and the grip on the levers D′ and C is retained, and the lever D′ is permitted to move forwardly until the roller d^5 again contacts the toggle C—C′ and controls the movement of the toggle. This forward movement of the lever D′ slightly retracts the cam d^3, and the closing movement of the bar A′ swings the end b^2 of the lever B, which is connected with said bar, away from the cam and thereby permitting the lever B to resume its normal position with the pin b^2 resting on the face of the toggle. As the jaw bars reach their half closed position said pin will engage in the socket c^3, thereby preventing the animal's jaws from coming together with sufficient force to injure the teeth. Then the lock may be tripped as before described and permit the jaw bars to fully close. During the closing movement the controlling lever is employed to prevent the jaw bars from closing too rapidly.

Obviously a device constructed in accordance with my invention affords a very effective means for holding an animal's jaws apart, and for controlling the closing movement thereof, and obviously also many details of form and construction may be varied without departing from the principles of my invention.

I claim as my invention:

1. The combination with a pair of pivotally connected jaw bars, of toggle levers connected to said bars, means movable into and out of engagement with said levers and force the bars to open position, means adapted to lock said bars in open position, and a trip mechanism adapted to release said bars.

2. The combination with a pair of pivotally connected jaw bars, of toggle levers engaged on said bars, a locking lever adapted to engage said toggle levers and prevent the bars from closing, and means adapted to automatically release said toggle levers.

3. The combination with a pair of jaw bars, of means pivotally connecting the same at their rear ends, a toggle intermediate the ends of said bars, an operating lever pivoted at the joint between said jaws and adapted to straighten said toggle and open the bars, means adapted to engage said toggle and lock the bars against closing, and trip mechanism adapted to release said bars.

4. The combination with a pair of jaw bars, of means pivotally connecting said bars, two pivotally connected levers, each pivoted on one of said bars, spring operated means on said bars adapted to lock with said levers and prevent closing movement of the bars, cam for releasing said lock, and means acting against said levers to open the bars.

5. The combination with a pair of jaw bars, of means affording a pivot therefor, a pair of rearwardly directed toggle levers pivoted on said bars and pivotally connected together at their adjacent ends, a locking lever pivotally mounted on said bars, means thereon adapted to lock said levers from closing movement, means adapted to release said locking means, and means adapted to force the joint of the toggle levers forwardly and open the jaw bars.

6. The combination with a pair of jaw bars, of a pivot post connecting said bars at their rear ends, a lever pivotally mounted on said post, a locking pin on the forward end of said lever, a pair of levers pivoted together at their adjacent ends and one pivoted on one bar and one on the other bar, there being sockets in said levers adapted to receive said locking pin, a housing journaled on said post, a cam block thereon adapted to operate said first named lever and throw said pin out of said sockets, and means adapted to rotate said housing.

In testimony whereof I have hereunto subscribed my name in the presence of two witnesses.

JOHN F. KOEHLER.

Witnesses:
A. R. KNIGHT,
DAVID KNIGHT.