

[54] BARRIER DEVICE	533,481	2/1895	Mershon	49/124
[76] Inventors: Josef Gail , 8891 Unterwittelsbach 1;	547,795	10/1895	Martin	49/124
Josef Kauferle , Dachauerstrasse 8,	1,519,055	12/1924	Reynolds	49/124 X
8890 Aichach, both of Germany	1,545,231	7/1925	Buttrick	49/124

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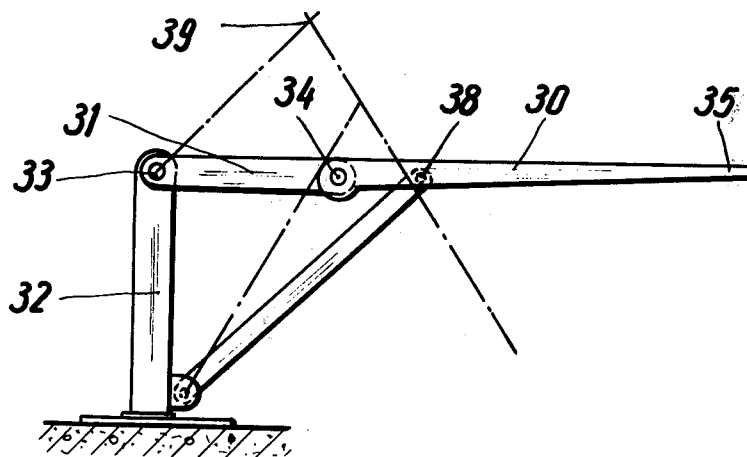
Primary Examiner—Dennis L. Taylor
Attorney, Agent, or Firm—Toren, McGeady and Stanger

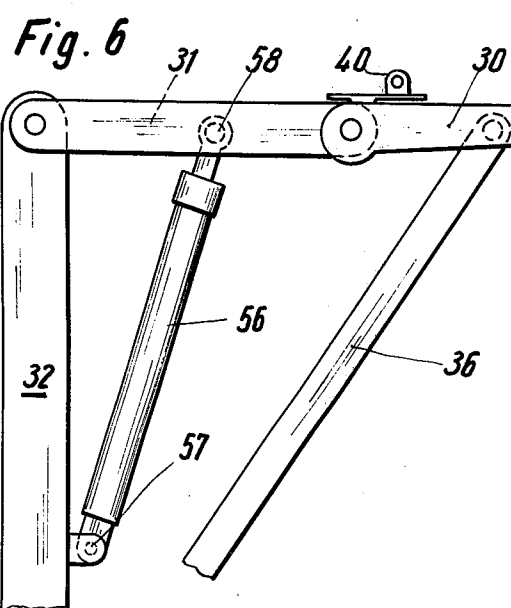
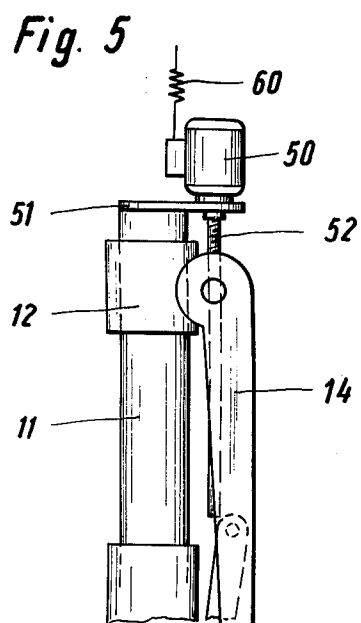
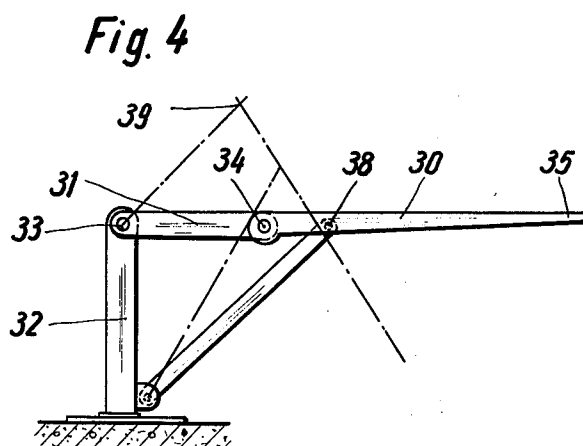
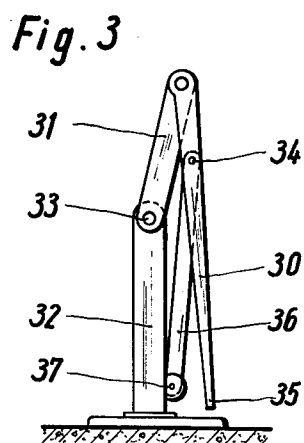
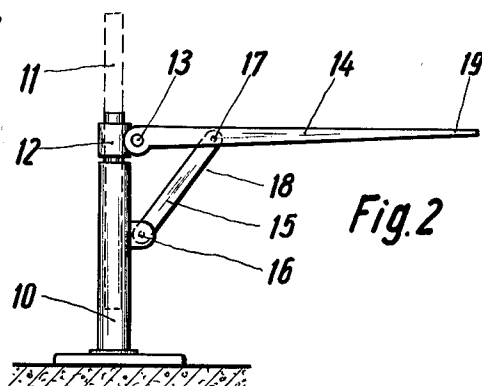
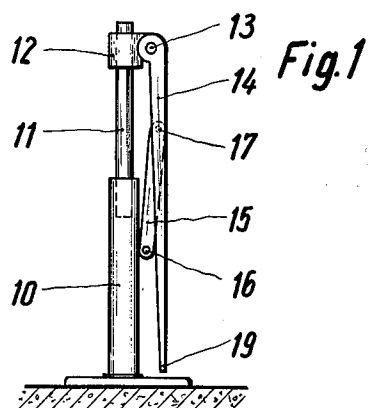
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Jan. 10, 1973	Germany..... 2300944
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[51] Int. Cl. ²	E06B 11/00
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[56]	References Cited			
	UNITED STATES PATENTS			
345,239	7/1886	Lidback	49/124	
496,960	5/1893	Teal	49/124	

[57] **ABSTRACT**
 A barrier or gate device for blocking roadways, toll booths and parking lot accesses and the like is disclosed, wherein a cantilevered arm is articulated or pivoted to a pillar or column member. In accordance with the invention, the pivot point of the barrier arm on the pillar or column is vertically movable or height adjustable so as to be located at different selected levels while the free end of the barrier arm points downwardly when the barrier device is in open or unblocking position.

6 Claims, 6 Drawing Figures





BARRIER DEVICE**FIELD OF INVENTION**

The invention is directed to a barrier or gate (hereinafter barrier device) for blocking roadways, accesses to toll booths and parking lots and the like, wherein a barrier arm in cantilever fashion is articulated to a stationary pillar or column (hereinafter column) and wherein the barrier arm is movable between a blocking or operative position in which the arm extends substantially horizontally and an inoperative or open position in which the barrier arm extends substantially vertically.

BACKGROUND INFORMATION

Known barrier devices of this kind comprise a barrier column at which the barrier arm is articulated through a pivot point, the barrier arm with its free end extending upwardly from the pivot point when the barrier is in the inoperative or open position. In order to close the barrier, the arm with its free end is moved in a downward position until it extends substantially horizontally. Associated with the movements of the barrier arm, force storage means are provided in some instances which are in the form of weights or a spring arrangement for storing the necessary force thereby to facilitate the subsequent opening of the barrier, to wit the movement of the arm into the inoperative position.

These known barrier constructions have several disadvantages. The barrier arm whose free end projects upwardly in the open position, occupies considerable length and for this reason oftentimes cannot be accommodated in, for example, parking garages which normally have relatively low ceiling height. Further, an upwardly projecting barrier arm presents an element of danger since in case of mechanical or material failure, the arm may fall down which in turn may cause injury to persons and damage to property. In prior art barrier device constructions of this kind, it is therefore necessary to provide special safety precautions. If the barrier device is to be used at railroad crossings, it is subjected to considerable wind forces which again requires additional safety arrangements.

It has been proposed to move barrier devices into the operative position in stages since this would be of advantage for remote controlled devices. This, however, has not proved to be practical since the barrier arm which descends into the blocking position in an oblique path blocks the upper region of the respective roadway almost from the very beginning of the descending movement.

Further, the force which is liberated during the downward movement of the barrier arm has to be absorbed in an additional force storage device, such as a weight or spring.

SUMMARY OF THE INVENTION

It is a primary object of the present invention to overcome the disadvantages of prior art barrier devices and to provide a barrier which, in open or inoperative position, has low structural height and which does not require force storage means, counterweights or the like for successful and effective operation.

Briefly, and in accordance with this invention, the pivot point or point of articulation of the barrier arm is height adjustable and the free end of the barrier arm points downwardly when the barrier device is in the inoperative or open position. By providing a barrier de-

vice wherein the pivot point of the barrier arm on the column is vertically movable so as to be positioned at different levels and by arranging the arm so as to point downwardly in the open position, the device can be constructed at a much lower total height than prior art devices, without sacrificing the blocking width which can be achieved with the device.

The varying forces which occur during the closing and opening movements of the barrier device due to weight displacement, can be compensated for without additional force storage means. Due to the inventive arrangement, substantial advantages are obtained in respect of construction and operation of the device, be it adapted for manual actuation or for mechanical one.

An additional advantage of the inverted barrier device is that the range or area through which a vehicle may pass can be decreased laterally without affecting the height of the passage.

On the other hand, it is advantageous that in accordance with the inventive barrier device, it is possible to block the respective passage in increasing manner almost immediately from the beginning of the closing movement of the barrier arm. This is due to the fact that the barrier arm moves into the passage to be blocked close to the bottom surface of the roadway.

The various features of novelty which characterize the invention are pointed out with particularity in the claims annexed to and forming a part of this disclosure. For a better understanding of the invention, its operating advantages and specific objects attained by its use, reference should be had to the accompanying drawings and descriptive matter in which there are illustrated and described preferred embodiments of the invention.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a first embodiment of a barrier device in the open position with a height adjustable sliding piece as connecting part of the barrier arm to the barrier column.

FIG. 2 shows the barrier device of FIG. 1 in the closed or operative position.

FIG. 3 is a second embodiment of the inventive barrier device in the open or inoperative position with a height adjustable intermediate member of the barrier arm.

FIG. 4 shows the embodiment of FIG. 3 in the operative position.

FIG. 5 shows an embodiment for automatic actuation of an inventive barrier device with vertically movable sliding piece and

FIG. 6 is a representation for automatic actuation of the barrier device with height adjustable intermediate member of the barrier arm.

The barrier device according to FIGS. 1 and 2 comprises a pillar or column 10 which is anchored in the respective soil formation. The column 10 is preferably formed from a tube of polygonal cross-section. The upper region of the column 10 has a smaller diameter than the lower region and serves as a sliding support or rod 11 for a sliding piece 12 which thus is vertically movable along the rod 11 to be positioned at different levels thereof. The barrier arm 14 is secured at the sliding piece 12 at the point of articulation or pivot point 13. The pivot point 13 can in an alternative embodiment be directly secured at the sliding rod 11. In the latter case, the sliding rod 11, as shown in FIG. 2 in dash lines, is telescopically movable within the lower column portion 10. The movement of the barrier arm

14 is controlled and the arm 14 is supported in the blocking position by means of a support member 15 one end of which engages at the column 10 through the pivot point 16 while the other end engages at the arm 14 through a pivot point 17.

In order to move the barrier into the operative or blocking position, the free end 19 of the barrier arm 14 is rocked or rotated upwardly. In so doing, the opposite end of the arm 14 which is articulated at the sliding member 12, descends as indicated in FIG. 2, to wit the sliding piece 12 glides or slides along the rod 11. The force expenditure for the opening and closing movements can be easily compensated if the arrangement of the support member 15 and its pivot points 16 and 17 is suitably made.

The sliding device may be provided with a locking arrangement, which may comprise a lock or the like (not shown) so as to fix the sliding device in the terminal positions relative to the column 10. In this manner the barrier arm 14 can be fixed or secured in the operative and inoperative positions.

In the barrier device according to FIGS. 3 and 4, the arm 30 is articulated at the column 32 through a movable intermediate member 31. The intermediate member 31 is in fact a part of the arm 30 and is bendable or foldable relative thereto. One end of the member 31 is secured at the column 32 through pivot point 33 while the other end is secured at the arm 30 through pivot point 34.

The arm 30 points downwardly with its free end 35 when the barrier is in its open or inoperative position.

When the barrier is actuated, the movements of the barrier arm 30 are controlled and the barrier arm is supported by means of a support member 36 which extends between the column 32 and the arm 30 and is articulated to these members by the pivot point 37, at the column 32, and by the pivot point 38 at the arm 30.

The opening and closing movement of the barrier proceeds essentially in the same manner as in the embodiment of FIGS. 1 and 2.

The manner in which the actuation of the barrier proceeds is indicated in FIG. 4 in dash dotted lines with the barrier arm in substantially half-open position. In this position, the bent barrier arm is straightened during the closing movement while it is bent during the opening movement into the inoperative position. The function of the height adjustable sliding piece 12 according to FIGS. 1 and 2, is taken over by the height adjustable intermediate member 31 which in fact forms a portion of the barrier arm 30. Due to this construction, the barrier device, in relation to the blocking range and compared to prior art devices, can be constructed with much lower height.

A lock 40 is provided in order to lock the barrier arm 30 with the intermediate piece 31 in the aligned, operative position. The lock 40 is thus suitably arranged so as to accomplish this function.

FIGS. 5 and 6 indicate possibilities for automatic actuation of an inventive barrier device.

Mechanical actuation is provided for barrier devices which are to block relatively wide roadways or which are to be remote controlled. Thus, in FIG. 5, an electric motor 50 is shown which is mounted on the upper end 51 of the sliding rod 11. The electric motor, by means of a screw spindle 52, moves the sliding piece 12 to different levels along the sliding rod 11. At the same time, the barrier arm 14 is closed or opened.

If desired the electric motor 50 with the screw spindle 52 may be accommodated in recessed manner in a cavity of the barrier column 10 so that the motor is not visible from the outside.

According to FIG. 6, an oil or compressed air cylinder 56 is provided for the actuation of the barrier arm 30. This cylinder 56 engages on the one hand at the column 32 through joint 57 while on the other hand a joint 58 is provided at the height adjustable intermediate member 31. Due to the movement of the cylinder the barrier arm can thus be actuated.

The actuation of the inventive barrier device may in known manner be released or effected through a receiver 60 which in turn is responsive to sound or signals which are transmitted in wireless manner. Such structures are generally known, and their actuation is automatic or by remote control.

While specific embodiments of the invention have been shown and described in detail to illustrate the application of the inventive principles, it will be understood that the invention may be embodied otherwise without departing from such principles.

What is claimed is:

1. A barrier device operative to selectively block a roadway comprising:

a vertical column fixed in the ground adjacent said roadway;

a barrier arm having a rigid generally straight solid body portion extending between a free end and an articulated end of said barrier arm, said barrier arm being mounted upon said vertical column to extend generally horizontally therefrom with said articulated end proximate said column and with said free end remote therefrom to block said roadway, and to extend generally vertically and parallel to said column with said free end below said articulated end to unblock said roadway;

a rigid generally straight support member having a pair of ends, one of said ends of said support member being pivotally mounted to said barrier arm at a point thereon intermediate said free end and said articulated end, with the other of said ends of said support member being pivotally mounted to said vertical column; and

operating means pivotally mounting said articulated end of said barrier arm to said vertical column, said operating means including means for raising and lowering said articulated end relative to said vertical column.

2. A device according to claim 1 wherein said operating means comprise a rigid generally straight intermediate arm having a pair of ends, with one end of said intermediate arm being pivotally connected to said articulated end of said barrier arm and with the other end of said intermediate arm being pivotally connected to said vertical column.

3. A device according to claim 1 wherein said operating means comprise a sliding member vertically movable relative to said column and having said articulated end of said barrier arm pivotally attached thereto.

4. A device according to claim 3 wherein said sliding member comprises a rod telescopically movable within said column.

5. A device according to claim 2 including drive means actuating said intermediate arm for pivotal motion about said other end thereof pivotally connected to said vertical column.

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6. A device according to claim 3 including drive movement relative to said vertical column.
means actuating said sliding member for vertical sliding

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