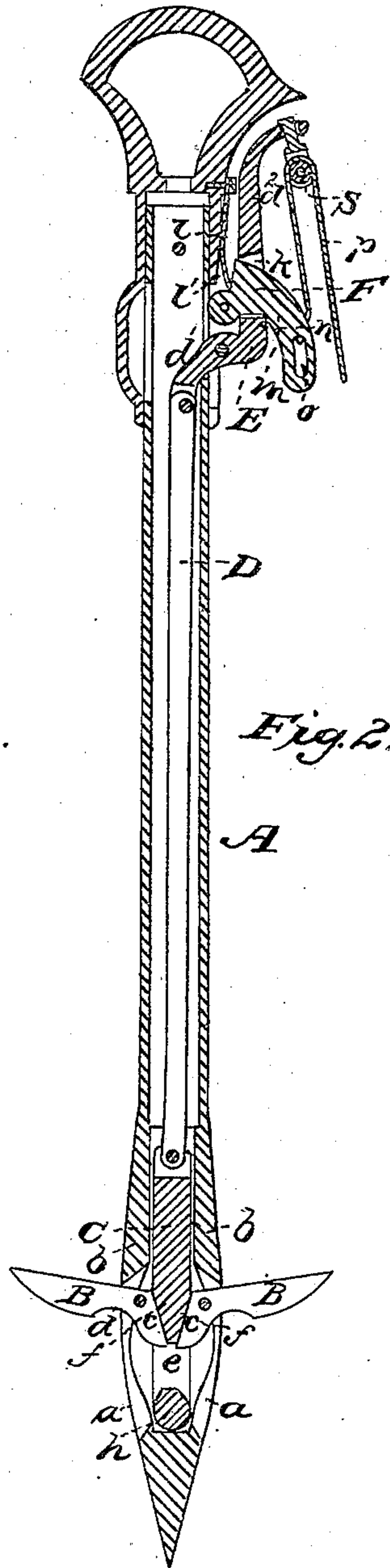
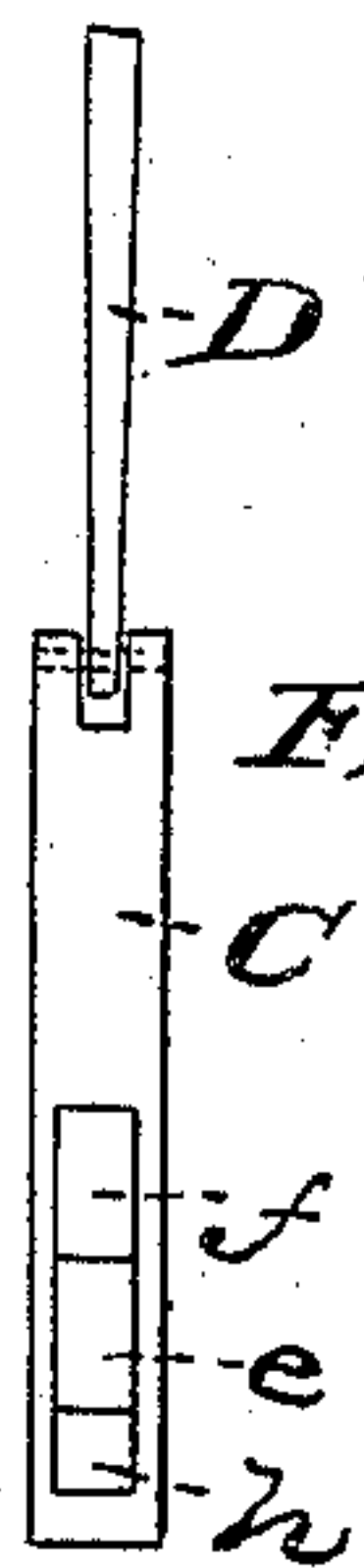
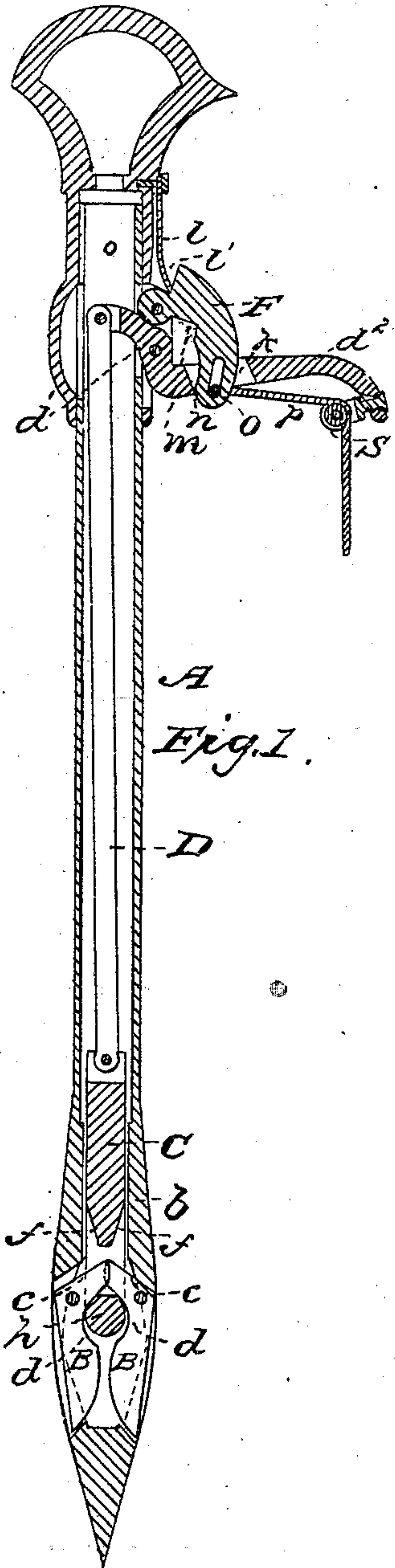


A. COATES.
Horse Hay-Fork.

No. 71,137.

Patented Nov. 19, 1867.



WITNESSES

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INVENTOR

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by his attorney

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United States Patent Office.

ABRAHAM COATES, OF WATERTOWN, NEW YORK.

Letters Patent No. 71,137, dated November 19, 1867.

IMPROVEMENT IN HORSE HAY-FORKS.

The Schedule referred to in these Letters Patent and making part of the same.

TO WHOM IT MAY CONCERN:

Be it known that I, ABRAHAM COATES, of Watertown, in the county of Jefferson, and State of New York, have invented certain new and useful Improvements in Hay-Forks; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings.

My invention relates to that class of hay-forks known as harpoon-forks, in which the claws for holding the hay are operated by means of a centre-bar working within a sheath of tubular or other suitable form. The claws, whether pivoted to the sheath or to the centre-bar, are caused to project from the sheath by the downward movement of the centre-bar, which, pressing or bearing upon their inner ends, throws the claws out from the sheath. Under this arrangement each claw may be considered to be a lever, whose fulcrum is the point where it is supported by or pivoted to the sheath; that portion of it which projects from the sheath constituting the longer arm, and that part on the other side of the pivot, or, in other words, its inner end, upon which the base of the centre-bar presses, the shorter arm of the lever.

The defects which it is the object of my invention to obviate arise from the ordinary method of combining the claws with the centre-bar and the centre-bar with the mechanism for locking or holding it in position. Under this method, when the fork is loaded, the claws sustaining a weight of eight or ten hundred pounds of hay, for instance, the strain upon the centre-bar and locking mechanism is very great. The inner end of each claw constituting, as above explained, the shorter arm of a lever, lies under the base of the centre-bar and presses forcibly against it, tending to force such bar upward in the sheath. If, as is usually the case, the outer ends of the claws or longer arms of the levers have three or four times the length of the inner ends, the upward pressure upon the centre-bar, exerted by the shorter arms of the claws, will be proportionately increased; so that if such claws support a weight of one thousand pounds, the inner ends of the claws will be forced up against the base of the centre-bar with a pressure of two or three thousand pounds, or even more. The locking mechanism, whose function it is to resist this pressure, must therefore be made extremely strong, and even then the bolts or other mechanism by which the bar is held in position are apt to be soon broken or injured so as to be unfit for use. And in every event, such is the pressure and strain brought to bear upon the mechanism that the parts of which it is composed become jammed together, and are held so tightly in the centre-bar and sheath as to be with difficulty operated to release the bar when the load is to be dropped. The sheath and bar also receive a great part of the strain, and, as experience has shown, are frequently injured and unfitted for use from this cause.

In order to obviate these difficulties, I combine with claws pivoted to the sheath, a centre-bar, whose lower end is wedge-shaped or has inclining faces converging, so as to form an angle which may be more or less acute, as desired. The claws and centre-bar are so combined that when the former are projected from the sheath, the wedge-shaped end will lie between the claws, whose inner ends are so shaped as to fit and be in entire contact with the inclined faces of the bar. In this position the upward pressure upon the bar is greatly reduced, as will be readily understood. If, for instance, the portion of the bar held between the ends of the claws were square, and the ends were correspondingly shaped, so as to fit upon each side of the bar, then there would be no upward pressure upon the latter, the inner ends of the claws constituting, in effect, a pair of jaws which would grasp the bar tightly, their hold upon it increasing with the weight carried by the fork. This arrangement is open to the obvious objection that considerable power must be applied to draw out the bar from between the claws, and is only mentioned to illustrate more fully the nature of my invention. Now, by making the part of the bar which lies between the claws wedge-shaped instead of square, giving at the same time a corresponding bevel to the ends of the claws, it will be seen that while the claws are forced in opposite directions against the sides of the bar, so as to neutralize in a great degree the pressure exerted by each, there will be at the same time a slight upward pressure upon the bar, due to the inclination given the wedge-shaped end. By making the angle of inclination of the sides of such size as to induce an upward pressure just sufficient to start the bar when it is unlocked, the strain upon the locking mechanism is reduced to the lowest possible point, and the liability of the operative parts of the fork to be injured from the cause above mentioned is wholly obviated.

To enable others to fully understand and use my invention, I will proceed to describe the manner in which the same is or may be carried into effect, by reference to the accompanying drawings, in which—

Figures 1 and 2 are vertical central sections of a fork constructed in accordance with my invention, and

Figure 3 is a side elevation of the centre-bar.

A represents the sheath of the fork. B B are the claws pivoted to the sheath within slots *a a*, formed in the lower end of the same in the usual manner. Neither these slots nor the claws pivoted within them are diametrically opposite each other, the latter being so placed that when in the position shown in fig. 1, their upper ends will lie partly side by side. C is the centre-bar, of rectangular form, which moves up and down

within the lower portion *b* of the sheath, by which it is steadied and guided. *D* is the connecting-rod or link, hinged or pivoted at one end to the centre-bar, and at the other to the locking mechanism. *E* is the lever by which the centre-bar is operated, through the medium of the connecting-rod *D*, the upper end of which is pivoted to the inner and shorter arm of the lever. *F* is the catch by which the lever is held in position when the centre-bar is depressed, so as to project the claws from the sheath. The claws *B*, which are pivoted separately to and upon opposite sides of the sheath, have their inner ends bevelled or inclined, as shown at *c c*, so as to fit the wedge-shaped portion of the centre-bar which is forced down between them. The claws are also recessed at *d d*, for the purpose hereinafter mentioned. The centre-bar *C* has a slot, *e*, of suitable width to receive the ends of the claws formed in it near its lower end. That portion of the bar immediately above the slot is wedge-shaped, the inclination of the faces *f f* corresponding to that of the claws at *c c*. The remaining part *h* of the bar below the slot is rounded, or has a curved form, corresponding in some degree to the curved recess *d* in the claws. The position of the centre-bar with relation to the claws is such that when the latter are within the sheath, as shown in fig. 1, their upper ends will lie within the slot *e*, while the part *h* will be in the recesses *d* formed in the claws.

Confining attention to this part of the fork, it will be seen that if the centre-bar be depressed its rounded end *h* will strike against the lower edges of the recesses *d*, thus moving apart the lower ends of the claws. The object of this is to start the movement of the claws, which is continued, by means of the wedge *f* pressing down between the ends *c*, until the claws are fully projected from the sheath, as shown in fig. 2, the inclined faces of the bar, when in this position, being held between the correspondingly-inclined ends of the claws.

For the reasons hereinbefore given, the tendency of the claws to lift the bar or press it upwards within the sheath is thus greatly reduced, growing less in proportion to the increased acuteness of the angle formed by the inclined sides, so that by giving the parts the form shown in the drawing the force with which the bar is pressed upward may be made just sufficient to raise it from its position between the claws. This, of course, relieves the other parts of the fork from all strain, and admits of the locking mechanism being simply constructed and readily operated.

To the upper part of the sheath is attached the mechanism by which the centre-bar is operated. The lever *E*, which is connected, as before explained, with the centre-bar by the hinged connecting-rod *D*, is pivoted to the sheath at *i*. Its shorter arm *d'*, which is curved or stands at an angle to the inner part of the lever, extends within the sheath, and is connected with the rod *D* by a hinge-joint. The longer arm *d''* is on the exterior of the sheath, and has a slot, *k*, of suitable dimensions, formed in it, through which plays the end of a catch or detent, *F*. This detent is pivoted to the sheath just above the lever, and, by means of a plate-spring, *l*, the end of which rests against a shoulder, *l'*, formed in its rear end, is pressed forward or downward, so that when the lever is raised, in the position shown in fig. 2, the notch *m* of the detent will fit over the shoulder *n* at the lower end of the slot *k*. The lever is thus held in an upright position; and as there is, as before stated, no excessive upward pressure upon the centre-bar and connecting-rod, the detent and lever which it holds are subjected to no strain, and can be operated with perfect ease.

When the lever is in the position shown in fig. 2, its shorter arm is swung down within the sheath, thus causing the consequent depression of the centre-bar and the projection of the claws from the sheath. In order, therefore, to retract the centre-bar, the detent must be raised, so as to unlock the lever and allow its longer arm *d''* to be drawn down. To accomplish this, I attach to the end of the detent, at *o*, a cord or rope, *p*, which passes up over a pulley, *s*, swivelled to the end of the lever, and thence extends downward a suitable distance, so as to be within reach of the operator. By pulling on the rope it will be seen that the two operations, of raising the catch and drawing down the arm *d''*, are accomplished simultaneously. When the centre-bar is withdrawn from between the claws the locking mechanism will be in the position represented in fig. 1.

It is obvious that the wedge-shaped end *f* of the centre-bar can be used either with or without the auxiliary part *h*, and that the centre-bar need not be slotted at *e*, as shown in fig. 3. Its construction can be varied in many particulars, so long as that portion which is forced between the ends of the claws, when the same are projected from the sheath, has the wedge-like formation hereinbefore explained.

Having now described my invention, and the manner in which the same is or may be carried into effect, what I claim, and desire to secure by Letters Patent, is—

1. In hay-forks, such as described, the combination of a centre-bar, wedge-shaped or provided with inclined sides, as specified, with claws or barbs pivoted to the sheath of the fork, and provided with correspondingly inclined or bevelled ends, under such an arrangement that when the said claws are projected from the sheath the inclined sides of the centre-bar will be held between the said ends of the claws, in the manner and for the purposes hereinbefore stated.

2. The combination with the slotted centre-bar, and wedges formed therein, of the claws or barbs pivoted to the sheath of the fork, and constructed and arranged for operation as herein described.

3. The combination, with the centre-bar and claws and hinged connecting-rod, of the lever to the shorter arm of which said rod is pivoted, and the detent or locking device, under the arrangement and for operation as herein shown and set forth.

4. The combination, with the lever for operating the centre-bar and claws, of the detent or locking device and its spring, under the arrangement specified, so that both the said lever and the detent by which it is held in position may be actuated simultaneously and at one operation, as set forth.

In testimony whereof I have signed my name this specification before two subscribing witnesses.

Witnesses:

M. BAILEY,
C. S. PAGE, Jr.

ABM. COATES.