(No Model.)

A. W. KNUTSON.

ELECTRIC ARC LAMP.

No. 603,383. Patented May 3, 1898.

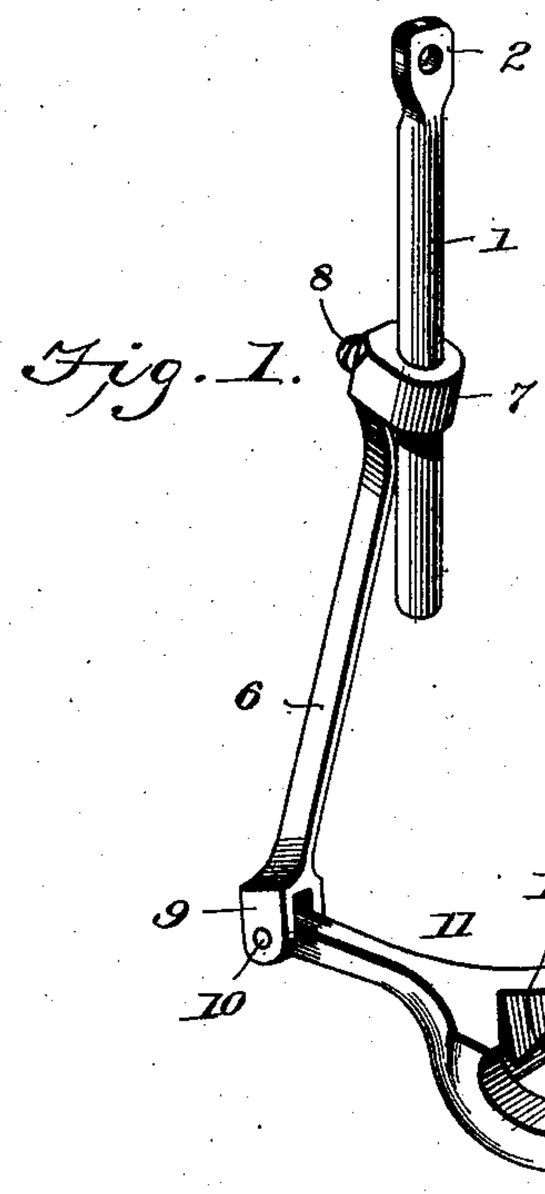


Fig. 1.

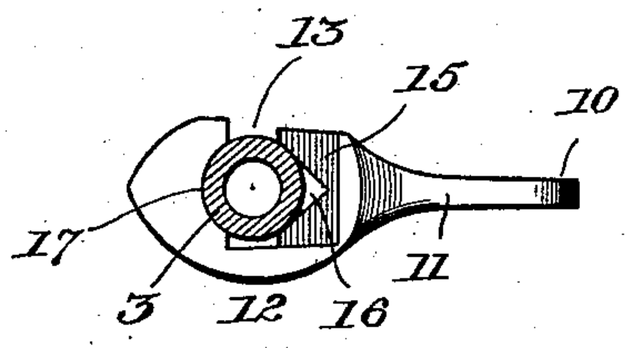


Fig. 4.

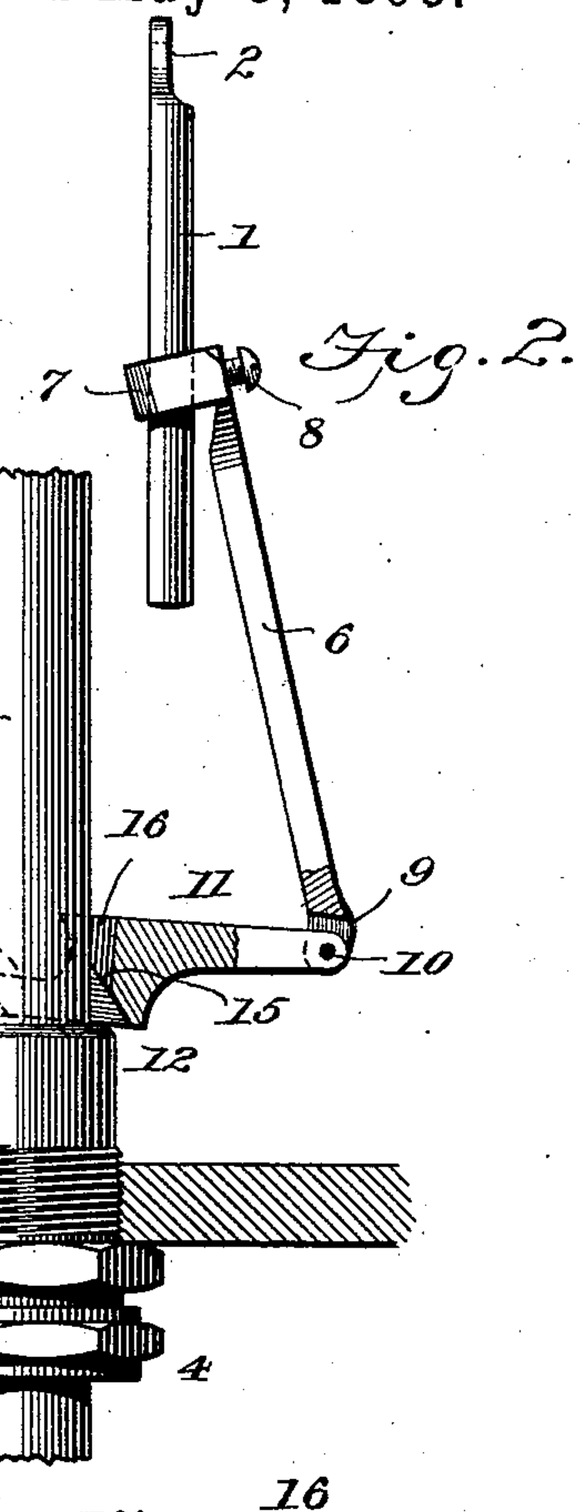
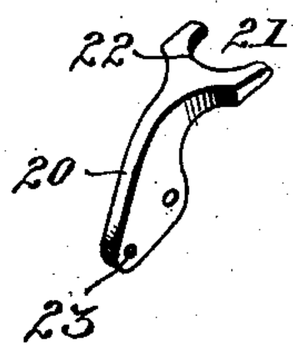


Fig. 2.



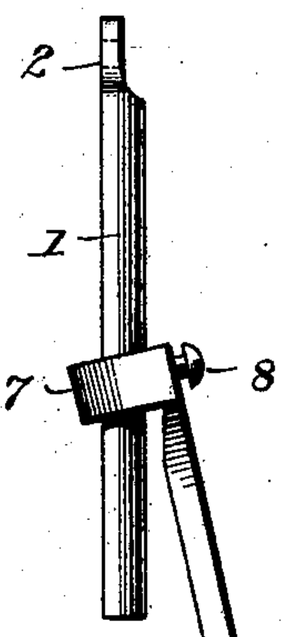
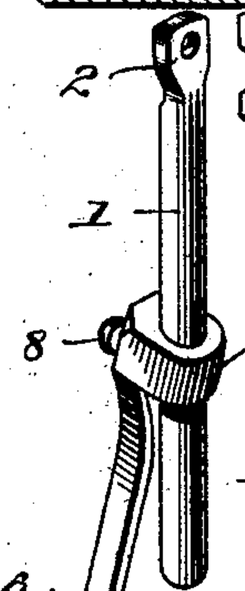


Fig. 7



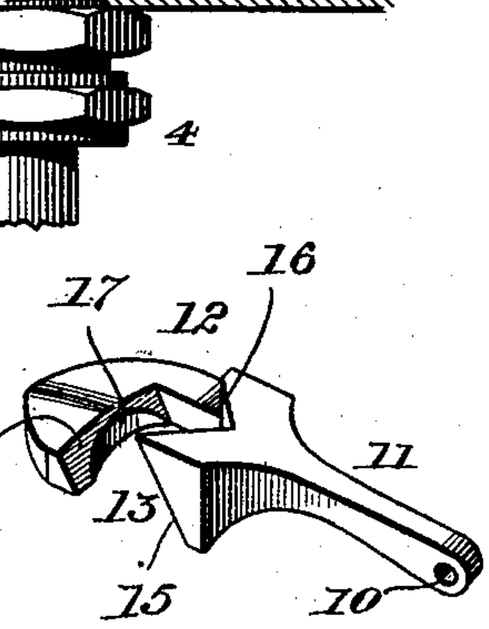


Fig. 3.

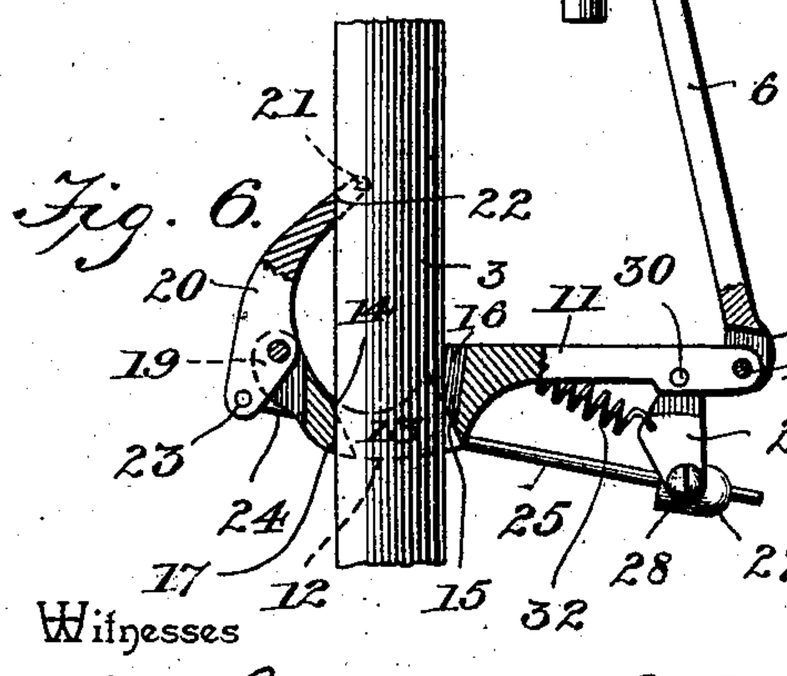


Fig. 6.

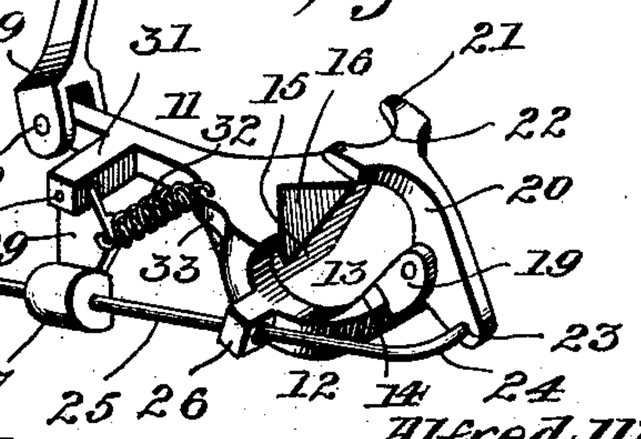


Fig. 5.

Witnesses

E. N. Monroe

S. P. Wolhampter

By his Attorneys,

Alfred W. Knutson

C. A. Snow & Co.

UNITED STATES PATENT OFFICE.

ALFRED WM. KNUTSON, OF GALESBURG, ILLINOIS.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 603,383, dated May 3, 1898.

Application filed April 30, 1897. Serial No. 634,584. (No model.)

To all whom it may concern:

Be it known that I, ALFRED WM. KNUTSON, a citizen of the United States, residing at Galesburg, in the county of Knox and State of Illinois, have invented a new and useful Gravity-Clutch for Electric-Arc Lamps, of which the following is a specification.

This invention relates to a gravity-clutch for electric-arc lamps; and it has for its object to provide a simple and efficient clutch of this character that can be readily fitted in arc-lamps without taking any of the mechanism thereof apart and which can also be readily engaged with and disengaged from the carbon rod without removing the cap at the upper end of the rod or disturbing the position thereof in the lamp. While accomplishing this object, the invention also contemplates a construction of clutch which while firmly gripping the carbon rod and firmly holding it at the same time is exceedingly sensitive, so as to readily release its grip from the carbon rod to allow the latter to feed at the proper time.

A common objection to most of the electric-arc-lamp clutches now in use is that such clutches cannot be fitted in place in a lamp without taking the cap and carbon-holder off of the carbon rod and letting the rod clear down, so that it can be inserted through the clutch, after which the cap and holder are replaced; but this objection is entirely overcome by the use of the form of clutch contemplated by this invention. Furthermore, some forms of clutches are constructed with springs, which are depended upon to cause the clutch to grip the carbon rod; but the use of springs for this purpose is very objectionable on account of the spring being liable to lose its temper by being short-circuited and also for the reason that very often the tension of such springs is not easily overcome by the normal amount of resistance produced in the coils of the magnet feed mechanism, when the carbons burn away and become widely separated, and consequently the coils of the magnet feed mechanism are liable to be burned out by abnormal resistance. Recognizing these objections to the use of springs the present invention provides a construction dispensing with the use of springs for insuring a grip for the clutch on the carbon rod.

Besides the advantages enumerated the present invention has for a further object a construction of clutch permitting the same to be readily removed and replaced for the purpose of cleaning and which will also greatly facilitate the trimming of the lamp.

With these and many other objects in view, which will readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination, and arrangement of parts hereinafter more fully described, illustrated, and claimed.

In the drawings, Figure 1 is a perspective view of a gravity-clutch for electric-arc lamps constructed in accordance with this invention. Fig. 2 is a vertical sectional view thereof, showing the relation between the clutch and the carbon rod and the lower guide-bushing for the carbon rod. Fig. 3 is a detail in perspective of the pivotal gravity-clutch arm. Fig. 4 is a bottom plan view thereof. Fig. 5 is a perspective view of a modified form of the clutch fitted with an auxiliary grip-jaw. Fig. 6 is a vertical sectional view of the construction illustrated in Fig. 5 applied to the carbon rod. Fig. 7 is a detail in perspective of the auxiliary pivotal grip-jaw.

Referring to the drawings, the numeral 1 designates a straight supporting-rod provided with a flat perforated upper end 2, adapted to be detachably connected in the usual manner to the movable magnet-plate (not shown) of the ordinary magnetically-controlled feed mechanism of the lamp, which feed mechanism, through the medium of the clutch, provides for the automatic raising and lowering of the carbon rod 3, which rod is fitted with the usual carbon-holder at its lower end and slides through the ordinary lower guide-bushing 4, fitted in the base of the lamp-casing 5, within which is mounted the usual mechanism with which ordinary arc-lamps are provided.

The rod 1 forms a support for the clutch proper and provides a connection between the same and the magnetically-controlled feed mechanism, and in connection with the rod 1 is employed a hanger-bar 6, disposed at an angle to said rod and provided at its upper end with a collar 7, slidably embracing the rod 1 and having fitted therein a set-screw 8, which provides for holding the collar 7, fast

on the rod 1, in any adjusted position. The hanger-bar 6 for the clutch is preferably formed at its lower end with a bifurcation 9, in which is pivotally mounted, as at 10, one extremity of the pivotal gravity-clutch arm 11. The pivotal gravity-clutch arm 11 is formed at its free end with a clutch-collar 12, having an obliquely-disposed rod-opening 13 therein, which rod-opening pierces one side of the collar to form an open side for the clutch-arm, whereby the latter may be readily slipped over and disengaged from the carbon rod 3 without disturbing the position or any of the attachments of the latter, which greatly facilitates the removing and replacing of the clutch whenever required.

The obliquely-disposed rod-opening 13, extending through one side of the clutch-collar 12, is formed by reason of its obliquity with oppositely-inclined side walls 14 and 15, respectively, the inner side wall 15 being widened to project above the plane of the outer wall 14 and formed in its upper edge with a reentrant V-shaped clutch-notch 16, which forms a gripping-surface to engage with the carbon rod 3, while the outer wall 14 is formed at its lower edge in a plane materially below the notch 16 with a curved contact-concavity 17, which registers with the carbon rod 3 and has a constant contact therewith as the latter slips through the clutch-collar.

In fitting the clutch within a lamp the supporting-rod 1 of the clutch can be readily connected with the magnetically-controlled feed mechanism in a manner well known to those skilled in the art, and the engagement of the collar of the clutch-arm with the carbon rod 3 is effected by simply tilting the clutch-arm 11 to such an angle as will bring the rod-opening 13 in a plane parallel with the carbon rod 3, thereby permitting the carbon rod to readily pass sidewise into the rod-opening 13. After engaging the clutch-collar with the carbon rod and connecting the supporting-rod 1 with the feed mechanism the collar 7 is adjusted until the normal position of the parts will hold the carbons of the lamp about one-eighth of an inch apart. The lamp is then ready for use, and as the current is turned through the carbons the feed mechanism will lower the clutch until the pivotal clutch-arm 11 strikes against the lower guide-bushing 4 for the carbon rod, which causes the clutch-collar to immediately release its grip from the carbon rod, thereby permitting the rod to drop, so that the carbons will come together. At this point the feed mechanism of the lamp will immediately lift the clutch, which movement tilts the clutch-arm 11 and causes the clutch-collar to pinch or grip the carbon rod and elevate the same to the desired arc. As the arc burns wide, the resistance in the coils of the magnetically-controlled feed mechanism necessarily increases and thereby operates such mechanism, causing the clutch to lower until the clutch-arm strikes the lower guide-bushing 4 and releases itself from the carbon rod to permit the latter to feed, this operation being repeated until the carbon is burned up.

The operation just described is perfectly free and positive without any slipping or lost motion whatever, thereby insuring a brilliant steady light, instead of the intermittent character of light which is produced by arc-lamps equipped with unreliable clutches.

While the form of clutch described is entirely complete and thoroughly reliable for ordinary work, the same may be fitted with an auxiliary attachment of the character illustrated in Figs. 5, 6, and 7 of the drawings. In the figures referred to the clutch-collar 12 is illustrated as being provided at its outer end with a pair of ears 19, between which is pivotally mounted an auxiliary grip-jaw 20. The auxiliary grip-jaw 20 is pivotally supported intermediate its ends and is provided with an inner forked head 21, lying above the plane of the collar 12 and having a curved contact-face 22, adapted to normally bear firmly against one side of the carbon rod 3. The outer end of the auxiliary pivotal grip-jaw 20 is perforated at 23 to loosely receive the angled end 24 of the adjusting-rod 25, loosely working through a perforated guide-lug 26, formed at one side of the collar 12, and having adjustably fitted thereon a collar 27. The collar 27 is held in any adjusted position on the rod 25 by means of the set-screw 28, with which screw is pivotally connected one end of a short link 29, the other end of which link is pivoted at 30 to a supporting-lug 31, projected integrally from one side of the clutch-arm 11. At a point intermediate its ends the link 29 has connected thereto one end of a pressure-spring 32, the other end of which spring is connected at 33 with the clutch-arm 11. The tension of the spring normally presses the forked head of the jaw 20 inward against the carbon rod 3 and the tension of the spring, and consequently the pressure of the auxiliary grip-jaw, may be regulated by adjusting the collar 27 on the rod 25.

The spring-actuated auxiliary grip-jaw 20 is useful to provide for a firmer gripping of the carbon rod and renders the clutch espepecially available for use in connection with lamps aboard ships or in other places where there is constant vibration and jarring.

Various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

Having thus described the invention, what is claimed, and desired to be secured by Letters Patent, is—

1. A clutch for electric-arc lamps having a clutch-arm formed with an obliquely-disposed rod-opening piercing one side of the arm to permit of the carbon rod passing laterally

into said opening, one of the inclined walls of said opening being provided with a clutch-notch.

2. A clutch for electric-arc lamps having a clutch-arm provided with a rod-opening, and a movable auxiliary grip-jaw supported on said arm and normally moved in an inward direction, substantially as set forth.

3. A clutch for electric-arc lamps, having a clutch-arm provided with a rod-opening therein, and a movable auxiliary grip-jaw supported on said arm at one side of the opening therein and provided with a head portion normally moved in an inward direction.

4. A clutch of the class described, comprising a hanger-bar, and a clutch-arm pivotally hung from said bar and provided with a clutch-collar having an obliquely-disposed rod-opening piercing one side thereof, said rod-opening being formed with opposite inclined side walls, the inner of which walls is formed in its upper edge with a V-shaped clutch-notch, and the outer wall being formed at its lower edge in a plane below such notch with a curved contact-cavity, substantially as set forth.

5. A clutch of the class described comprising a hanger-bar, a clutch-arm pivotally hung from said bar and provided at its free end with a clutch-collar having a rod-opening therein, and an auxiliary grip-jaw pivotally supported on said collar at the outer side thereof and provided with an inner forked head normally moved in an inward direction, substantially as set forth.

6. A clutch of the class described, comprising a hanger-bar, a clutch-arm pivotally hung from said bar and provided at its free end with a clutch-collar, an auxiliary grip-jaw pivotally supported between its ends on said collar at the outer side thereof and provided with an inner forked head, an adjusting-rod slidably mounted at one side of the clutch-arm and loosely connected at its outer end with one extremity of said grip-jaw, a collar adjustably fitted on said rod, a link pivotally suspended from the clutch-arm and pivotally connected with said collar, and a spring connected at one end with the link and at its other end with the clutch-arm, substantially as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

ALFRED WM. KNUTSON.

Witnesses:
R. CLIFF. RICE,
JAMES T. WASSON.