2 Sheets—Sheet 1.

H. FUCHS.

CLUTCHING DEVICES.

No. 189,210. Patented April 3, 1877.

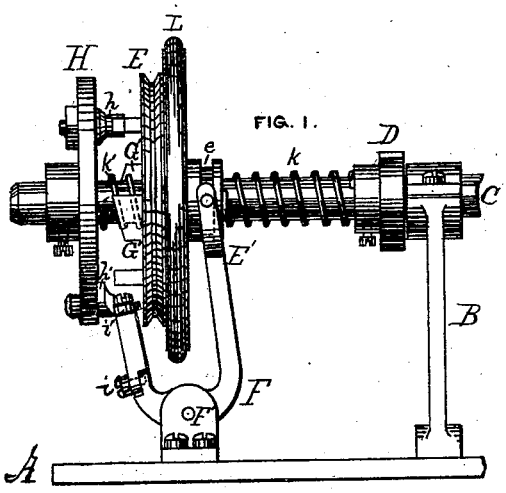

FIG. 1.

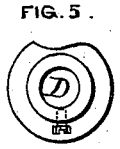

FIG. 5.

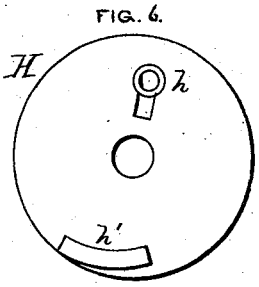

FIG. 6.

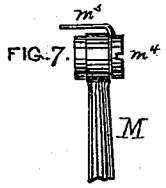

FIG. 7.

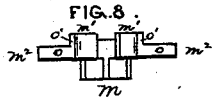

FIG. 8.

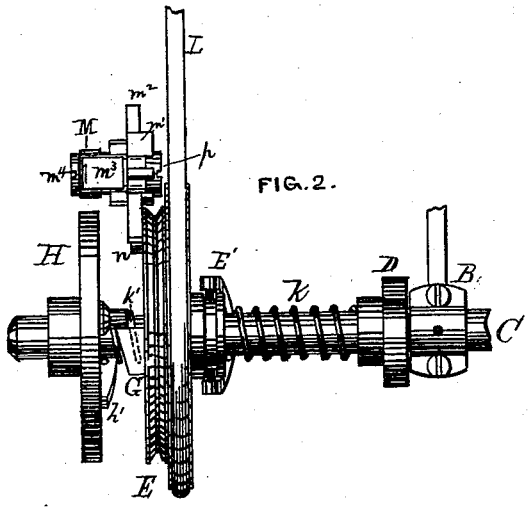

FIG. 2.

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2 Sheets—Sheet 2.

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CLUTCHING DEVICES.

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FIG. 3

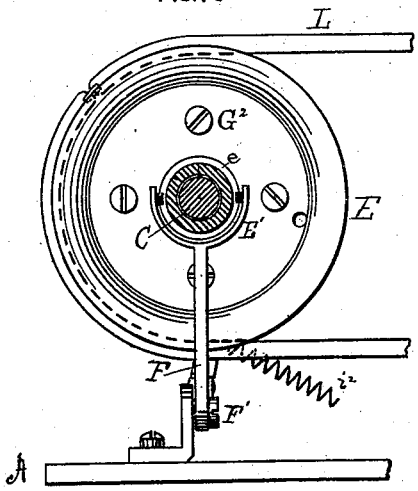
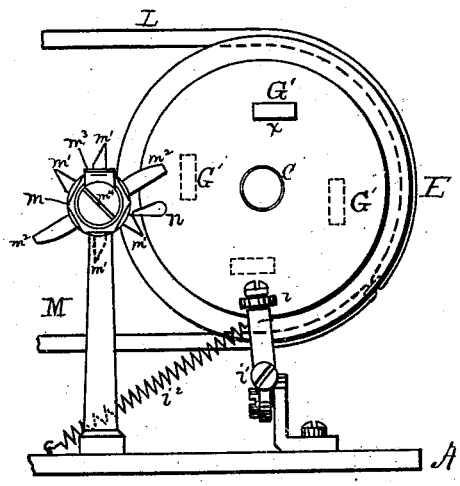


FIG. 4.



Witnesses
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L. B. Kilgour

Henry Fuchs Inventor

By Munday & Evarts, his Attorneys

UNITED STATES PATENT OFFICE.

HENRY FUCHS, OF CHICAGO, ILL., ASSIGNOR TO GEORGE W. BARNHART, ALSON E. BARNHART, ARTHUR M. BARNHART, AND CHARLES SPINDLER, OF SAME PLACE.

IMPROVEMENT IN CLUTCHING DEVICES.

Specification forming part of Letters Patent No. **189,210**, dated April 3, 1877; application filed November 22, 1876.

To all whom it may concern:

Be it known that I, HENRY FUCHS, of Chicago, in the county of Cook and State of Illinois, have invented certain Improvements in Clutching Devices, of which the following is a specification:

The object of this invention is to obtain a means of actuating the vibrating plate or mold-carrying part of type-casting machines which, while it does not lessen or in any way affect or change the speed of any movement of the plate, will yet permit it to linger with the mold at the mouth of the melting-pot a sufficient length of time for the metal in the mold to cool and set before the type is discharged. A further object has been to so construct this actuating mechanism that the period of such lingering or rest of the vibrating plate may be varied and made to conform to the requirements of different sizes of type.

While my invention has been made with special reference to the needs of type-casting machines, yet it may be equally well-applied to others where similar movements are required, as will be obvious from the description and drawings.

The nature of the invention will fully appear from the subjoined description and the accompanying drawings, in which—

Figure 1 is a front view of my improved actuating device. Fig. 2 is a plan view of the same. Fig. 3 is a side elevation of the driving-pulley and the shifter by which it is moved back and forth upon the shaft, with its collar and shaft in section. Fig. 4 is a view of the other side of the driving-pulley, showing also some other features of the invention, which will be hereafter described. Figs. 5, 6, 7, and 8 are detached views of portions of the apparatus.

Like letters of reference indicate like parts wherever used in the several figures.

In the drawings, A designates the bed-plate of the machine, and B one of the standards supporting a shaft, C, the latter carrying the cam D, by which the vibrating plate and mold, after discharging a type, are forced over against the melting-pot to receive the metal for the next casting, or by which the intermittent motion afforded by my invention is communicated to the part or machinery where it is desired. This cam is of the ordinary construction, and is shown at Fig. 5. Mounted loose upon the same shaft is the drive-pulley E, which may, if desired, be a cone-pulley, as thereby the speed of the machine may be additionally regulated. This pulley is free to slide back and forth a limited distance upon the shaft, the object of which movement is to force it into engagement with the clutch-wheel, hereinafter mentioned, during a part of the time, and to free it therefrom the balance of the time. It is forced out of reach of the clutch-wheel and toward the cam D by a shifter, E′, working in a groove, *e*, in the collar of the pulley, the shifter being mounted upon one end of a bent rock-lever, F, pivoted at F′ in a bearing rising from the bed-plate.

At equal distances upon a circle drawn upon the side of the drive-pulley are apertures for the insertion of catches G^1, which I secure therein by screws G^2, inserted from the opposite side of the pulley.

H is a clutch-wheel upon the end of the cam-shaft, and firmly secured thereto, so as to rotate the latter with it. The side of this wheel toward the drive-pulley is shown detached at Fig. 6, and is provided at a point thereon where it will engage the catches on the driving-pulley with a clutch or stub, *h*. It is also provided at a point about half-way around from the stub *h*, and nearer the periphery, so as not to interfere with the catches on the drive-pulley, with a cam, *h′*, designed to act upon one end of the bent lever F.

This end of the lever F is provided with an anti-friction roller, *i*, which receives the impact of the cam *h′*. It is also jointed at i^1, so that that portion above the joint may yield a little to the cam in a line transverse to the line of the lever; and in order that such yielding portion may recover its normal position after the cam has passed, a coiled spring, i^2, exerting a force contrary to that of the cam, is attached near the roller *i* and to the bed-plate, as shown in Fig. 4.

Encircling the cam-shaft, and held thereon between the drive-pulley and the cam D, is a spiral spring, *k*, which exerts a steady press-

ure upon the drive-pulley, and, whenever the latter is not impelled toward the cam by the shifter, keeps it in position upon the shaft to engage with the projecting stub on the clutch-wheel. A similar but shorter spring, *k'*, is placed upon the shaft between the wheel and the pulley, designed to prevent the too close contact between those two parts.

The operation of my invention, as thus far described, is as follows: Supposing one catch, G^1, to be inserted in the pulley E, and motion to be imparted by the belt L, the catch, in its rotation, will meet the stub on the clutch-wheel, and carry it and the cam-shaft with it until the cam on the wheel strikes the bent lever, and exerts such force upon it that it shifts the belt-pulley away from the clutch-wheel a sufficient distance to release the catch and stub from contact. When this release has taken place, the drive-pulley, which meanwhile continues its rotation unimpeded, is, by the freeing of the shifting-lever from the cam upon the clutch-wheel, (which occurs at the same instant, or nearly so,) left to the influence of the spring *k*, and is forced back so that its catch will engage the clutch-wheel again as soon as it completes a revolution from the point at which the release took place. During this last-mentioned revolution of the drive-pulley, the cam-shaft remains stationary, and the period of time occupied thereby represents the length of the dwell or rest of the mold at the mouth of the melting-pot.

The period of this rest may be shortened by inserting additional catches G^1. Thus, if it is desired to shorten it by one-half, another catch is inserted at the aperture opposite the one already occupied, and the cam-shaft will then be dormant during but one half-revolution of the drive-pulley, because the second catch will engage the clutch-wheel when a half-turn has been made. It may be still further reduced by the insertion of a greater number of catches G^1 than two, care being taken that they are placed at equal distances from each other.

I will now describe the devices by which I secure a rest of the cam-shaft longer that that afforded by the parts already described. A standard or post, M, rising to about the level of the cam-shaft, is located with reference to the drive-pulley, as shown in Figs. 2 and 4. It is provided at the top with a recess, in which is inserted a pivot, *p*, the latter supporting a small wheel, *m*, with six arms radiating from its periphery. This wheel I call a "star-wheel". Of its six arms the four lettered m^1 are shorter than the others, and in the line across the edge of the wheel are of the same width from the stub to point, while in the other direction they are thick at the stub, and beveled off upon one side toward the point, so that at the point an edge from side to side is formed. The two remaining arms, m^2, are preferably longer than the others, and upon the side toward the driving-pulley are cut away for about half their width, and nearly all their length. A slight taper is given upon one side, near the point, as shown. That part of the hub of the wheel projecting toward the standard is flattened, so as to present the same number of sides that the wheel is given arms, and these sides are so located that their centers are in a line with the centers of the spaces occupied by the arms—that is to say, the flattened sides correspond with the arms in both number and location.

A flat metal spring, m^3, secured to the standard by a set-screw, m^4, is bent over so as to press down upon these flattened surfaces, so as to check the movement of the wheel as soon as the impelling force of the catch upon the driving-pulley, hereinafter next mentioned, has ceased to operate upon the arms. The wheel should be placed in such proximity to the pulley that the latter may be withheld from engagement with the clutch-wheel by such one of the arms m^1 as is in position for the time being. Care should also be taken to so place it that but one of those arms is engaged in this function at a time. All these features will be fully understood by reference to the drawings, wherein a side of the standard M is shown by Fig. 7, and an edge view of the star-wheel by Fig. 8.

The wheel *m* is rotated, step by step, by a catch, *n*, located near the periphery of the drive-pulley, and extending just beyond that periphery, which catch strikes an arm of the star-wheel each time its rotation brings it to the point where it meets the arms, each stroke, of course, carrying the star-wheel one-sixth of a revolution, and leaving the latter where the catch upon its next turn will engage the next arm, and so on.

When the star-wheel is employed but one of the catches G^1 on the drive-pulley is used. That one is marked additionally with an *x*. It performs the same function whether used in conjunction with the star or without it; and it should be here noticed that it is placed far enough from the periphery of the pulley to escape contact with the star-arms under all circumstances.

Each one of the arms m^1 serves to detain the pulley from engagement with the clutch-wheel during the time it is in position with its point in contact with the pulley, as will be readily seen. The arms m^2, on the contrary, allow the pulley to slide toward the clutch-wheel until it meets the narrow part *o* of those arms, the part *o'* offering no obstacle. When the pulley has reached this location it is in position to engage the wheel H.

During the revolution of the pulley, which occurs while the narrow arm m^2 is against the pulley, the latter moves the clutch-wheel with it, and, consequently, near the close of that revolution the action of the cam upon the rock-lever and pulley will gradually force the pulley away from the clutch and from the arm m^2. In order, therefore, that the catch *n* may not cease to act upon the arm m^2 before the latter has completed its one-sixth revolution, the catch *n* is made to project be-

yond the pulley a sufficient distance to strike that portion of arm m^2 lettered o', as before mentioned, and thereby its action is continued during the same period as in the case of the arms m^1.

This star-wheel operates, in connection with the other parts of my invention, as follows: Supposing the first of the arms m^1, after one of the arms m^2, to be in position to receive the stroke of the catch n, and motion to be imparted to the pulley, as before, the pulley will revolve independently of the clutch-wheel; but the catch n will, in its first revolution, carry the arm m^1, just mentioned, a one-sixth revolution downward, leaving the second arm m^1 in the position it occupied when motion was imparted, and which it has just vacated. The catch, in its second revolution, strikes this second arm m^1 and carries it the same distance, and leaves the arm m^2, which is next, in turn, in the position previously held by the others. During this revolution of the pulley there is likewise no contact between it and the clutch-wheel; but the moment the second arm m^1 is carried so far that it cannot touch or interfere with the pulley the latter is free to yield to the pressure of the spring k until it reaches the narrow part of the arm m^2, and it will then engage with and rotate the clutch-wheel until forced back again by the shifter. This forcing-back operation is coincident in point of time with the striking of the arm m^2 by the catch n, and it is this fact which permits the narrow arm to be succeeded by a wide one.

It will thus be observed that the cam-shaft remains stationary during two revolutions of the drive-pulley, and moves with it during the revolution next thereafter; or, in other words, it rotates with the drive-pulley during every third revolution of the latter, and is still at other times. This is the result of the construction shown; but it may be varied indefinitely. Thus, by substituting an arm, m^1, for one of the arms m^2, the cam-shaft will be rotated but once during six revolutions of the pulley. Again, by substituting a star with six m^1 arms and two m^2 arms, the cam will be turned but once with the pulley during four revolutions of the latter, and by changing one of the m^2 arms to an m^1 arm, the length of rest last mentioned will be doubled, and so on, any number of changes desirable in this class of machinery can be produced without difficulty.

Having thus fully described my invention, what I claim as new is—

1. The combination, with the cam-shaft, of a drive-pulley mounted loosely thereon, and carrying one or more catches, G^1, a wheel, H, fast upon said shaft, and carrying a clutch, h, and cam h', and a bent rock-lever, actuated by the cam h', and provided with a shifter for shifting said pulley, substantially as set forth.

2. The combination, with the pulley mounted loosely upon the cam-shaft, and the wheel H, fast upon the same shaft, and both provided with catches, so that they will clutch when brought together, of a coiled spring encircling the shaft and held thereon, so as to exert a pressure upon the pulley, tending to force it toward the wheel H, substantially as specified.

3. The bent lever, jointed so as to permit one end to yield transversely, in combination with the spring i^2, so attached as to resist such yielding, essentially as described.

4. The star-wheel provided with radiating arms m^1 and m^2, constructed substantially as shown and described.

5. The star-wheel provided with radiating arms, and having its hub flattened with the same number of sides that it has arms, and combined with a spring impinging upon said flattened sides, substantially as and for the purpose set forth.

6. The combination, with the pulley and the spring pressing it toward the clutch-wheel, of a wheel mounted upon an appropriate standard, and provided with radiating arms, the wheel being so placed that the arms will act to resist the spring, substantially as specified.

7. The pulley provided with a catch, n, essentially as shown, in combination with the wheel m m^1 m^2, substantially as set forth.

8. The combination, with the cam-shaft, of the drive-pulley E, the wheel H, the lever F, spring k, and star-wheel m m^1 m^2, the pulley carrying the catches G^1, x, and n, the wheel carrying catch h and cam h', and the lever being provided with a shifter for shifting the pulley, and all the parts being arranged substantially as set forth.

9. The combination, with the drive-pulley and the wheel which rotates the cam-shaft, both pulley and wheel being provided with catches to clutch, of a device for shifting the pulley away from the wheel, operated by a cam upon the wheel, substantially as set forth.

10. The clutch operating the cam-shaft, the driving part whereof is provided with a catch, n, in combination with a wheel, m, suitably mounted and located with reference to the movable part of the clutch, essentially as shown, and provided with radial arms, so constructed that one or more of them will permit the contact of the parts of the clutch, while the others will prevent it, substantially as specified.

11. The cam-shaft intermittently operated by and in combination with a clutch, one part of which is provided with several removable catches, so that the number of contact-points may be changed at pleasure, substantially as set forth, whereby the period of rest may be regulated by changing the number of catches.

HENRY FUCHS.

Witnesses:
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