No. 869,424. PATENTED OCT. 29, 1907.

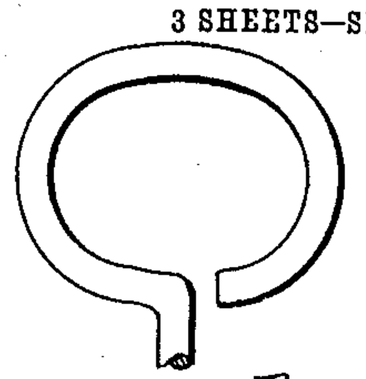
W. H. CRANE.

COUNTING MECHANISM FOR GRAIN HARVESTERS.

APPLICATION FILED SEPT. 7, 1906.

3 SHEETS—SHEET 1.

Fig. 1.



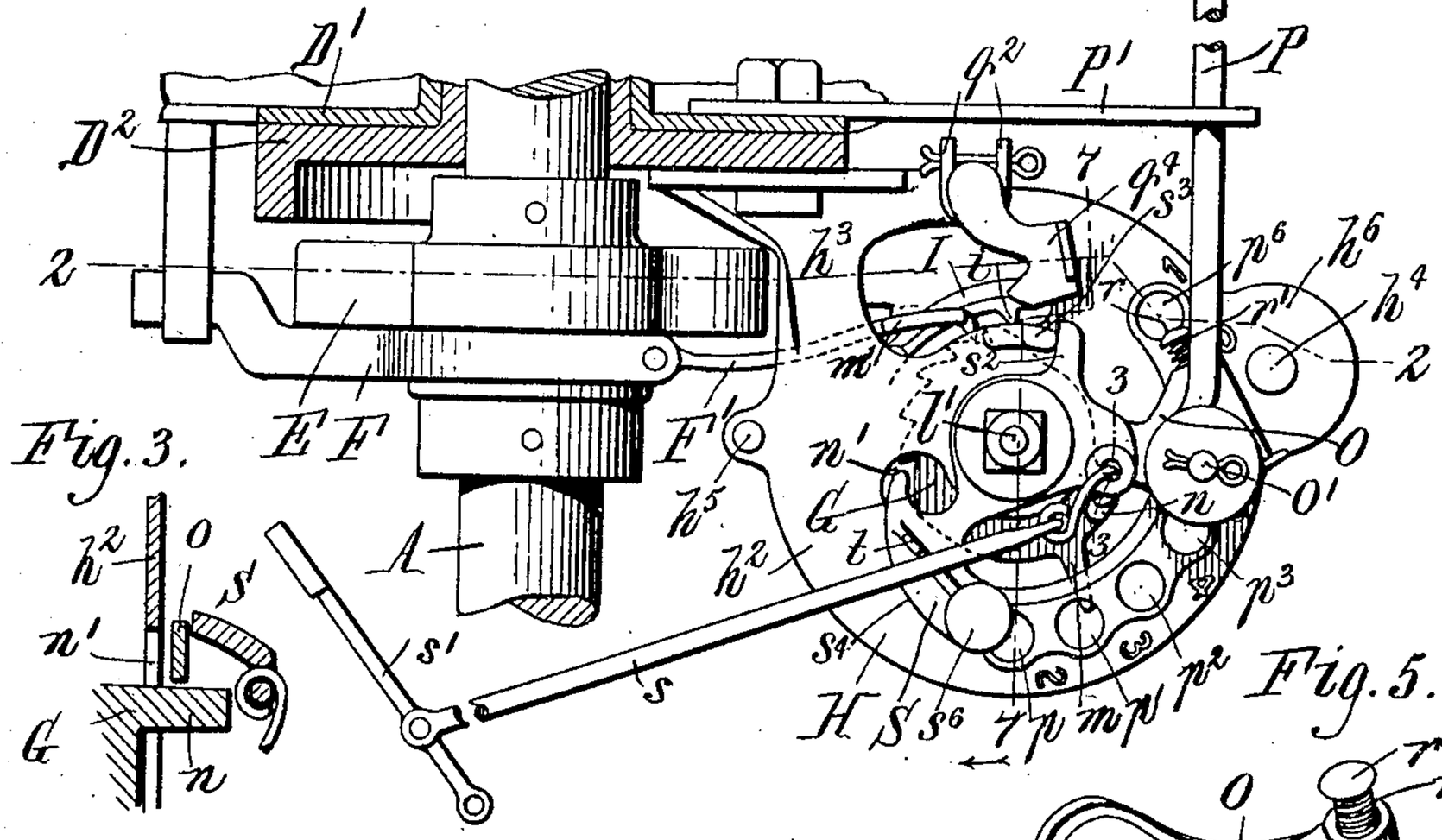


Fig. 3.

Fig. 5.

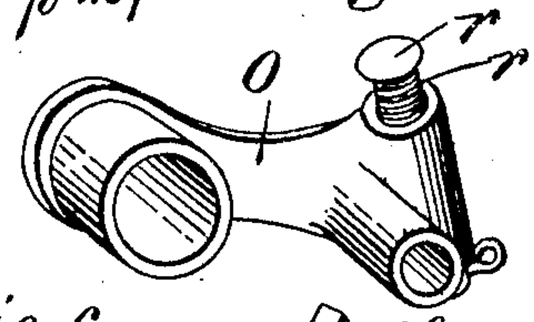
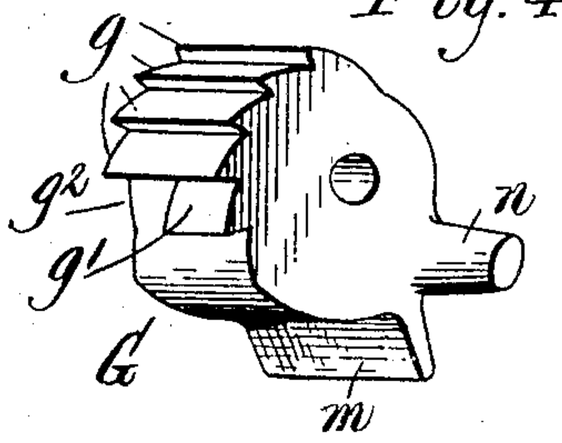


Fig. 4.



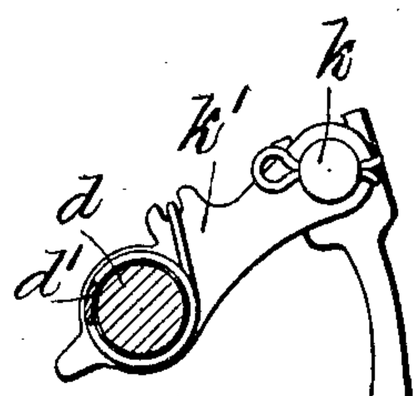


Fig. 6.

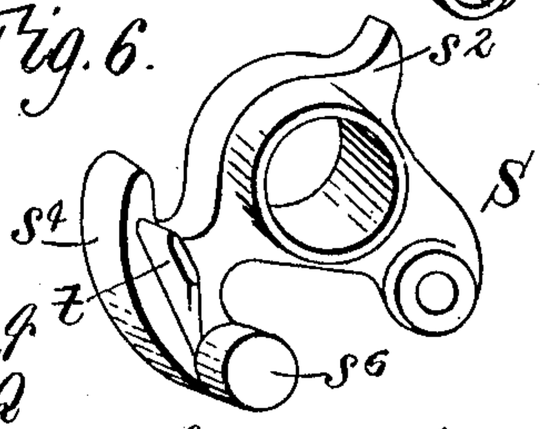
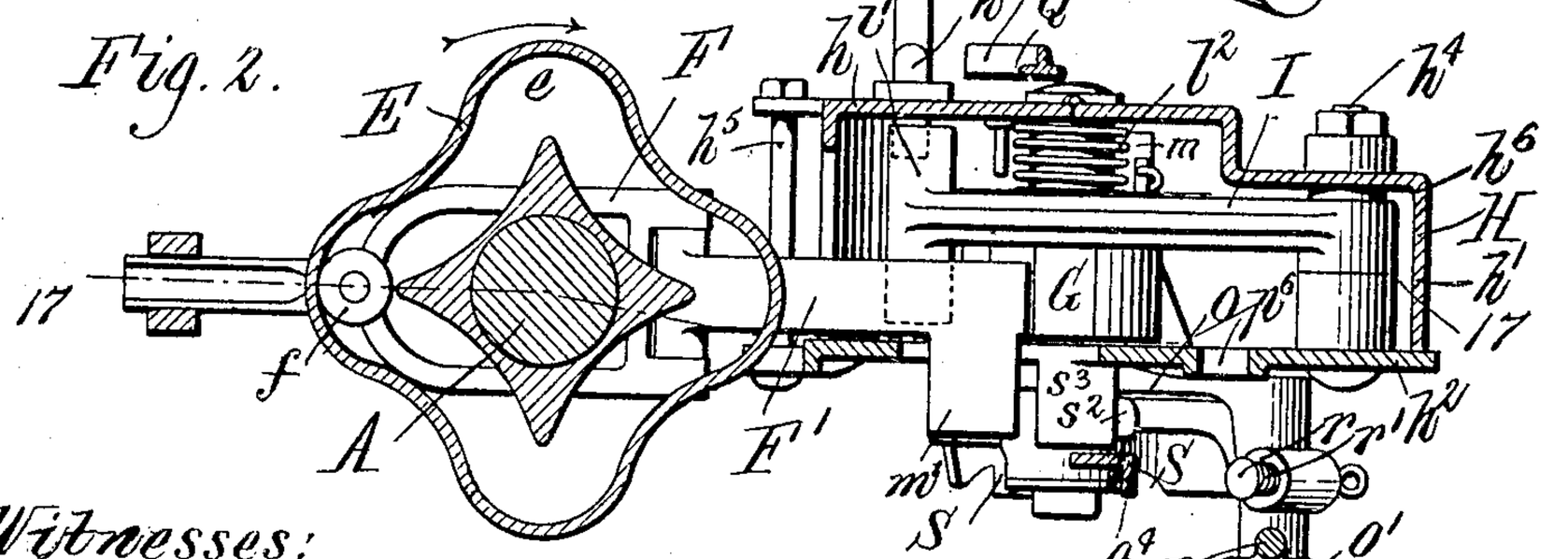


Fig. 2.



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3 SHEETS—SHEET 2.

Fig. 7.

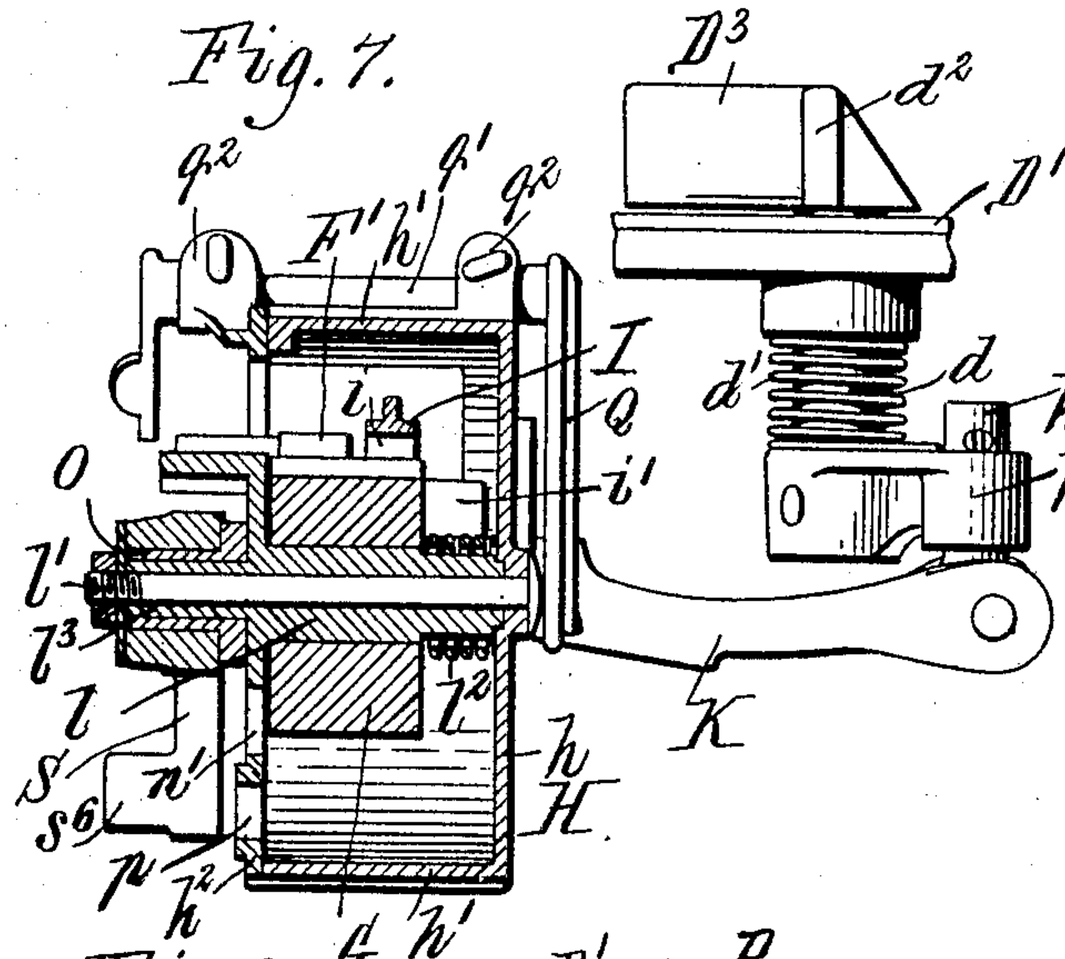

Fig. 8.

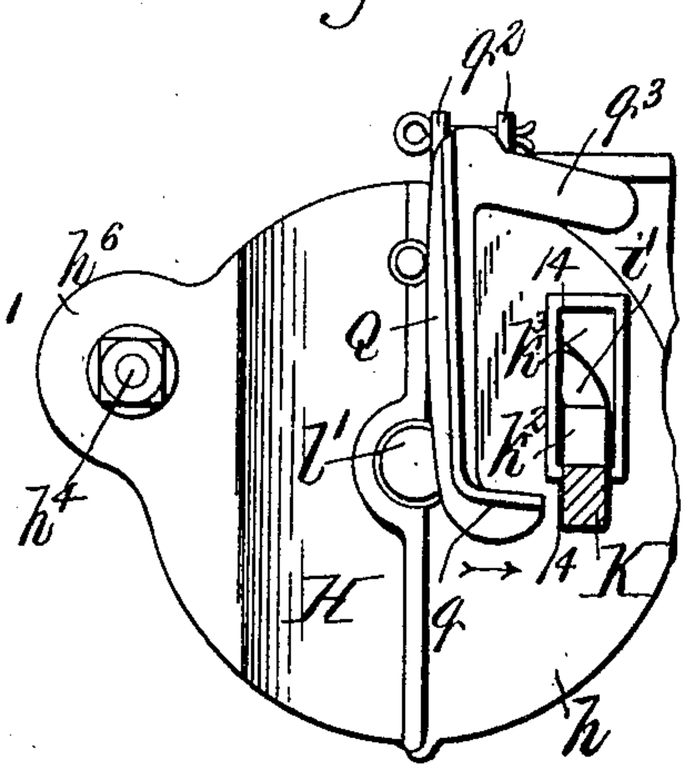

Fig. 9.

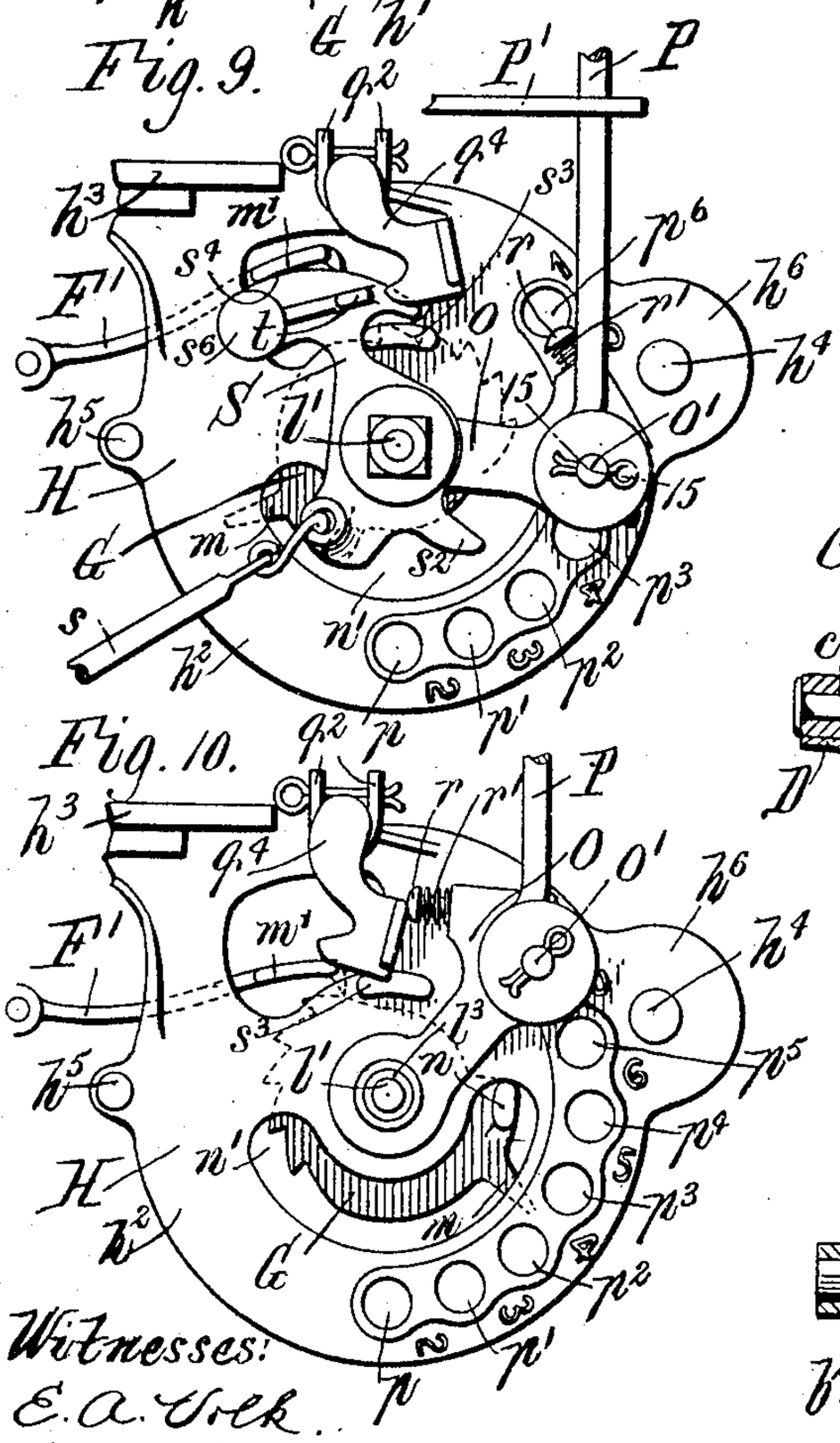

Fig. 10.

Fig. 11.

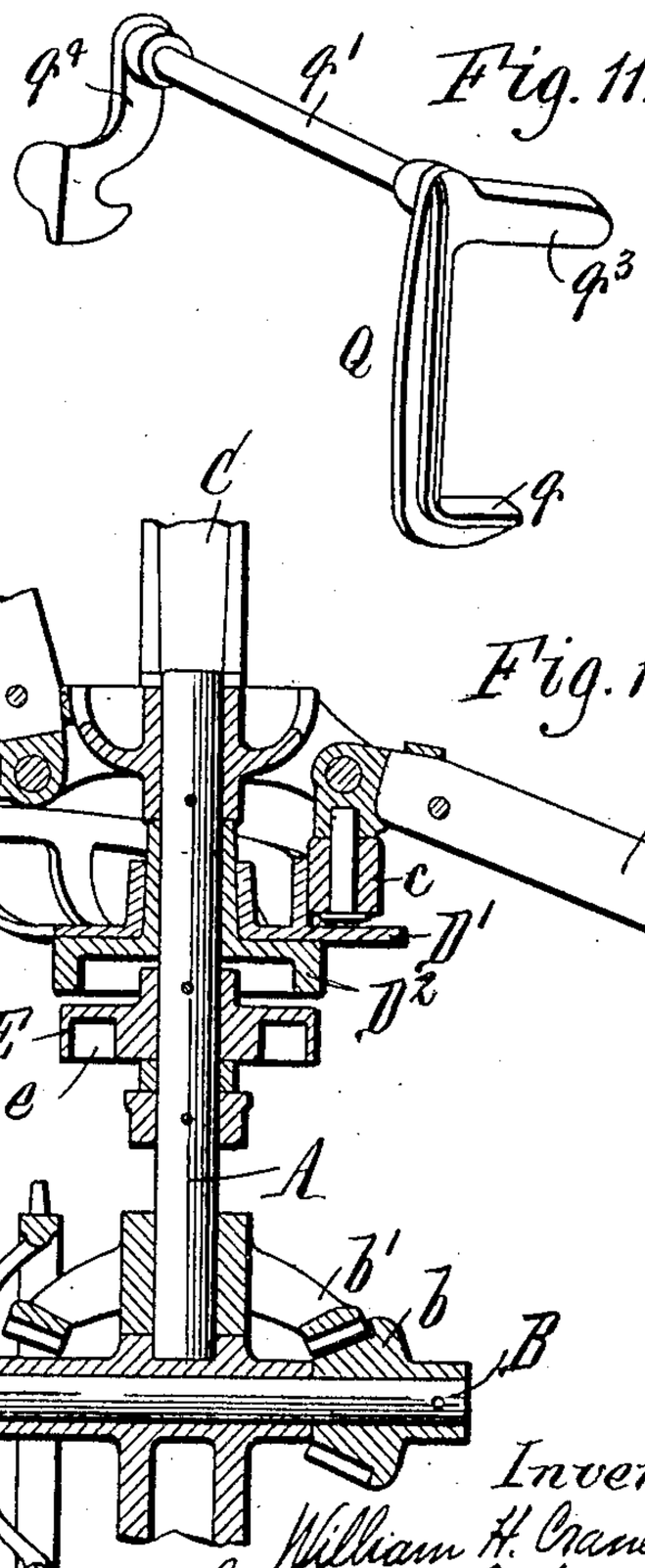

Fig. 12.

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COUNTING MECHANISM FOR GRAIN HARVESTERS.

APPLICATION FILED SEPT. 7, 1905.

3 SHEETS—SHEET 3.

Fig. 13.

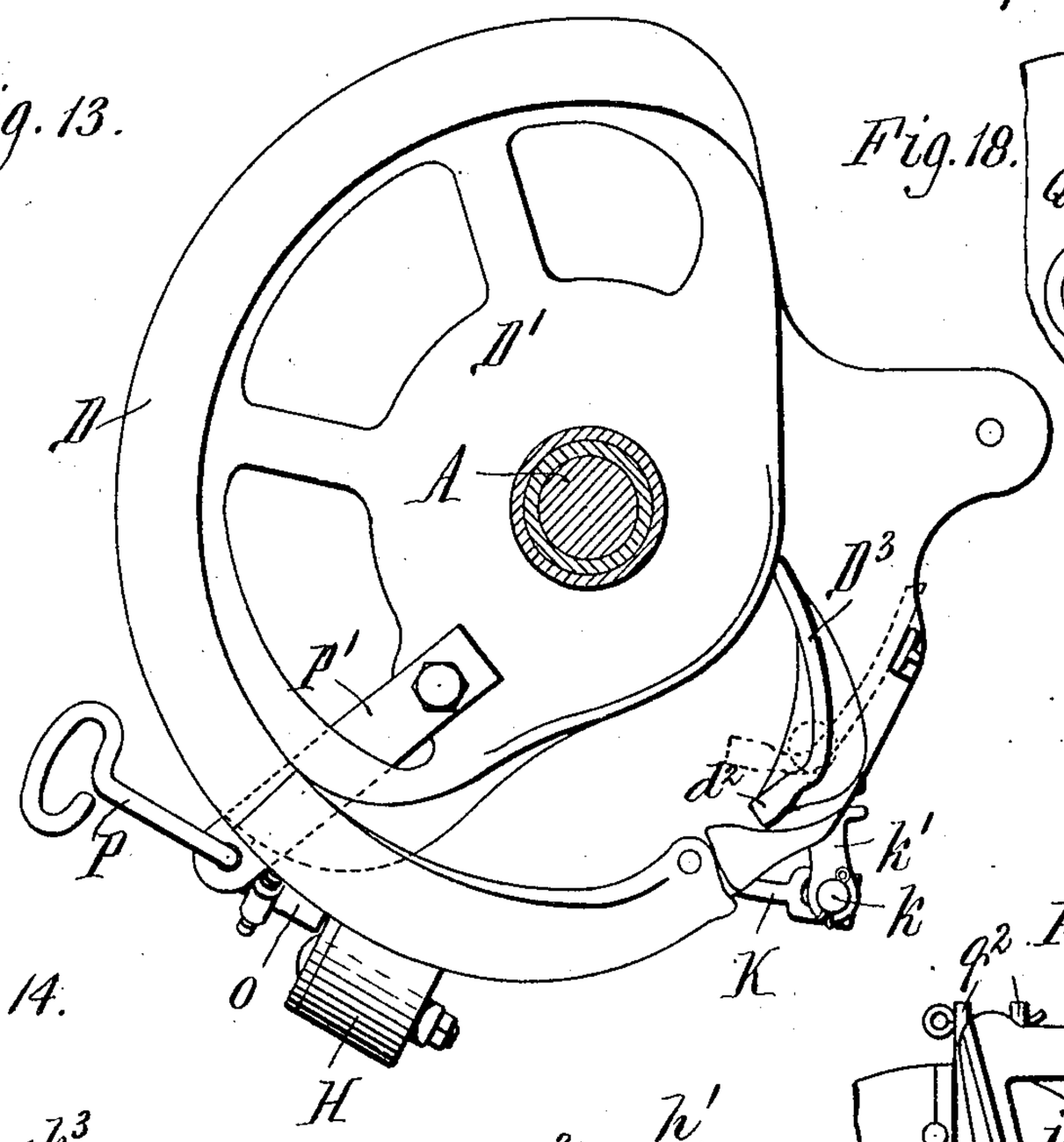


Fig. 18.

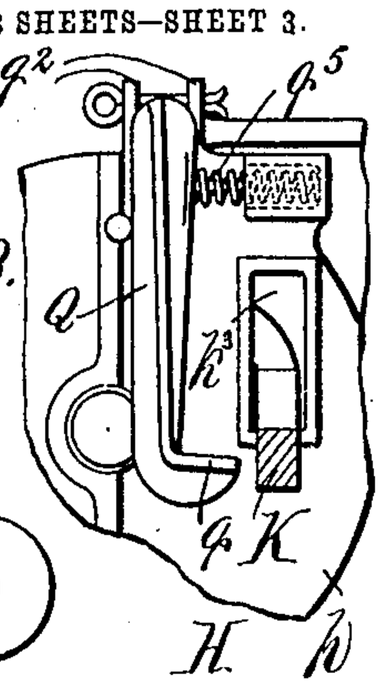


Fig. 14.

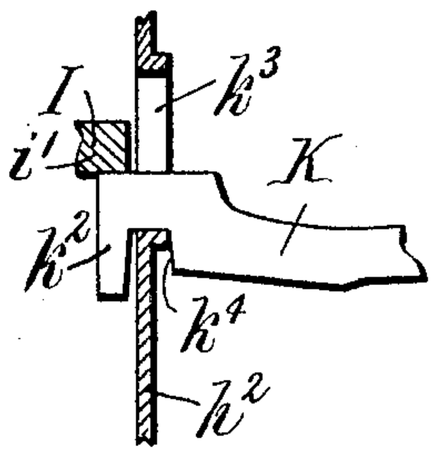


Fig. 15.

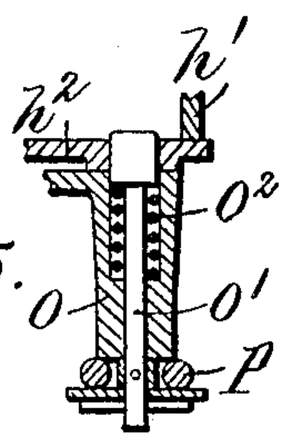


Fig. 16.

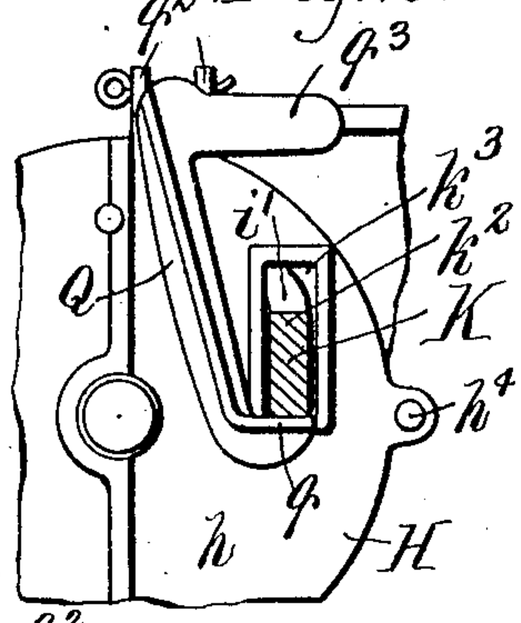
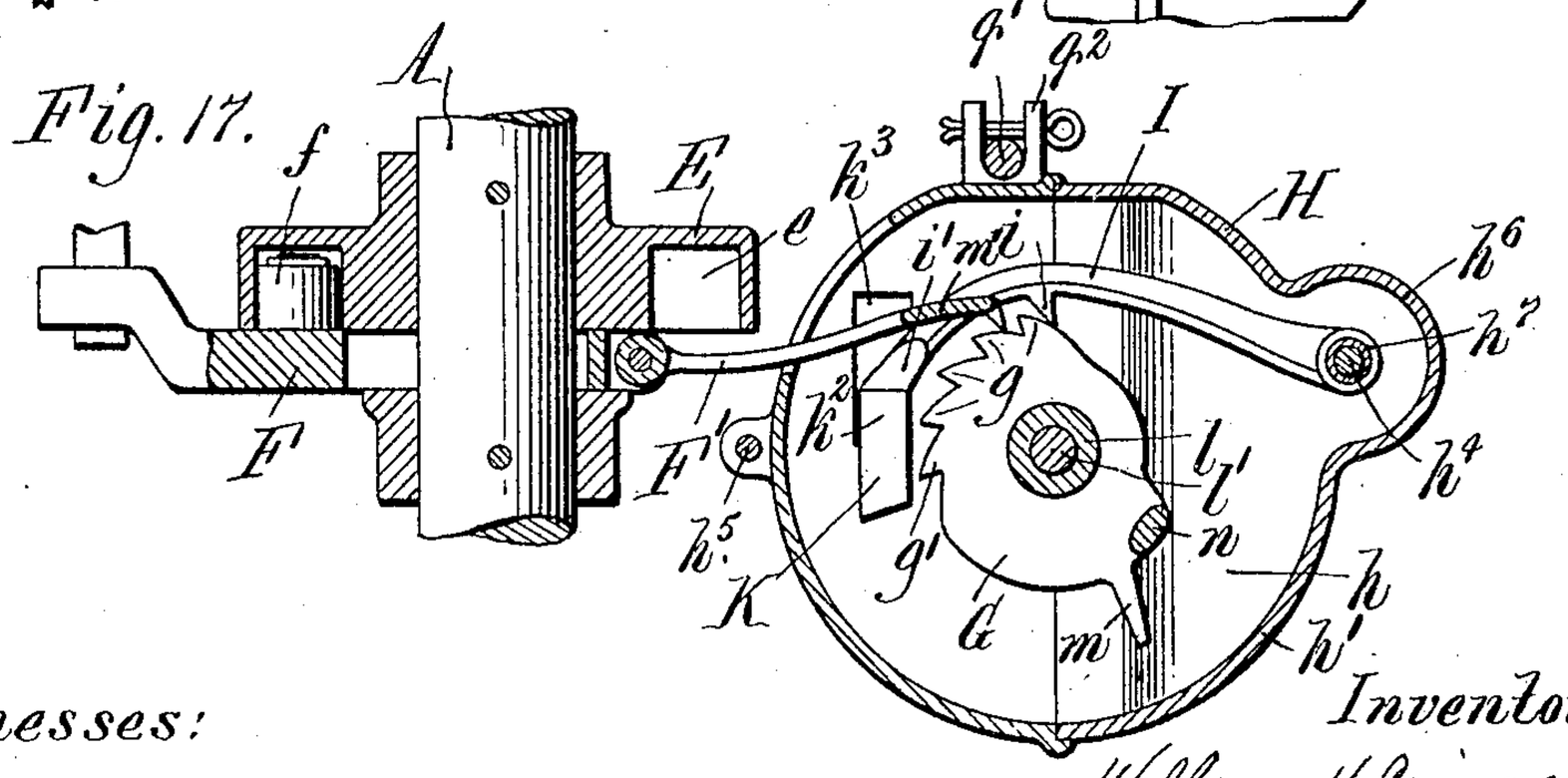


Fig. 17.



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UNITED STATES PATENT OFFICE.

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COUNTING MECHANISM FOR GRAIN-HARVESTERS.

No. 869,424. Specification of Letters Patent. Patented Oct. 29, 1907.

Application filed September 7, 1905. Serial No. 277,401.

To all whom it may concern:

Be it known that I, WILLIAM H. CRANE, a citizen of the United States, residing at Poughkeepsie, in the county of Dutchess and State of New York, have invented a new and useful Improvement in Counting Mechanisms for Grain-Harvesters, of which the following is a specification.

This invention relates to the counting mechanism employed in grain harvesters in connection with the rotary rake head and the switch for controlling the frequency of the raking action, and has particular reference to that class of counting mechanisms in which the switch is controlled by a latch which is actuated periodically by a toothed tripping wheel to which a step by step forward movement is imparted by an actuating pawl connected with the rake head and which is returned to its initial position, when the latch has been tripped, by a spring when the tripping wheel has actuated the latch.

The objects of this invention are to improve this class of counting mechanisms by providing simple and convenient means for increasing the range of adjustments.

In the accompanying drawings, consisting of three sheets: Figure 1 is a sectional front elevation of my improved counting mechanism. Fig. 2 is a top plan, partly in section, the section being taken in line 2—2, Fig. 1. Fig. 3 is a fragmentary vertical section through the front plate of the casing and adjacent parts in line 3—3, Fig. 1. Fig. 4 is a perspective view of the tripping wheel. Fig. 5 is a perspective view of the stop lever. Fig. 6 is a perspective view of the pawl lifting lever. Fig. 7 is a vertical section at right angles to Fig. 1, in line 7—7, Fig. 1. Fig. 8 is a rear elevation of the casing with the latch in section. Fig. 9 is a front elevation of the counting mechanism, showing the lifting lever in its operative position. Fig. 10 is a similar front elevation with the lifting lever removed and the stop lever in engagement with the latch-supporting device. Fig. 11 is a perspective view of the latch-supporting device. Fig. 12 is a vertical section of the rake head and connecting parts. Fig. 13 is a top plan view of the rake head and connecting parts, partly in section. Fig. 14 is a fragmentary sectional elevation of the latch and the casing in line 14—14, Fig. 8. Fig. 15 is a horizontal section of the free end of the stop lever in line 15—15, Fig. 9. Fig. 16 is a fragmentary rear elevation of the casing with the latch in section and the latch-supporter engaged underneath the latch. Fig. 17 is a sectional elevation in line 17—17, Fig. 2. Fig. 18 is a fragmentary rear elevation of the casing, showing a spring-pressed latch-suppporter.

Like letters of reference refer to like parts in the several figures.

A represents the upright rake shaft driven in the usual manner, for instance, as shown in Fig. 12, from a horizontal shaft B by bevel wheels b b', the shaft B being driven by a sprocket wheel b^2.

C represents the rake arms provided with the usual rollers c which run on the track D mounted by its base D′ on the table D^2.

D^3 represents the switch secured to the upper end of a pivot d, Figs. 2 and 7, which is provided with a spring d' by which the switch is opened. The switch is provided outside of its pivot line with a tail piece d^2, Figs. 7 and 13, against which the roller strikes after having passed the open switch, thereby closing the same.

E, Figs. 1, 2, 12 and 17, represents the cam of any suitable construction by which the tripping wheel is actuated and which may be secured to the upright rake shaft or to the rake head. As shown, this cam is provided in its under side with a groove e having salient portions corresponding in number and arrangement with the rake arms, but this groove may be otherwise arranged.

F represents the actuating slide carrying a roller f which is engaged by the cam E and whereby the slide is reciprocated.

F′ represents the actuating pawl which is pivoted to the slide F.

G represents the tripping wheel provided with ratchet teeth g g' which are engaged by the pawl F′ in such manner that every forward movement of the pawl moves the wheel forward the distance of one tooth until the last or tripping tooth g' is reached.

The tripping wheel G is mounted in an upright casing H which is secured to the under side of the table D^2. This casing is approximately cylindrical in form and comprises a rear plate h and a peripheral wall h' formed integrally therewith and forming the body of the casing, a front plate h^2, and a flanged top extension h^3 by which the casing is secured to the table D^2. The body and the front plate of the casing are secured together by horizontal bolts h^4 h^5 and the body is preferably cast in two parts divided vertically, as represented in Figs. 2, 7 and 17. The casing is provided with a hollow peripheral projection h^6 in which the bolt h^4 is arranged, and which also receives the hub portion of the detent pawl I which is hung on a thimble h^7 through which the bolt h^4 passes. This pawl engages the teeth of the tripping wheel with its holding tooth i for the purpose of preventing backward movement of the latter except when the detent pawl is raised clear of the teeth.

K represents the latch which is connected by an upright swivel post k to the arm k' of the switch and which projects with its head k^2 into an opening k^3, Figs. 8 and 14, formed in the rear wall h of the casing. The head of the latch is provided with a locking shoulder k^4, Fig. 14, by which it bears against the rear wall of the casing

below this opening and prevents the switch from being opened while the latch remains so locked. Upon lifting the latch clear of the lower edge of the opening k^3, the switch is thrown open by the spring d'. When the rake roller c has passed by the switch it strikes the tail-piece d^2 thereof and closes the switch, retracting the latch K until the head of the latch is again interlocked with the rear wall of the casing.

The tripping wheel G turns on a horizontal rearwardly-projecting, hollow stud l, Fig. 7, formed on the front plate h^2 of the casing. A tie bolt l' passes through this stud. The tripping wheel G is mounted on the front portion of this stud and the spring l^2 by which the wheel is returned to its initial position is mounted on the rear portion of the stud, the latter being seated with its rear end in the rear wall h of the casing.

The tripping wheel is provided with a trip or unlocking arm m, Figs. 4 and 17, arranged circumferentially in rear of the teeth of the wheel in such a position that this arm will raise the latch and disengage the same from the casing when the wheel has been turned forward by the actuating pawl F′ the required distance. The detent pawl I rests upon the head of the latch K, as shown in Figs. 2, 14 and 17, so that by raising and unlocking the latch the detent pawl is disengaged from the tripping wheel, leaving the latter free to be returned to its initial position by the spring l^2.

As shown in Figs. 2 and 17, the detent pawl I is provided beyond its holding tooth i with a broad head i' which has its rear portion arranged over the head of the latch K and the front portion underneath the free end of the actuating pawl F′, so that, when the latch is raised, during its unlocking movement, the detent pawl and the actuating pawl are also raised. The actuating pawl F′ is provided on its front side, near its head, with a lifting lug m' which projects outwardly through an opening in the front plate h^2 of the casing.

The initial position of the tripping wheel is fixed by a stop n which projects forwardly on the front side of the wheel and bears in its extreme rear position against the rear end of a segmental slot n' formed in the front plate h^2 of the casing, as shown in Figs. 1 and 10, and in other positions against a stop lever O which can be secured across said slot, at different distances from the rear end thereof, thereby adjusting the initial position of the wheel accordingly. This stop lever is pivoted on the front plate h^2 of the casing concentric with the tripping wheel, preferably by being mounted upon a forward extension l^3 of the hollow stud l, Fig. 7.

The stop lever is held in its adjusted position by a bolt O′, Figs. 1, 9 and 15, which is seated in the end portion of the lever and projected rearwardly by a spring O^2. This bolt engages in one of a series of openings p p' p^2 p^3 p^4 p^5 p^6 formed in the front plate h^2 of the casing and arranged equidistant from the pivot line of the lever. The latter is operated by a rod P which engages with its lower end the outer portion of the spring bolt O′, Figs. 1, 2 and 15, and which extends upwardly to a point in convenient reach of the operator. This shifting rod passes through a plate P′, Figs. 1 and 13, which is secured upon the base D′ of the roller track or some other fixed part, and which is provided with an opening in which the rod can be rocked and also be moved lengthwise. By rocking the rod the spring bolt O′ can be withdrawn from the opening in which it is engaged and by moving the rod lengthwise the lever O can be turned on its pivotal support, as may be necessary to engage the bolt in a different opening. These openings are preferably so arranged that when the lever O is locked in the lowermost opening p the lever arrests the stop n of the tripping wheel in that position in which the wheel will be so actuated that the latch will be unlocked and the switch will be opened for every second rake, while the succeeding openings p' p^2 p^3 p^4 will serve to hold the stop lever in such positions, respectively, that the latch will be unlocked and the switch will be opened for every third, fourth, fifth and sixth rake. In Figs. 1 and 9 the stop lever O is shown adjusted for opening the switch for every sixth rake.

In addition to these adjustments the mechanism is provided with means for causing every rake to sweep the platform, and further, with means for enabling the operator, at will, to prevent the rakes from operating.

The means for causing every rake to operate consists of devices whereby the locking latch is prevented from locking and the switch is allowed to remain open. These devices are constructed as follows: Q, Figs. 8, 11, 16 and 18, represents an arm for supporting the latch in its raised or unlocked position. This arm is arranged in an upright position on the rear side of the casing H and has at its lower end a lug q by which it engages underneath the latch. The arm is secured at its upper end to the rear end of a horizontal shaft q' which is rotatably supported between lugs q^2 upon the casing H and arranged parallel with the axis of the tripping wheel. This shaft is provided with means tending to swing the arm Q away from the side of the latch, which means may be an overhanging weight q^3, Fig. 16, or a spring q^5, Fig. 18. The shaft q' is provided at its front end with an actuating arm q^4 which depends into the path of the stop lever O, so that the arm q^4 can be moved by means of the stop lever in the proper direction to swing the supporting arm Q against the latch, as indicated by the arrow in Fig. 8. For the purpose of making a yielding contact between the stop lever O and the actuating arm q^4 the former is provided with a bolt r which is pressed toward the actuating arm by a spring r'. This spring bolt is so arranged with reference to the actuating arm q^4 that when the stop lever is swung upwardly and locked in the uppermost opening p^6 the spring bolt r during the last portion of this movement, will engage against the actuating arm and swing the latter and the supporting arm Q so as to press the arm Q against the side of the latch K, the spring r' of the bolt r being under compression in this position of the parts. When the latch is next raised by the movement of the tripping wheel the spring r' will press the bolt r further forward and cause the supporting arm Q to engage with its lug q underneath the latch, as shown in Fig. 16, and the arm will now hold the latch in its unlocked or inoperative position. While the latch is held in this position by the stop lever O through the intervention of the rocking supporting device Q q' q^4 the switch is held open by its spring and every rake roller passes behind the switch over the effective part of the track, thereby causing every rake to operate.

Upon disengaging the stop lever O from the uppermost opening p^6 and moving the lever downwardly,

the spring bolt r is swung away from the actuating arm q^4 and the rocking supporting device is released and swung away from the latch by the overhanging weight q^3 or spring q^5. The latch now descends to its operative position.

For rendering the rakes inoperative the stop lever O is locked in the opening p^5 which is located between the series of openings p—p^4, in which positions a different frequency of raking is obtained by shifting the initial position of the tripping wheel, and the opening p^6, in which position each rake is rendered operative by rendering the latch inactive.

When the stop lever O is secured in the opening p^5, the tripping wheel G is not shifted from its inoperative position in which it rests with its stop n against the end of the slot n', the actuating pawl F′ rides upon the back of the tripping wheel and does not move the same, the latch remains locked, the switch remains closed, and every rake roller is deflected by the switch to the inoperative part of the track, thus preventing the rakes from operating.

The counting mechanism is further provided with means for enabling the operator, at will, to prevent the rakes from operating or to cause the rakes to operate, irrespective of the frequency for which the mechanism is adjusted by the position of the stop lever O. For this purpose a swinging lifting lever S, Figs. 1, 6, 7 and 9, is provided which is pivoted concentric with the tripping wheel, preferably by having its hub mounted on the hub of the stop lever O. This lifting lever is operated by a rod s connected with a treadle s' under the control of the operator. The lever S is provided with a stop s^2 by which it rests in its inoperative position against the rear side of a stop s^3 on the front plate h^2 of the case, as shown in Figs. 1 and 2. The lever is further provided with a curved cam face s^4 adapted to engage underneath the lifting lug m' of the actuating pawl F′ for lifting the latter. Upon depressing the treadle S the lifting lever is swung to its operative position, shown in Fig. 9, in which the lever bears with its curved cam face s^4 under the lug m' and lifts the actuating pawl out of engagement with the teeth of the tripping wheel. The pawl now moves clear of the wheel, the latter is not moved, the latch is not unlocked, and the switch remains closed, rendering the rakes inoperative. By holding his foot on the treadle the operator can hold the parts in this position and prevent the rakes from operating for any desired length of time. The lifting lever S rests in its operative position against the front side of the stop s^3, as represented in Fig. 9.

By swinging the lifting lever S forwardly, as described, the tripping wheel is turned forwardly, the lever engaging against the stop n of the wheel, and the wheel is left in a position in which the next forward movement of the wheel produced by the actuating pawl F′ will raise the latch out of engagement.

When the operator releases the treadle the lifting lever S drops by gravity back to its inoperative position, the lever being provided with a weight s^6 for this purpose. The tripping wheel, however, remains in the position to which it was moved by the lever as it is held by the detent pawl, and the actuating pawl drops back on the wheel and operates the latter during its next forward stroke. The wheel now lifts the latch and opens the switch.

If the operator desires to rake out of time that is to say, sooner than the time at which the raking would take place by the operation of the mechanism as set, he can readily do so by depressing the treadle and then releasing the same. This moves the wheel forwardly to that position which next precedes the final forward movement of the wheel and causes the next following forward movement of the actuating pawl and the wheel to trip the latch and cause the next rake to operate.

When the stop lever O is set in the opening p^6, in which position of the parts every rake is caused to operate and in which the latch is held out of engagement by the rocking supporting device, and it is desired to stop the operation of the rakes temporarily, it becomes necessary to swing the supporting device away from the latch. For that purpose the lifting lever S is provided with a forwardly projecting lug l, Figs. 1, 6, and 9, which presses against the actuating arm q^1 of the supporting device, when the lever S has reached its operative position, and forces the supporting device away from the latch. This movement of the supporting device is permitted by the spring bolt r of the stop lever O which yields under this pressure. When the lifting lever is returned to its inoperative position the spring r' of the bolt r returns the supporting device to its former position as soon as the latch has been lifted by the tripping wheel.

The last or tripping tooth g' of the tripping wheel is cut away on the rear side of the wheel, with which the locking tooth i of the detent pawl engages, to form a space g^2, Fig. 4. This prevents the detent pawl from engaging this last tooth and allows the wheel to be returned immediately by the spring when the forward movement of the actuating pawl F′ has been completed.

All the different adjustments of the counting mechanism, except those which are made by means of the lifting lever S, are effected by the stop lever O in the same way in which the ordinary adjustments for frequency are made, and all adjustments are made by the operator from his seat with great ease and convenience.

I claim as my invention:

1. The combination with a rake-switch counting mechanism having an adjustable setting lever and a releasable fastening device for said lever mounted thereon, of a shifting device connected with said fastening device for releasing the same and shifting the setting lever, said shifting device being operated from the driver's seat and capable of a rocking movement for releasing said fastening device and of a lengthwise movement for shifting the setting lever, substantially as set forth.

2. The combination of a rake-switch counting mechanism comprising an adjustable setting lever, a spring-pressed fastening bolt on said lever for securing the same in its adjusted position, and a shifting device capable of rocking and lengthwise movement and connected with said bolt for releasing the same and for shifting the setting lever, substantially as set forth.

3. The combination with a rake-switch counting mechanism having an adjustable setting lever and a releasable fastening device for said lever mounted thereon, of a shifting device movably connected at one end with said fastening device and having its opposite end arranged near the driver's seat, said shifting device being capable of a rocking movement for releasing said fastening device and of a lengthwise movement for shifting the setting lever, substantially as set forth.

4. The combination of a rake-switch counting mechanism comprising a tripping wheel and an adjustable setting lever for the same, a spring bolt mounted on said lever for securing the same in its adjusted position, and

a shifting device connected with said bolt and adapted to be operated from the driver's seat by a rocking and lengthwise movement for releasing said bolt and shifting the setting lever, substantially as set forth.

5. In a rake-switch counting mechanism, the combination of a tripping wheel, an adjustable setting lever for the same, a spring bolt mounted on said lever for securing the same in the adjusted position, a shifting rod connected with said spring bolt for operating said bolt and said lever, and a guide in which said rod can be rocked and moved lengthwise, substantially as set forth.

6. In a rake-switch counting mechanism, the combination of a switch-latch, a tripping means for the latch, a setting lever for said tripping means, and a latch supporter which is independent of the tripping means and which is moved by the setting lever toward the latch to support the same in such position that it can move without locking, substantially as set forth.

7. In a rake-switch counting mechanism, the combination of a switch-latch, a tripping means for the latch, a setting lever for said tripping means, and a latch supporter which is independent of the tripping means and which comprises an actuating arm which is engaged by the setting lever and a supporting arm which engages the latch, substantially as set forth.

8. In a rake-switch counting mechanism, the combination of a tripping wheel, a fixed stop, a switch-latch adapted to interlock with said stop in its lower position and to clear said stop in its raised position, a setting lever for said tripping wheel, and a rocking latch supporter having an actuating arm which is engaged by the setting lever and a supporting arm which raises the latch and supports the same in such a position that it can move without interlocking with said stop, substantially as set forth.

9. In a rake-switch counting mechanism, the combination of a tripping wheel, a fixed casing for the same, a switch-latch adapted to interlock with said casing and capable of movement with reference thereto, a setting lever for said tripping wheel, and a rocking latch supporter mounted on said casing and having an actuating arm which is engaged by the setting lever and a supporting arm which engages the latch and supports the same in such a position that it can move without interlocking with said casing, substantially as set forth.

10. In a rake-switch counting mechanism, the combination of a tripping wheel, a fixed casing for the same, a switch-latch arranged on the rear side of said casing and adapted to interlock therewith, a setting lever for the tripping wheel arranged on the front side of the casing, and a rocking latch supporter arranged on said casing and provided at the front side thereof with an actuating arm which is engaged by the setting lever and on the rear side with a supporting arm which engages the latch, substantially as set forth.

11. In a rake-switch counting mechanism, the combination of a switch latch, a tripping means for the latch, a setting lever for said tripping means, an elastic contact device on said lever, and a latch-supporter which is engaged by said contact device and pressed by the same toward the latch, substantially as set forth.

12. In a rake-switch counting mechanism, the combination of a switch latch, a tripping means for the latch, a setting lever for said tripping means, a spring bolt arranged in said lever, and a rocking latch-supporter having an actuating arm which is engaged by said spring bolt, substantially as set forth.

13. The combination of a rake-switch, a latch for the same, a tripping wheel, an adjustable setting lever for said wheel, a spring-pressed fastening on said lever for securing the same releasably in its adjusted position, a latch-supporter which is actuated by said lever, and a spring bolt on said lever for engaging said latch-supporter, substantially as set forth.

14. The combination of a rake-switch, a latch for the same, a tripping wheel, a setting lever for said wheel, a spring bolt on said lever for securing the same in its adjusted position, a casing in which said wheel is mounted and which is provided with a series of openings for receiving said spring bolt, a movable latch-supporter, and a spring bolt in said lever for engaging said supporter, substantially as set forth.

15. The combination of a rake-switch, a spring for opening the same, a latch for holding the switch closed, a tripping wheel, an adjustable setting lever for said wheel, a spring-pressed fastening which releasably secures said lever in its adjusted position, a movable latch supporter, independent of said tripping wheel and operated by said setting lever to support the latch in such a position that it can move without locking, and a casing for said tripping wheel provided with a series of openings for receiving said spring-pressed fastening in different positions of the setting lever, substantially as set forth.

16. In a rake-switch mechanism, the combination of a switch latch, a tripping wheel for said latch, an actuating pawl for said wheel, a movable supporter for preventing the latch from locking, a setting lever for said tripping wheel, which lever moves said latch-supporter toward the latch, and a lifting lever for said actuating pawl, which lever moves the latch-supporter away from the latch, substantially as set forth.

17. The combination of a switch-latch, a tripping wheel for the same, an actuating pawl and a setting lever for said wheel, a supporter for preventing the latch from locking, comprising an actuating arm which is engaged by the setting lever for moving the supporter toward the latch, and a supporting arm which engages the latch for enabling the latter to move without locking, and a lifting lever which disengages the actuating pawl from the tripping wheel and engages the actuating arm of the latch supporter for moving the latter away from the latch, substantially as set forth.

18. The combination of a switch-latch, a tripping wheel for the same, an actuating pawl and a setting lever for said wheel, a supporter for preventing the latch from locking, comprising an actuating arm which is engaged by the setting lever for moving the supporter toward the latch and with a supporting arm which engages the latch for enabling the latter to move without locking, a lifting lever which disengages the actuating pawl from the tripping wheel and engages the actuating arm of the supporter for moving the latter away from the latch, and a yielding contact device by which the setting lever bears against the latch supporter, substantially as set forth.

Witness my hand, this first day of Sept., 1905.

WILLIAM H. CRANE.

Witnesses:

WEBSTER D. HASBROUCK,

G. M. PATTEN.