J. W. FOWLER & D. F. LEWIS.

Passenger-Register.

No. 207,728. Patented Sept. 3, 1878.

Fig. 1.

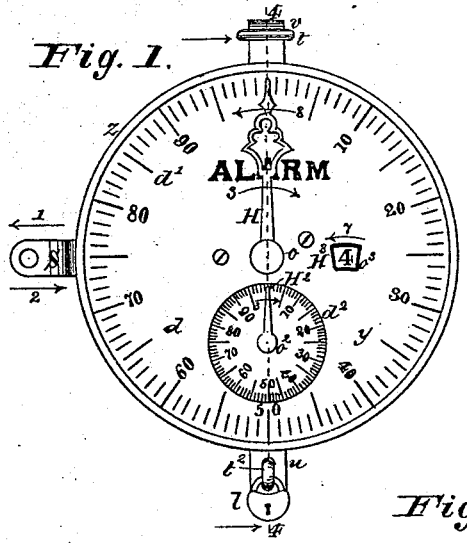


Fig. 2.

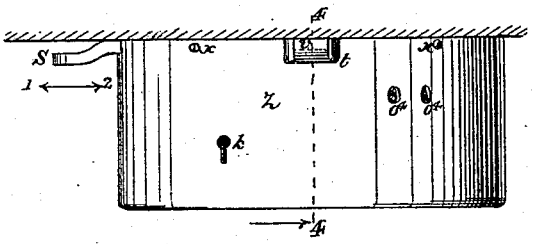


Fig. 3.a

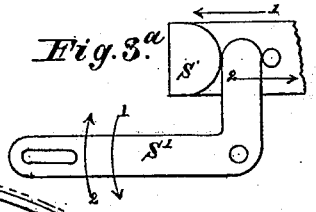
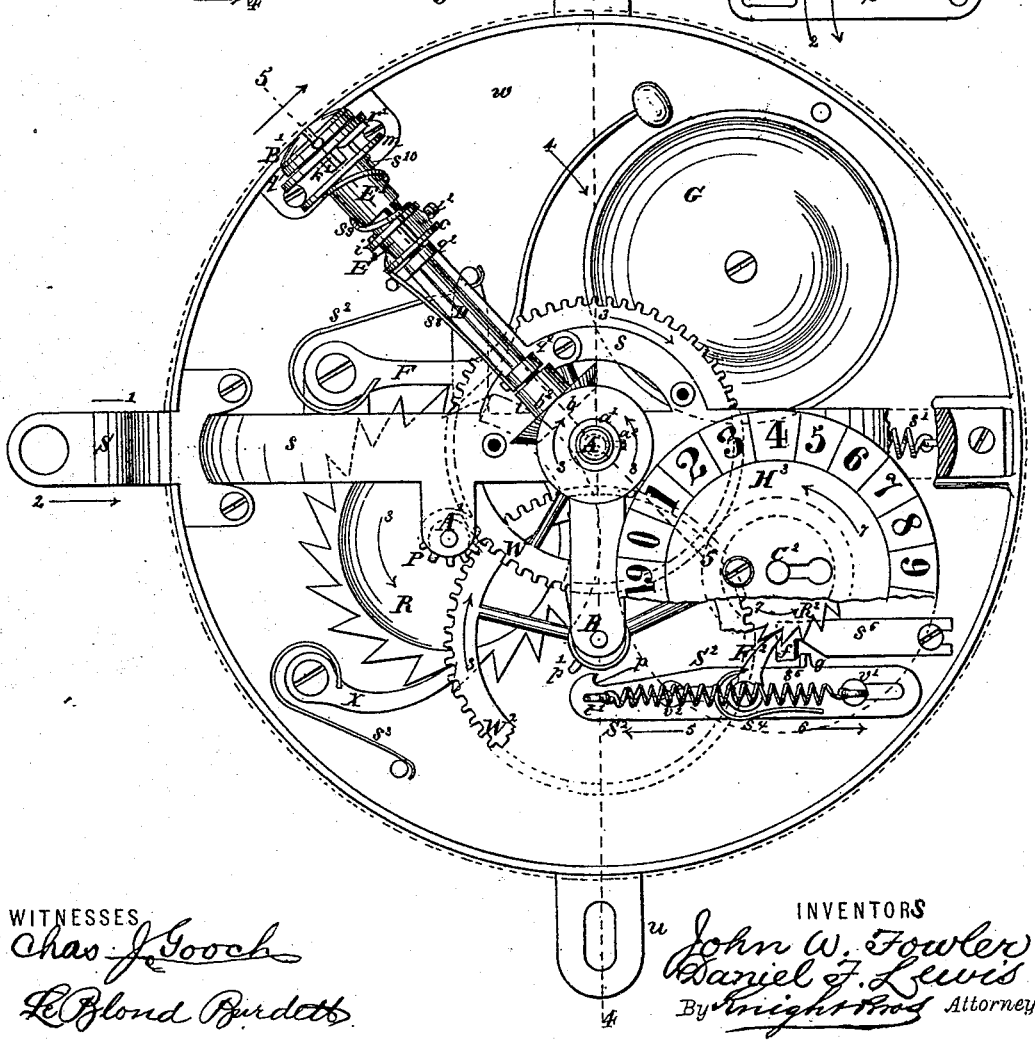


Fig. 3.



WITNESSES.
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L. Blond Burdett

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By Knight Bros Attorneys

2 Sheets—Sheet 2

J. W. FOWLER & D. F. LEWIS.

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Fig. 4.

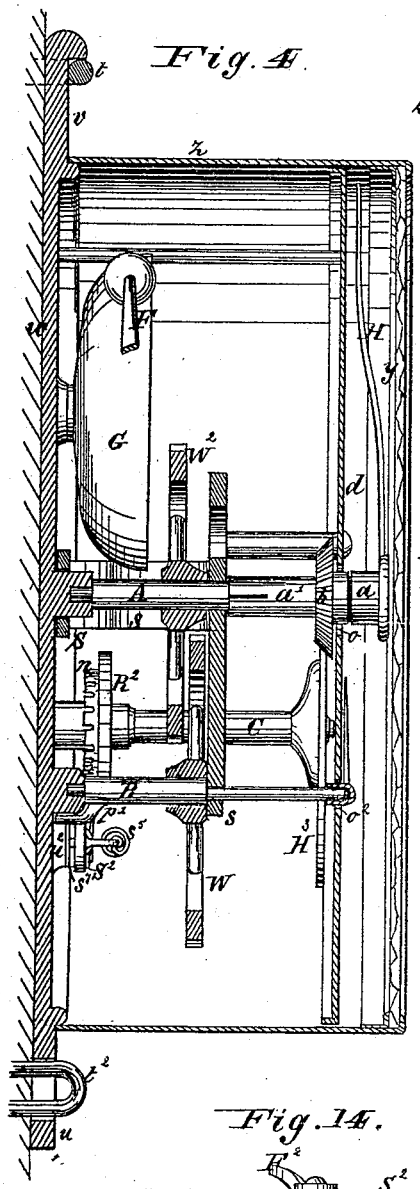

Fig. 5.

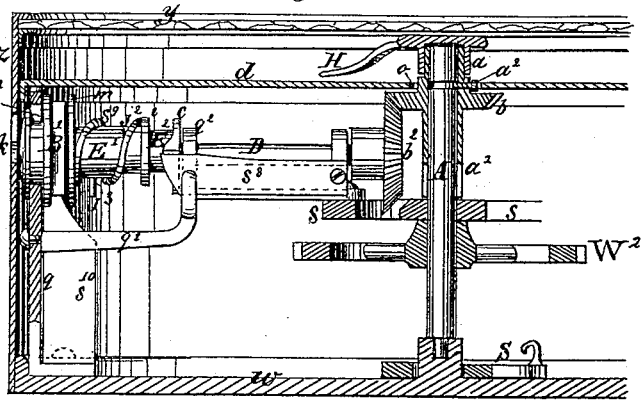

Fig. 6.

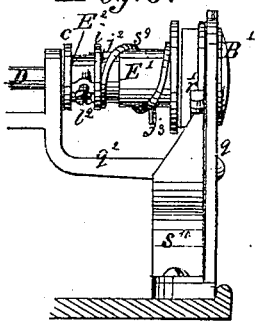

Fig. 7.

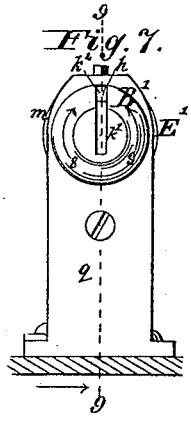

Fig. 8.

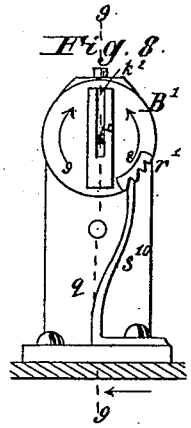

Fig. 9.

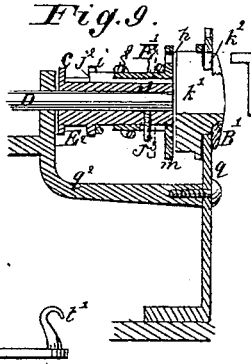

Fig. 10.

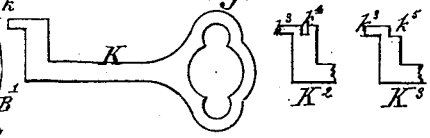

Fig. 11.

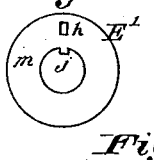

Fig. 12.

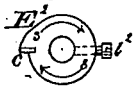

Fig. 14.

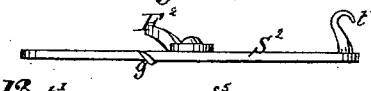

Fig. 13.

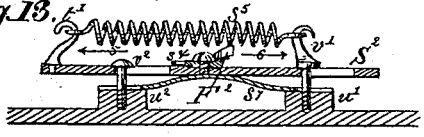

Fig. 15.

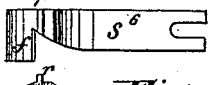

Fig. 16.

WITNESSES

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JOHN W. FOWLER AND DANIEL F. LEWIS, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN PASSENGER-REGISTERS.

Specification forming part of Letters Patent No. **207,728**, dated September 3, 1878; application filed January 29, 1878.

To all whom it may concern:

Be it known that we, JOHN W. FOWLER and DANIEL F. LEWIS, both of the city of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Passenger-Registers, of which the following is a specification:

In Letters Patent of the United States No. 190,021, dated April 24, 1877, we describe a new passenger-register, which we have named the "Alarm," certain features of which are peculiar mechanism for resetting the trip-hand by key, means for insuring the resetting of the trip-hand at zero whenever the key is inserted, and means for instantaneously operating the hundreds-register at the proper moments.

The improvements which constitute the present invention relate primarily to said parts of our original apparatus; but the improved devices are applicable to other registers.

The objects of the first part of this invention are, first, to provide for the employment of a key of simple construction, and to insure the rotation of this key in the proper direction, and its withdrawal when the trip-hand is set at zero, and to prevent its withdrawal until it has made a complete rotation; secondly, to give audible notice of the approach of the trip-hand to zero when it is actuated by key, so as to prevent straining the zero-guard accidentally; thirdly, to provide by superior means for inserting the key at any time, irrespective of the position of the trip-hand, and to prevent the withdrawal of the key after it is once engaged with the shaft of the trip-hand gearing until it is brought to zero; fourthly, to prevent the evasion of detection by leaving the key in until the trip-hand reaches zero by subsequent registrations. Any successful manipulation of the trip-hand is thus prevented, and the detection of any attempt to accomplish such manipulation is insured, with the aid in all cases of the permanent register.

The objects of the second part of the invention are to facilitate adjusting the trip-hand with reference to the resetting mechanism in assembling the parts in the original manufacture and after repairs, and to keep the gearing of this mechanism in perfect mesh. A very ample frictional connection of these parts with the main shaft is at the same time secured in the most simple manner.

The object of the third part of the invention is to render the mechanism of the hundreds-register more strong, simple, and effective.

Referring to the drawing, Figure 1 is a front view of an alarm passenger-register illustrating the present improvements. Fig. 2 is a top view of the same. Fig. 3 is a face view of the same on a larger scale, with the case, index-hands, and dial-plate removed and portions broken away to expose parts behind. Fig. 4 represents a vertical section of the complete register in the plane indicated by the lines 4 4, Figs. 1–3. Fig. 5 represents a partial section of the same in the plane indicated by the line 5 5, Fig. 3. Fig. 6 is an elevation of the key-guard and zero-guard, showing the side which is behind in Fig. 5. Fig. 7 is an end elevation of the same. Fig. 8 is a back view of the key-guard shown in Fig. 7. Fig. 9 represents a longitudinal section of the parts shown in Figs. 6–8. Fig. 10 is an elevation of the key and of the bits of two modified keys. Figs. 11 and 12 are end views of two of the parts of the key-guard and zero-guard, showing details. Fig. 13 represents a longitudinal section of the slide of the hundreds-register, showing its appurtenances. Fig. 14 is an edge view of the slide, looking in the opposite direction. Figs. 15 and 16 are elevations of the detent-spring of the hundreds-register.

Figs. 3 to 16, inclusive, are drawn to the same scale.

Like letters of reference indicate corresponding parts in the several figures.

This improved passenger-register has a circular inclosing-case, consisting of a sheet-metal drum, *z*, and a glass face-cover, *y*, and attached by screws *x* to the back-plate *w* of the registering mechanism. Parallel to the face a dial-plate, *d*, is supported, and this is pierced with orifices $o\ o^2$ for a pair of shafts, A B, which carry index-hands H H^2, and with an index-orifice, o^3. Unit-dials $d^1\ d^2$, each of a capacity of 100, are marked on the dial-plate *d*, concentric with the orifices $o\ o^2$, and a hundreds-dial, H^3, of twenty spaces, rotates be-

hind the orifice o^3. The first dial, d^1, is concentric with the case, and as large as it will accommodate, and constitutes, with the hand H, the indicator of a trip-register. The dial d^2 is a small circle, corresponding with the seconds-dial of a watch, and this, with its index-hand H^2 and the hundreds-dial H^3, with the index-orifice, constitute the indicators of an irreversible or permanent register.

A slide, S, retracted by a spring, s^1, carries a combined feed-pawl and hammer, F, which, at each outward movement of the slide, propels a ratchet-wheel, R, one space, and at the end of the return movement, by means of a tail-spring, s^2, strikes a gong, G. Orifices o^4, Fig. 2, protected internally by wire-gauze, give escape to the sound. The ratchet-wheel R, through its shaft A′, a pinion, P, of the same number of teeth, thereon, and a pair of spur-wheels, W W^2, each having one hundred teeth, drives the shafts A B, and, consequently, the index-hands H H^2, synchronously, said spur-wheels W W^2 being keyed on said shafts A B. A detent-pawl, X, having a tail-spring, s^3, prevents any backward movement of the train; and a skeleton yoke-frame or spider, s, attached to the back-plate w, forms therewith the requisite supports and guides for the parts. By this mechanism each fare is simultaneously registered on the two dials d^1 d^2, and an alarm is subsequently sounded to attest the registration. The movements of the slide S are indicated by arrows 1 2. Those transmitted by the feed-pawl and hammer F are indicated by arrows 3, and the striking motion of the latter by arrow 4.

The parts above described are the same as those correspondingly lettered in our Patent No. 190,021, hereinbefore referred to, except in unessential mechanical details.

For operating the hundreds-dial H^3, a strong projection, p', is securely attached to the shaft B near its inner end. Once in each rotation of the shaft B this projection comes in contact with a projection, p, at one end of a slide, S^2, and this slide carries a feed-pawl, F^2, having a tail-spring, s^4, by which it is kept in mesh with a ratchet-wheel, R^2, on a shaft, C, which shaft is that of said dial H^3, said wheel R^2 having one tooth for each of the spaces of said dial. The slide S^2 is guided by screws v^1 v^2, passing through stop-slots in the slide into studs w^1 w^2 on the back-plate; and the outer screw, v^1, is provided with an extended head, of hook shape, to which one end of a spiral spring, s^5, is attached. The other end of this spring is attached to a hook, t', at the inner end of the slide. The spring consequently tends to draw the slide outward, and is located in front of the slide and parallel thereto. The shaft B, through the projections p' p, draws the slide in the opposite direction, as indicated by arrows 5, and holds it until the index-hand H^2 leaves 99 to register 100. A strong plate-spring, s^6, having a detent-rib, r, at its head, holds this detent-rib in mesh with a notched crown-flange, n, on the back of the ratchet-wheel R^2 during said inward movement of the slide S^2. The head of said spring also carries or is made to form an incline, f, oblique to the plane of the back-plate, and the inner edge of the slide carries a corresponding projection, g. The slide is also, in this connection, made yielding by means of a semi-elliptic spring, s^7, interposed between it and its supporting-studs w^1 w^2. In said inward movement of the slide S^2 the projection g passes in contact with the back of the incline f, and said slide is forced back, so as to let said projection pass. When said slide is released by the projection p' the spring s^5 instantaneously draws said slide outward, as indicated by arrows 6; and in the first part of this movement the projection g, passing in contact with the face of the incline f, forces back the spring s^6 and releases the ratchet-wheel R^2. The remainder of the motion shifts the dial-plate H^3 one space through the pawl F^2, ratchet-wheel R^2, and shaft C, and the latter is then relocked. This motion is indicated by arrows 7. All this occurs in an instant.

The shaft C is a sleeve-shaft, mounted on a stud-shaft, C^2. The former has a broad flange at its outer end to support the dial H^3, and the inner shaft has an undercut extremity, which engages with a key-hole slot in the dial, and with the aid of a single screw securely attaches the latter, while by the same means the sleeve-shaft is held in place.

The index-hand H^2 is simply attached to the outer end of the shaft B by means of a tightly-fitting cap. The trip-hand H is secured, by means of a frictional hub, a, to the outer end of the hub of a bevel-gear, b, which gear in turn embraces the outer end of the shaft A, so as to rotate therewith in the direction of the arrows 3, but so also as to be capable of independent rotation. A long sleeve-shaped hub, a^1, is accommodated, thus affording ample frictional surface. The independent frictional attachment of the hand to the gear provides for adjusting the latter irrespective of the mesh of the gear. A lateral set-screw, a^2, entering a circumferential groove in the shaft A, holds the gear b in position, so as to keep it in mesh with a similar gear, b^2, on the inner end of a radial shaft, D, which is supported parallel to the dial-plate by a supplemental frame, q q^2.

A key-hole, k, of ordinary shape, is cut in the drum z opposite the end of the shaft D, and is extended in the form of a narrow slot, k^1, through a rotary box, B′, which is swiveled in the end bracket of the frame q q^2. The opening k^2 in the bracket itself is of the same shape as the key-hole k, its circular portion being occupied by a cylindrical wrist, uniting two circular disks, which complete the rotary box, as shown in Figs. 5 and 9. The above devices accommodate a simple key, K, Fig. 10, having a flat lateral bit and a flat shank, to which said key-hole extensions are fitted, the flat shank occupying the wrist of the box. When the key is turned the solid portions of the respective disks close the bit-extensions of the

bracket, so as to pre-

x B′ is extended in-
t D, so as to pre-
e of skeleton keys.
also to carry a series of
, r', which are engaged by the
pawl-spring or click, s^{10}, the same
g to insure turning the key forward in
e proper direction, and to prevent turning the key backward to the key-hole, and also to give audible notice of the approach of the trip-hand to zero. Where this last effect is not considered important, a continuous ratchet-rim may be formed on the box B′. When the key is withdrawn the spring s^{10} remains in mesh with the ratchet, as shown in Fig. 10, and holds the box in position.

The bit of the key K terminates in a small projection, k^3, parallel to the shank. Matching this is a single hole, h, in a broad circular flange, m, at the outer end of a sliding sleeve, E^1, which is mounted on the outer end of the shaft D. Another sleeve, E^2, is arranged within the sleeve E^1, and clamped in position by means of a set-screw, l^2, and the sleeve E^2 is caused to rotate therewith by means of a spline and spline equivalents, $j\,j^2\,j^3$, either or all of which may be used. j^2 is a spline-extension, working in a notch in a flange, i, on the sleeve E^2, and j^3 is a pin inserted into the latter through a stop-slot in the sleeve E^1. Between the flange i and that of the sleeve E^1 a spiral spring, s^9, is arranged to press said sleeve outward.

When the key K is introduced to turn the trip-hand it forces back the sleeve E^1, as indicated by dotted lines in Fig. 9, before it can enter through the ward formed by the bracket q. It can now be turned in the direction of the arrows 8, Figs. 7 and 8, and when the projection k^3 comes opposite the hole h the sleeve E^1 is projected by the spring s^9 and the key is coupled to the shaft D. The trip-hand can now be moved back and forth at will by means of the key; but the key cannot be disengaged from the sleeve until the hole h is again in line with the key-hole, as shown in Figs. 5, 9, and it can only be brought to this position after carrying the trip-hand to zero in the direction of the arrows 8.

As thus moved the trip-hand is stopped at zero by the contact of a stop-spring, s^8, with a steel-faced shoulder in a volute stop flange or collar, c, at the inner end of the sleeve E^2, which is shown in Fig. 12. The spring s^8 is supported parallel to the shaft D, or nearly so, by means of the supplemental frame q^2, which supports the shaft, and being held at both ends, as shown, it cannot be sprung out of place. It is protected against undue strains, however, by the ratchet device $r'\,s^{10}$, as before described.

When the trip-hand is turned forward by registrations to and beyond zero, the zero-guard $c\,s^8$ offers no obstruction; but when the trip-hand is turned back said zero-guard forms a stop, as before stated; and when the hand is at zero the rotation of the key in either direction is prevented by the zero-guard on one side and the ratchet device $r'\,s^{10}$ of the key-guard on the other. The key must then be withdrawn.

The ratchet device $r'\,s^{10}$ serves also, in connection with the inserted key and the key-clutch $E^1\,h$, to lock the trip-hand against motion with the shaft A, and thus insures the detection of any attempt to accomplish any manipulation of the trip-hand by leaving the key in its box B^1, or to escape detection in this manner after finding that the hand can only be left at zero. The ratchet device limits the complete rotation of the key to the direction of the arrows 8, while the movement of the shaft A would tend to turn it in the direction of the arrows 9.

If preferred, a key with a round shank can be used, its bit, in combination with the inward extensions of the box B^1, serving to rotate the latter; and with a flat shank the lateral bit may be omitted, if desired.

As another modification, we propose constructing the key-bit with a notch, k^4, or a shoulder, k^5, in line with the projection k^3, as shown in Fig. 10, the same to be occupied by a corresponding ward, supported parallel to the bracket q, or its equivalent. The object of this construction is to provide a guide which will steady the described form of flat key, and also serve to prevent the escape of the projection k^3 from the socket h of the key-clutch before the rotation of the key-box is completed. The said socket h of the key-clutch may also be a depression or notch instead of an orifice.

We also propose to operate the main slide S by means of a bell-crank lever, S^1, as illustrated in Fig. 3^a, so as to provide for pulling downward on the operating-strap or its equivlent.

To facilitate comparing this specification with that of our said Patent No. 190,021, like letters of reference have been used for the respective parts and their substitutes as far as possible.

Nothing that is shown in said Patent No. 190,021 is intended to be claimed as a part of the present invention.

The following is what we now claim as new and desire to secure by Letters Patent, namely:

1. A rotary key-box, B^1, swiveled substantially as herein described, and provided with a ratchet device, $r'\,s^{10}$, in combination with a zero-guard $c\,s^8$, for the purpose set forth.

2. A short series of ratchet-teeth, r', and a spring-click, s^{10}, in combination with a rotary key-box, B^1, for regulating its motion and giving warning of the approach of the trip-hand to zero.

3. A key-clutch, $E^1\,m$, splined to the setting-shaft D, and projected by spring s^9, and having a single socket, h, in combination with a key, K, having a matching projection, k^3, parallel to its shank, for the purpose specified.

4. The combination of a setting-shaft, D,

geared to the trip-hand of a passenger-register, a key-clutch, E^1, carried by said shaft, and having a positive connection, k^3 h, with the key, and a rotary key-box, B', having a ratchet device, r' s^{10}, the latter arranged and operating substantially as herein described for preventing the rotation of the trip-hand by registrations while the key is in its box.

5. The combination, in a passenger-register, of a setting-shaft, D, gearing b b^2, driven by said shaft, a zero-guard, c s^8, controlling the motion of said shaft, and a trip-hand, H, attached to said gearing by a frictional hub, a, said trip-hand being thus adapted to be adjusted independently with relation to said zero-guard, substantially as herein set forth.

6. The combination of a grooved main shaft, A, a bevel-gear, b, attached to said shaft A by frictional hub a^1 and
gear, b^2, in
trip-hand, H, att
first gear by a fr
as herein describe

7. A single plate-spri
tent-rib, r, and an incline, J,
with an actuating-slide, S^2, a fe
carried thereby, a ratchet-wheel, R^2,
notched crown-flange, a, on said ratchet-wh
for locking and unlocking the latter, in the manner herein specified.

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Witnesses:
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