

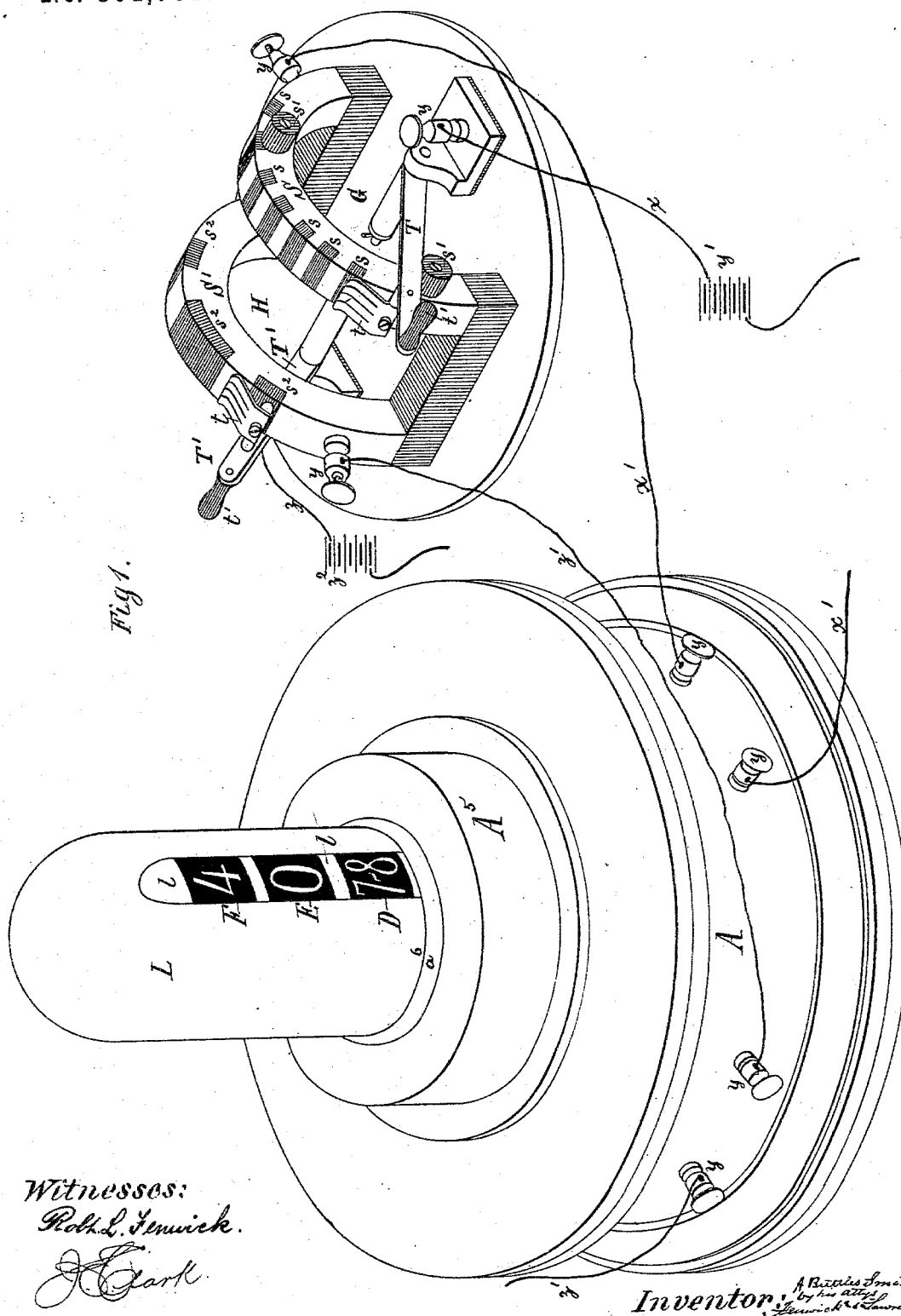
(No Model.)

3 Sheets—Sheet 1.

A. B. SMITH.
ELECTRIC STOCK INDICATOR.

No. 301,763.

Patented July 8, 1884.



Witnesses:

Robt. L. Fenwick.

J. Clark.

Inventor:

A. B. Smith
by his atty
Fenwick & Lawrence

(No Model.)

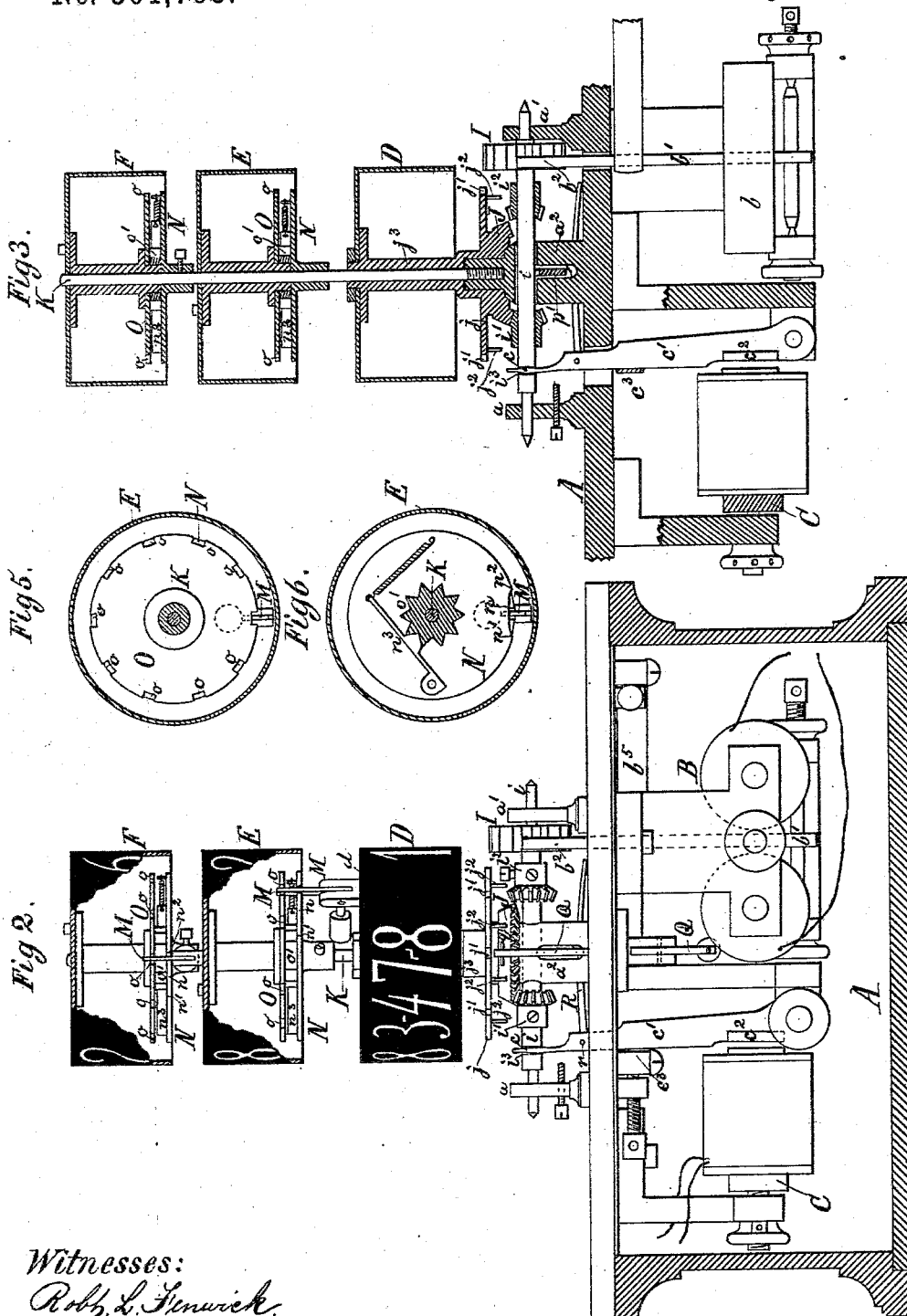
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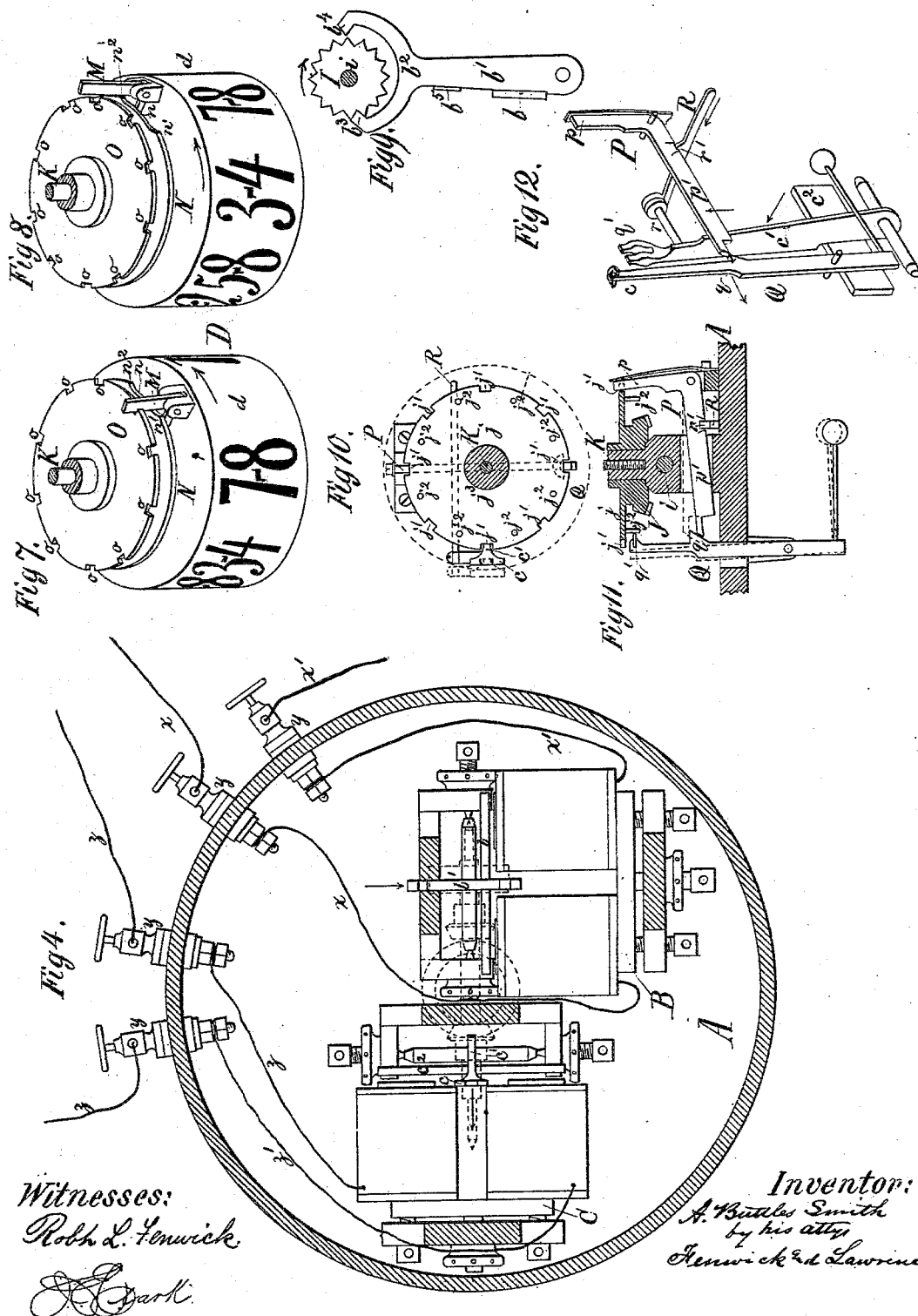
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UNITED STATES PATENT OFFICE.

ALBERT BUTTLES SMITH, OF NEW YORK, N. Y., ASSIGNOR OF THREE-FOURTHS TO JOHN W. DEXTER, EDWARD DEXTER, AND ERASTUS G. KNIGHT, ALL OF SAME PLACE.

ELECTRIC STOCK-INDICATOR.

SPECIFICATION forming part of Letters Patent No. 301,763, dated July 8, 1884.

Application filed February 2, 1884. (No model.)

To all whom it may concern:

Be it known that I, A. BUTTLES SMITH, a citizen of the United States, residing in the city, county, and State of New York, have invented a new and useful Stock-Indicator, of which the following is a specification.

My invention relates to a telegraphic apparatus by means of which the varying prices of stocks are communicated from a central office to the stockholders, editors, and others in large printed or painted numbers and by means of which all changes of such prices are conspicuously and accurately made known. In cities where stocks, oil, grain, and the like are bought or sold there is a demand for an index or indicator of the market prices, differing materially from the indicators now in use. What is needed by the brokers and others is an indicator having large plain figures, which can be so placed in any office that the different changes of the market may be seen at a glance by all the occupants of the office and read off without difficulty. The present stock indicators or "tickers" print the prices, but in such small type that it is often hard to read the same, and it is almost impossible for more than three persons to watch the changes of the market at the same time, which is a matter of great inconvenience to the brokers, as well as their customers. I believe I have perfected an electric indicator which will supply this demand.

My invention will be fully understood from the following description, claims, and accompanying drawings.

In the accompanying drawings, Figure 1 is a perspective view of my indicator in connection with the operating-switches. Fig. 2 is a view, partly in elevation and partly in section, of the indicator, exposing the principal parts to view. Fig. 3 is a vertical section through said principal parts. Fig. 4 is a part top view and part horizontal section of the magnets and armatures used in my indicator. Fig. 5 is a top view of the operating-disk of one of the two upper indicator-drums, the drum and its support being shown in section. Fig. 6 is a detail horizontal section of one of the drums and its support and a top view of one of their releasing-disks. Fig. 7 is a perspective view of the lower indicating-drum and the release

and operating disks of the indicator-drum next above, illustrating the operation of the middle indicator-drum by the lower indicator-drum through the aid of a weighted or drop lever. Fig. 8 is a perspective view of the same, illustrating the position of the several parts after one operation of the middle drum has taken place. Fig. 9 is a detail view of the prime motor of the apparatus. Fig. 10 is a top view of a regulating-disk of the lower indicator-drum and certain adjuncts thereof. Fig. 11 is a sectional detail view of the regulating mechanism of the lower indicator-drum, and Fig. 12 is a perspective view of the regulating and reversing mechanism.

A represents a suitable housing for two magnets, B C; and D E F are three indicating revolving drums, with numerical figures, as shown, marked or placed upon their peripheries, and covered by an opaque housing, L, which is closed at top and open at bottom, and provided with a transparent portion, l, as shown.

G H are two operating and controlling switches. The parts B C and D E F, with their housings and other mechanism, hereinafter described, constitute my stock-indicator proper; and the same when placed in a main or central office is provided with the switches, but when used in another place or branch office, which is connected with the circuit-wires $x' z'$ by suitable means, is used without switches in such office or place.

The switches G and H are each connected with a separate battery, and, by means of conducting-wires and binding-screws, have communication with the magnets in the housing. The switch G is connected with the magnet B by well-known ordinary means, the armature b of it being fastened to an arm, b' , hung in the usual way opposite the magnet and extending through the top of the housing A, and there provided with a pallet-head, b^2 . This head b^2 has two pallets, $b^3 b^4$, between which a triangular-toothed wheel, I, is provided on a horizontal shaft, i . The vibrations of the armature b , caused by the alternate action of the charged magnets and of a tension-spring, b^5 , which moves the released armature back to its normal position, move the wheel I arcwise

with its shaft *i*. The shaft *i*, which is suitably hung to the stands *a a'* on the housing A, is provided with bevel-wheels *i' i''*, permanently fixed to the shaft *i* and made to alternately gear into a bevel-wheel, J, loosely fitted to a central upright extension, *a''*, of the housing A. This alternate gearing of the bevel-wheels *i' i''* into the wheel J is effected by slipping the shaft *i* longitudinally by means of the other magnet C, as will be seen. The shaft *i* is provided with an annular groove, *i'''*, in which the forked head *c*, at the upper end of an armature-arm, *c'*, is located, and as the armature *c'* is alternately attracted by the charged magnet C or released, and by a tension-spring, *c''*, moved back to its normal position, the shaft *i* is moved either to its extreme left or right position, and accordingly the wheel *i'* or the wheel *i''* will be in gear with the wheel J. The bevel-wheels *i'* and *i''* serve for revolving the drums accordingly as the shaft *i* may have been shifted from right to left, or vice versa. The bevel-wheel *i'* moves the drum or drums in one direction, while the wheel *i''* drives the same in an opposite direction, in the manner hereinafter fully explained. The extension *a''* of the housing is provided with a rigidly-fixed central shaft, K, firmly screwed into it, and by this shaft the indicator-drums and their operating mechanisms are supported. The wheel J is provided with a disk, *j*, having eight notches, *j'*, in the rim, and eight vertical pins, *j''*, between said notches. It is also provided with a tubular extension, *j'''*, to the upper end of which the lower drum, D, is fastened, and which revolves around the shaft K. The drum D is marked at eight equidistant places with the fractions $\frac{1}{2}$, $\frac{1}{4}$, $\frac{3}{4}$, $\frac{1}{8}$, $\frac{5}{8}$, $\frac{3}{8}$, $\frac{7}{8}$, and a blank space, *d*, between $\frac{1}{2}$ and $\frac{1}{4}$. As the pallet-head *b'* oscillates, it moves the angularly-toothed wheel I around, and, by means of the wheel *i' J* or *i'' J*, revolves the drum D either right or left, and thus exhibits one after another of the fractions or the blank at a given point.

In order to prevent mistakes in the reading off of the true exhibit, the drum is surrounded by an opaque cylinder, L, having one transparent portion, *l*, for the exposure of the exhibit. I make this cylinder L and transparent space high enough to serve the same purpose for the other two drums, E F, and so that their combined exhibits shall stand in the same vertical line, and can thus be easily read. The housing L is high and large enough to inclose the indicator mechanism without bearing upon any portion of the same; and its lower circular edge fits within a circular offset, *d''*, of the cylindrical stand A⁵, mounted upon the main housing A, as shown in Fig. 1. This housing L may be confined from turning by frictional bind between it and the offset, or by any suitable catch or fastening device. It is intended that this housing L shall pass down over the indicator mechanism in the same manner as the glass cover of a clock is applied. As the blank space *d* of the drum D

arrives at the transparent portion *l* of the opaque cylinder L, the middle drum, E, which exhibits the units, is moved either to the right or left, in order to indicate the addition or subtraction of one unit. For this purpose the top portion of the drum D is provided with a drop-lever, M, which bears upon the rim of a stationary disk, N, on the shaft K, and said drop-lever travels around the same with the drum.

Opposite the transparent portion *l* in the cylinder L the disk N is provided with a depression, *n*, Figs. 7 and 8, which joins the rim of the disk by means of two slopes, *n' n''*, which lead the drop-lever M without difficulty in and out of the depression *n*. In entering said notch *n* the lever M enters one of the equidistant notches *o* in the rim of a disk, O, suitably united to the middle drum, E, and thus it carries the disk O and drum E along until it becomes disengaged from the notch *o* by passing over one of the said slopes *n'* or *n''*, and occupying its normal position on the rim of disk N. The length of the notch *n*, together with the slopes *n' n''*, amounts to one-tenth the periphery of the disk N, and hence every movement thus transmitted to the drum E amounts to one-tenth of a revolution; and as the drum is provided at ten equidistant places with the numbers 1, 2, 3, 4, 5, 6, 7, 8, 9, 0, it will with every movement exhibit the following or preceding number at the transparent portion *l* of the cylinder L, such movement taking place at every revolution of the drum D. The drum F is marked in the same manner as the drum E, except that in place of the zero (0) there is a blank space. The top portion of the drum E is provided with a drop-lever, M, which bears upon the rim of a stationary disk N, with a notch, *n*, and slopes *n' n''* opposite the portion *l*, and by this means enters one of the notches *o* of a disk, O, united to the drum F, and thus effects a movement similar to that of the drum E, heretofore described. Accidental displacement of the two upper drums is prevented by providing the disk O with a wheel, *o'*, having ten triangular teeth, and providing the disk N with a spring-pawl, *n''*, which gears into the said wheel, and thus holds it and the drum attached to it in place; but is yielding enough not to arrest the operation of the drop-lever M. As the movements of the lower drum, D, must be positive in order to be correct, and as they must be very swift in order to expedite the display of messages of the varying quotations of the market, I have provided a means whereby the pallet-head *b'* can be very rapidly operated without endangering the correctness of the messages from false motion or slippage. This means consists in a drop-lever, P, a pawl, Q, and a release-bar, R, as will be explained. The drop-lever P is suitably hung to the housing A, and has an upright arm, *p*, standing near the rim of the disk *j*, and a horizontal arm, *p'*, resting upon the detent *q* of the pawl Q, which pawl Q has a curved head, *q'*, standing in range of the pins *j''* of the disk *j*, and in

a line diametrically opposite the drop-lever P. Both the drop-lever P and the pawl Q are so weighted that their upright portions bear toward the disk *j*, and in consequence thereof the pins *j*², while revolving with the disk *j*, will push the pawl Q outward, so that the detent *q* becomes disconnected from the arm *p*¹ of the drop-lever P, whereupon the arm *p* is swung toward the rim of the disk *j* and enters the next notch *j*¹ of the same, and thereby checks the motion of the disk *j* and the drums D E F, and the pallet-head *b*² may now be operated without effect upon the said drums. If, therefore, any indicator of the circuit should fail, by reason of some accident, to show the required number simultaneously with the rest of the indicators of the circuit, the operation of the pallet-head *b*² continues until those not operating perfectly are stopped by their respective drop-levers P. As it is desirable to move the pallet-head *b*² more rapidly than could be done by hand with an ordinary switch or operator's key, I have devised a novel switch, G, adapted for this purpose, said switch G consisting of an insulated conducting-arc, S, having upon its outer surface a number of non-conducting strips, *s*, arranged at suitable intervals, two non-conducting checks, and an insulated concentric switch-arm, T, having a conducting spring-brush, *t*, which bears upon the outer surface of the arc S. I make the number of strips *s* greater than the number of movements of the pallet-head *b*² necessary for producing one-eighth of a revolution of the drum D, so as to provide for emergencies such as above stated. I connect the arc S and the switch-arm T by means of conducting-wires *x x'* and binding-screws *y*, in a suitable manner with operating-batteries *y*² and the coils of the magnet B, and thus by one movement of the switch-arm T from one check *s*¹ to the other, produce a number of oscillations of the pallet-head *b*² sufficient to move the drum D one-eighth of a revolution; or, in other words, one full stroke of the switch-arm T will effect one change in the exhibition of fractions of the drum D. When the switch-arm T is not operated, the current between the switch G and magnet B ought to be cut off; and in order to enable the operator to do this without failure, the non-conducting strips *s* and checks *s*¹ are so arranged that the conducting spring-brush *t* of the said switch-arm rests upon one of the strips *s* when the switch-arm is in contact with either of the checks *s*¹. If the drum D is to be moved again either forward or backward, the arm *p* of the drop-lever P must be removed from the notch *j*¹ it occupies. This is accomplished by means of the other magnet, C, and switch H. The switch H consists of an insulating conducting-arc, S', and an insulated concentric switch-arm, T', both suitably connected by means of binding-screws *y* and conducting-wires *z z'* with a battery, *z*², and the magnet C. The arc S' is provided with non-conducting strips *s*, (three being a sufficient num-

ber for successful operation,) and the arm T' with a conducting spring-brush, *t*; and the arc S' may have checks similar to those of the arc S. By moving the arm T' to the position shown in Fig. 1, the magnet C will be charged and will attract the armature *c*², thereby moving the arm *c*¹ and the releasing-bar R, which latter is pivoted at *r* to an extension of the arm *c*¹, and is provided with a cam, *r*¹, near the arm *p*¹ of the drop-lever. By each movement of the arm *c*¹ the cam *r*¹ is passed under the arm *p*¹, whereby said arm *p*¹ is lifted above the detent *q* of the pawl Q, (see Fig. 12,) and placed on top of the same, thereby releasing the disk *j*. When the movement of the disk *j* is to be reversed, the magnet C is charged, and remains so until the drop-lever P stops the disk *j*; then, if the backward motion is to continue, the disk *j* will be released by momentarily cutting off the current from the magnet C, thereby releasing the armature *c*², and causing the cam *r*¹ of the release to move under the arm *p*¹ from the opposite direction and lift the same, thus releasing the disk *j* in the manner above described. It will be seen that by either closing or opening the circuit of the magnet C, the disk *j* is released and rendered ready for further movement, not exceeding one-eighth of a revolution, and at the same time the movement of said disk is reversed if the circuit is not immediately reclosed or reopened. Therefore, a quick reciprocating movement of the switch-arm T' will release the disk *j* almost in an instant, and the movements of the pallet-head *b*² may go on uninterrupted, if so required by the nature of the messages or state of the market. Switches G and H are used in the central office, or where the quotations of the stock-market are received by the operator, who holds the insulated handle *t'* of a switch-arm in each hand. One motion of the arm T from one check to the other will effect a change of one-eighth in the exhibits of all the indicators connected with the switch G in the one hand of the operator, while the other hand, by means of the switch H, controls either the stoppage or the continuation or reversion of the movements created by the switch G.

The described indicator, with the switches, is the one used in the central office, and by means of circuit-wires *x'* and *z'*, Fig. 1, it is connected with a number of similar indicators in different localities and at different distances from the central office, and these indicators, (without being furnished with switches,) being so connected, produce simultaneously the same exhibits of numbers when operated by the electric current from the batteries *z*² *y'* by means of the switches G H.

The operator in the central office is necessarily supplied with one of the indicators, in order that he may watch the results of his operation and avoid mistakes.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. An electrically-operated indicator for in-

dicating the market prices of stocks and produce, comprising, in combination, a main operating-drum with numbers on its periphery, a mechanism, as described, for revolving the drum either forward or backward, a reversing mechanism, as described, by which the drum-moving mechanism is made to move the drum either forward or backward, drums E and F, and connecting mechanism, as shown, a prime operating-magnet, and a reversing-magnet, substantially as described.

2. An electrically-operated indicator for indicating the market prices of stocks and produce, comprising, in combination, a main operating-drum with numbers on its periphery, a mechanism, as described, for revolving the drum forward or backward, a reversing mechanism, as described, by which the drum-moving mechanism is made to move the drum either forward or backward, drum E and connecting mechanism, as shown, a mechanism for effectually controlling the drum E, a prime operating-magnet, and a reversing-magnet, substantially as described.

3. The combination of the magnet B, armature-arm b' , having pallet-head b^2 , the sliding shaft i , having wheel I, and reverse bevel-wheels i' i^2 and annular groove i^3 , the drum-wheel J, the magnet C, and armature-arm c' , having forked head c , substantially as and for the purpose described.

4. The combination of the rotating and sliding shaft i , having reverse bevel-wheels i' i^2 , the drum-wheel J, having disk j , with notches j' and pins j^2 , the drop-lever P, having arms p p' , the pawl Q, having head q' and detent q , and the armature-arm c' , having release-bar R and cam r' , substantially as and for the purpose described.

5. The combination of the revolving drum D, having a drop-lever, M, the stationary disk N, having doubly-sloped depression n , and the revolving disk O, having exhibit-drum E and notches o , substantially as and for the purpose described.

6. The combination of the electrically-operated exhibit-drums D and E, a prime operating-magnet, a secondary or reversing magnet provided with suitable switches, and suitable intermediate connecting and controlling mechanism, as described, between said drums, whereby said drum D can be moved either forward or backward separately from and also with the drum E, substantially as described.

7. The combination of the electrically-operated exhibit-drums D E F, a prime operating-magnet, a secondary or reversing magnet provided with suitable switches and suitable intermediate connecting and controlling mechanism, as described, between said drums, whereby said drum D can be moved either forward or backward separately, and also with the drums E and F, substantially as described.

8. The combination of the drop-lever P, having arms p p' , the pawl Q, having head q' , and detent q , and armature-arm c' , having release-bar R and cam r' , with the forward and backward revolving drum disk j , having notches j' and pins j^2 , and with suitable electrically-operated reversing-gear, substantially as described.

9. The combination of the revolving exhibit-drums E and F, drop-levers M M, stationary disks N N, having, respectively, double-sloped depressions n n , and revolving disks O O, having, respectively, notches o o , and revolving exhibit-drum D, substantially as and for the purpose described.

10. The combination of the revolving-disk O, a revolving exhibit-drum, triangularly-toothed controlling-wheel o' , having back and forward movements, with the shaft K, and stationary disk N, having stationary double-acting pawl n^2 , substantially as described.

11. The switch G, consisting of the insulated conductor S, having strips s and checks s' , and an insulated arm, T, having a brush, t , in combination with a switch, H, having an insulated conductor, S', strips s^2 , arm T', and brush t , a back and forward revolving exhibit-drum, D, on a stationary shaft, a prime operating-magnet, B, a secondary or reversing magnet, C, and suitable connecting-wires of two electric batteries, whereby the respective currents can be opened and closed, so as to cause the movements of the reversing-gear to be reversed by one magnet, and the drum D to be moved forward or backward, as required, by the other, and the indicator can be controlled until the proper exhibits are produced, substantially as described.

ALBERT BUTTLES SMITH.

Witnesses:

ALONZO FOSTER,

HENRY A. WILSON.