Jan. 15, 1935. G. J. CHAPMAN 1,988,162

DIRECTORY

Filed Dec. 23, 1933

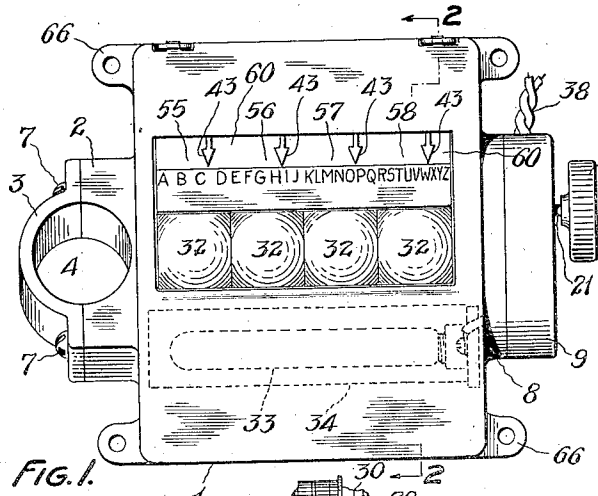


FIG. 1.

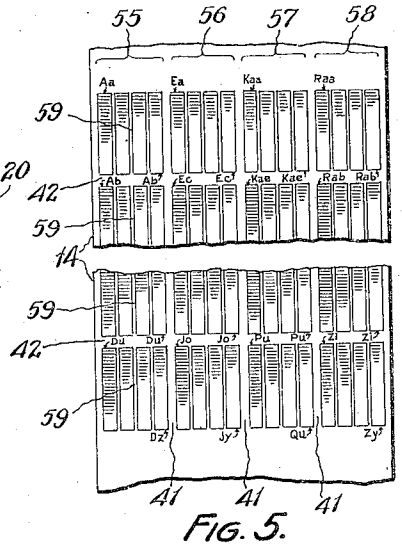


FIG. 5.

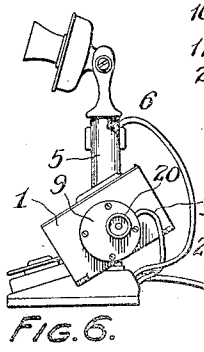


FIG. 6.

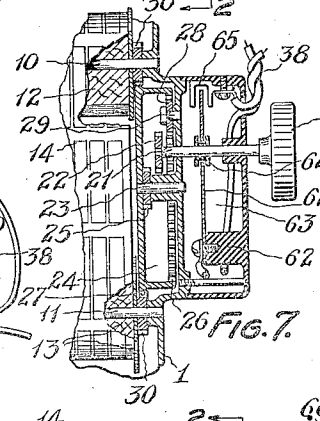


FIG. 7.

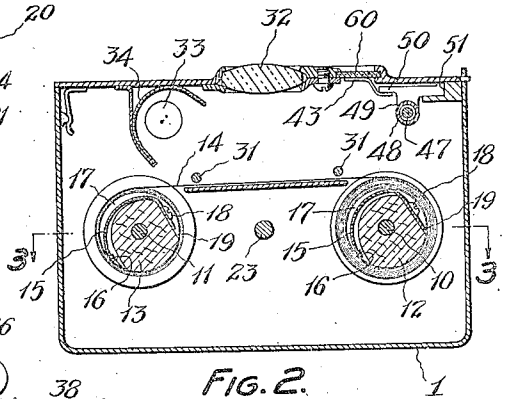


FIG. 2.

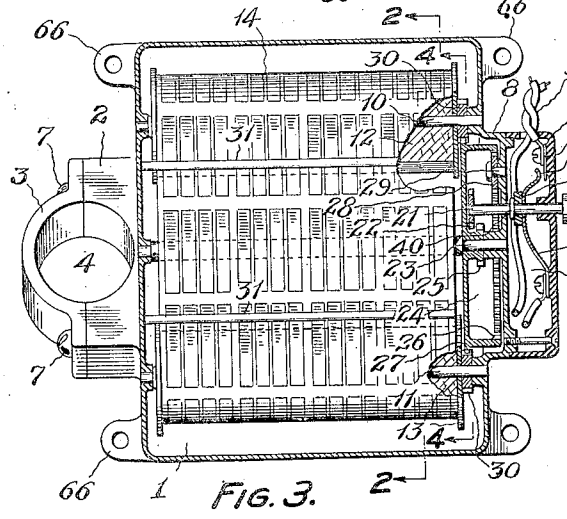


FIG. 3.

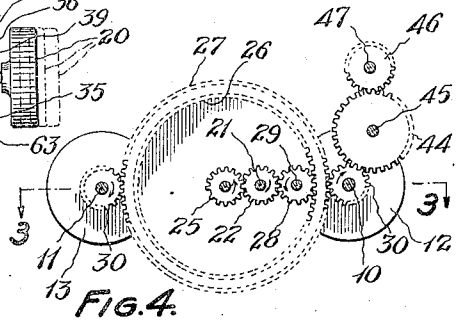


FIG. 4.

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UNITED STATES PATENT OFFICE

1,988,162

DIRECTORY

George J. Chapman, Shaker Heights, Ohio

Application December 23, 1933, Serial No. 703,746

14 Claims. (Cl. 40—95)

My invention particularly relates to directories having the tabulated and classified data thereof in small characters so as to permit the inclusion of a large amount of such data in small compass. Preferably, the data is displayed in such small characters as to require the assistance of a lens of high magnifying power in order to enable the operator readily to locate and accurately to read the desired information. My invention lends itself for use in many fields which require directories or indices, but I have found my invention particularly adaptable for use as a telephone directory, so that the principle of my invention is illustrated in this application by reference to such a directory. Insofar as I am informed, the best method of obtaining the small sized characters adaptable for use in my directory is to reduce in size, by well-known photographic methods, the usual compilation of the directory data which is printed in type large enough to permit reading thereof by the average person without the aid of magnifying lenses, for instance, the pages of the usual telephone directory.

The annexed drawing and the following description set forth in detail certain means embodying my invention, such means disclosing, however, but two of the various forms in which the principle of the invention may be embodied.

In said annexed drawing:

Figure 1 is a plan view of my invention suitably arranged for use as a telephone directory;

Figure 2 is a longitudinal vertical section of one form of my invention, taken in the planes indicated by the line 2—2, Figures 1 and 3;

Figure 3 is a plan section, taken in the plane indicated by the line 3—3, Figures 2 and 4;

Figure 4 is a side view of certain transmission elements forming part of the telephone directory and taken from the plane indicated by the line 4—4, Figure 3;

Figure 5 is a broken fragmentary view of a flexible film or ribbon upon which the minute-sized tabulated data, such as the names of the telephone users and their respective telephone numbers, is displayed, the arrangement or classification of the data thus shown upon this film being one which lends itself to a quick, accurate, and convenient use of my improved directory;

Figure 6 is a side view of a telephone set, to the post of the instrument of which my improved directory is clamped; and

Figure 7 is a fragmentary section of a modification.

Referring to the annexed drawing in which the same parts are indicated by the same respective numbers in the several views, I provide a casing 1 of any suitable form, but preferably rectangular in plan section, having extended from one side thereof a concave boss 2 which, in conjunction with a concavo-convex clamp strap 3, forms a circular hole 4 adapted to receive the post 5 of a telephone set 6, whereby the directory may be secured to the post 5 through the medium of the screws 7 which engage the boss 2 and clamp 3, as clearly shown in Figure 3. A cap-like extension 8 formed upon the side of the casing 1 opposite to that from which the boss 2 extends provides a chamber 24 for certain operating elements hereinafter clearly described. An insulating cover or cap 9 extended from the casing member 8 forms a chamber 63 for lamp conductors and an insulated switch controlling the lamp line, as will be fully hereinafter explained. If it is so desired to mount the directory, it may be secured to a building wall or other suitable support by means of the ears 66.

Secured to a pair of transverse shafts 10 and 11 mounted at their ends in the two sides of the casing 1, are a pair of spaced rollers 12 and 13 upon one of which, in one direction of travel, a flexible film or ribbon 14 is adapted to be wound and from the other of which the ribbon 14 is adapted to be unwound, this ribbon 14 displaying in small characters the names of the telephone users and their respective telephone numbers. In the other direction of travel, the ribbon 14 is oppositely wound and unwound. The rolls 12 and 13 are rotated by means hereinafter fully described, and are turnable in either direction up to the limits of the ribbon length, to unwind the ribbon from one roll and to wind it upon the other. The respective ends of the ribbon 14 are secured to the rolls 12 and 13 by means of plate spring fasteners 15 having claws 16 at free ends thereof which grip the respective ribbon ends and thus resiliently hold the ribbon, the spring fasteners 15 being contained within narrow recesses 17 formed in the rolls 12 and 13 and being secured by screws 18 to plane chord-like portions 19 formed upon the rolls 12 and 13.

Exterior manual control of the rotation of the rolls 12 and 13 is afforded by a hand wheel 20 secured to the outer end of a shaft 21 mounted in the casing member 8 and the insulating housing 9, and cooperating mechanisms hereinafter fully described. The shaft 21 is laterally movable inwardly and outwardly of the casings 8 and 9 by pulling upon or pushing the hand wheel 20, in addition to being rotatable by the hand wheel 20, and in three of its lateral positions, the shaft

21 is effective for certain operations necessary to the manipulation of the directory, as hereinafter clearly described. A pinion 22 is secured to the inner end of the shaft 21. Mounted upon a pin 23 secured in the casing member 8 is a unitary transmission unit consisting of a central pinion 25 and laterally opposed encircling internal and external gears 26 and 27, respectively. Engaging the internal gear 26 is an idler pinion 28 mounted upon a pin 29 supported by the casing member 8. The three lateral positions of the shaft 21, hereinbefore mentioned, effective for use and manipulation of the directory, are as follows: In the first place, the hand wheel 20 secured to the shaft 21 is shown in full lines in Figure 3 in an idle position which is effective for maintaining a lamp turned off, as hereinafter fully described; in the second place, an intermediate position of the shaft 21 causes the driven pinion 22 to engage the pinion 25 to effect the rotation of the internal and external gears 26 and 27 at a certain speed; and in the third place, an outer position of the shaft 21 effects the engagement of the driven pinion 22 with the idler pinion 28 to effect the rotation of the internal and external gears 26 and 27 at a certain speed materially slower than that of the intermediate position of the shaft 21. The intermediate position of the hand wheel 20 is shown in Figure 3 by dotted lines, and the outer position of said hand wheel is shown in said figure by dot-and-dash lines. It is evident, from the transmission set-up that the rotation of the internal and external gears 26 and 27 effected by the intermediate position of the shaft 21 is materially faster than the rotation of said gears effected by the outer position of the shaft 21. The purpose of these differential speeds will be hereinafter fully described. It is also evident that both the internal gear 26 and the external gear 27 rotate together at both speeds, since they are both parts of a unitary transmission element which also includes the pinion 25. These speeds are communicated to the rolls 12 and 13 through the medium of pinions 30 engaged by the external gear 27 and secured respectively to the shafts 10 and 11 to which the rolls 12 and 13 are secured.

When using the directory, the small characters printed or otherwise displayed upon the ribbon 14 are viewed in that part of the field of the ribbon which lies between the rolls 12 and 13, Figure 2, this part of the ribbon field being maintained smooth through the medium of a pair of spaced bar guides 31 beneath which the ribbon 14 passes, as clearly shown in Figure 2. Inasmuch as these characters are small, for the purpose of compressing a great amount of data into small compass, as hereinbefore described, preferably magnifying lenses 32 of high power, and/or a lamp 33, are utilized as aids to the discernment of the characters, the field of each lens 32 being a part of the cross-wise dimension of the ribbon field between the guides 31, and the light from the lamp 33 being reflected upon the entire field through the medium of a reflector 34.

Inasmuch as it is desired that the lamp 33 shall burn only when the directory is being used, I provide an automatic switch 35 forming part of the light circuit and closed only when the hand wheel 20 has been moved outwardly somewhat from its idle position shown in full lines in Figure 3. This switch 35 is of spring material and of plate formation and is secured at one end to and within the insulating casing 9. Intermediate of its ends the spring switch plate 35 is intersected by the shaft 21, and, at its free end it forms a make or break terminal 36 adapted to contact with or be released from a plate contact member 37 secured to the inside face of the insulating casing member 9, and in circuit with a lamp conductor 38. The spring switch 35 is inwardly bowed intermediate its ends and tends to move its free end terminal 36 away from the terminal 37. In so doing, it also tends to move the shaft 21 to its inner or idle position due to the fact that the intermediate portion of the spring switch 35 which surrounds the shaft 21 bears against an insulating block 39 mounted on the shaft 21 and which in turn is disposed against a stop 40 secured to the shaft 21. Thus, when the shaft 21 is pulled outwardly by the hand wheel 20, the stop 40 and insulating block 39 compress the spring 35 and cause the terminals 36 and 37 to contact, which closes the light circuit. Upon the hand wheel 20 being pulled further outwardly until the driven pinion 22 engages the pinion 25, the external gear 27 is rotated integrally with the pinion 25, upon turning the hand wheel 20, and hence, the pinions 30 and the rolls 12 and 13 are turned at the high speed. Upon still further pulling the shaft 21 outwardly until the driven pinion 22 engages the idler pinion 28, the latter turns the internal gear 26, when the hand wheel 20 is turned, and thus through the external gear 27, which is integral with the internal gear 26, turns the pinions 30 and hence the rolls 12 and 13 at the slow speed.

The purpose of the differential speeds at which the rolls 12 and 13 are rotated, and a preferable arrangement of the characters upon the film or ribbon 14, will now be described. An inspection of Figures 1 and 5 will show that I have subdivided the grouping of the characters upon the ribbon 14 into four smaller relatively lateral groups each arranged longitudinally of the film 14, such groups being indicated by the characters 55, 56, 57, and 58, respectively, each laterally adjacent pair of small groups being separated by a spacing such as "41", each of the small groups 55, 56, 57, and 58 being further subdivided longitudinally by spacings 42, such smallest groups being indicated by the character "59". The longitudinal dimension of the group 59 is substantially the same as the distance between the bar guides 31 or, in other words, substantially the longitudinal dimension of the field of vision, so that four laterally adjacent groups "59" will occupy substantially the entire field of vision, each group 59 being within the field of one of the magnifying lenses 32. The purpose of the lateral subdivisions, illustrated by the characters 55, 56, 57, and 58, is to insure that the field of vision upon the ribbon 14, in any idle position of the ribbon 14, will be within reasonable distance of all subscribers' names and telephone numbers. In other words, each of the groupings 55, 56, 57, and 58, covers a certain number of the letters of the alphabet, as clearly shown in Figure 1, so that whatever name it is desired to inspect for the telephone number corresponding to such name, will require a turning of the ribbon 14 no further, in any event, than the length of ribbon necessary to accommodate all of the names commencing with the letters forming the letter-group in which the particular name sought is catalogued. This extreme amount of turning is only substantially one-quarter of the total longitudinal length of all name lists in the directory, and, of course, most names would be brought

into the field of vision by an amount of turning less than this maximum.

After pulling the hand wheel 20 outwardly so as to cause the driven pinion 22 to engage the pinion 25, the turning of the hand wheel 20 causes the rolls 12 and 13 and ribbon 14 to be turned rapidly, which rapid rotation is continued until that part of the ribbon upon which the desired name appears approaches the field of vision. In order plainly to indicate when the desired area of the ribbon 14 approaches the field of vision, I provide a series of pointers 43, one for each of the lenses 32 and the laterally adjacent groupings 55, 56, 57, and 58, which pointers have fields of lateral travel over the respective several groupings and which travel adjacent the several letters of the alphabet associated with the respective groupings, so as to register in vertical alignment with each letter as the names commencing with that letter enter the field of vision. Thereafter, upon pulling the hand wheel 20 outwardly until the driven pinion 22 engages the idler pinion 28, the turning of the hand wheel 20 effects the slow rate of travel of the ribbon 14, by reason of the rotation of the rolls 12 and 13 from the internal gear 26, thus permitting the ready "spotting" of the desired name.

The cross travel of the pointers 43 is effected by an idler pinion 44 engaged by the pinion 30 secured to the roll shaft 10, said idler pinion 44 being mounted upon a pin 45 supported in the casing 1 and engaging a pinion 46 secured to a shaft 47 mounted in the casing 1, upon which shaft 47 is formed a screw element 48 engaging a traveling nut 49 formed integrally with a follower 50 to which the pointers 43 are attached. The follower 50 slides transversely of the casing 1 in a guide 51 formed adjacently beneath one edge of the top surface of the casing 1, the pointers 43 traveling beneath a glass panel 60 disposed in said surface adjacently interiorly of said edge.

The operation of my improved directory, which will be readily understood from the aforegoing description and the accompanying drawing, is essentially as follows: The hand wheel 20 and hence the driven pinion 22 will be in their respective inner positions, illustrated by the full line position of the hand wheel 20, Figure 3, any time that the directory is not in use, due to the spring tension of the lamp switch 35, and the lamp 33 will be "off". At any such idle period, there will be within that part of the ribbon field between the guide rods 31 some one set of four laterally adjacent groupings 59, within one of which groupings 59 will be the name and telephone number of the subscriber last previously looked for. When desiring next to use the directory, the operator will commence to pull the hand wheel 20 outwardly, first resulting in the compression of the spring switch 35 to close the lamp circuit, after which the continued pulling outwardly of the hand wheel 20 will engage the driven pinion 22 with the pinion 25, so that the ribbon 14 can be speedily turned, either forwardly or backwardly, as desired, to bring into the field of vision those names commencing with the letter of the alphabet corresponding with the first letter of the name being sought. Whether this desired name commences with "A", "G", "M", or "T", for instance, this rapid turning of the ribbon 14 will be essentially the same, although there would be some difference in the amount of rapid turning for the four groupings 59, because a substantially uniform number of names in each grouping requires that some groupings include more letters of the alphabet than other groupings. For instance, I have shown in the accompanying drawing the longitudinal grouping 55 comprising, of course, several small groupings 59, to cover four letters, the grouping 56 to cover six letters, the grouping 57 to cover seven letters, and the grouping 58 to cover nine letters. The above-mentioned letters "A", "G", "M", and "T", are merely illustrative because "C", "F", "N", and "V", and many other combinations are illustrative of one letter from each of the longitudinal groupings 55, 56, 57 and 58.

When the letter of the alphabet with which the desired subscriber's name commences enters the field of vision, or is about to enter such field, as indicated by the proper pointer 43, the hand wheel 20 is pulled to its outermost position, causing the driven pinion 22 to engage with the idler pinion 28, after which the hand wheel 20 can be turned to effect the comparatively slow movement of the ribbon 14 so as to permit the "spotting" of the desired name and the obtaining of the corresponding telephone number. Upon release of the hand wheel 20, it and the shaft 21 and driven pinion 22 are moved to their respective innermost positions, under the influence of the spring switch 35, the terminal 36 being pulled away from the terminal 37, thus turning off the lamp 33.

A modified arrangement of the control and actuating elements of my improved directory is shown in Figure 7. In this form of apparatus, the lamp switch 61 is a flexible spring plate secured at one end to an insulating lug 62 projecting from the inner face of the insulating case 9 into the chamber 63, said plate normally maintaining itself in a plane parallel with the longitudinal axis of the casing 1, but being movable out of said plane by two insulating collars 64 secured to the shaft 21, one such collar 64 upon each side and adjacent to the spring switch 61, upon the inward or outward movement of the shaft 21. Upon such inward or outward movement of the shaft 21, the free end of the spring switch 61 contacts with one or the other leaves of a U-shaped electrical contact 65 secured to the inside face of the insulating casing 9 and in circuit with the lamp 33. In this form of apparatus, the idle position of the shaft 21 and driven pinion 22 lies between the positions which it occupies during high speed and low speed operations of the device. When the high speed operation is desired, the shaft 21 is pushed inwardly by the hand wheel 20, resulting in the lighting of the lamp through contact of the spring switch 61 with the left-hand leaf of the terminal 65, and then causing the driven pinion 22 to engage with the pinion 25, resulting in the high speed operation of the device. When the low speed operation is desired, the shaft 21 is pulled outwardly by the hand wheel 20, resulting in the lighting of the lamp by reason of the engagement of the spring switch 61 with the right-hand leaf of the terminal 65, and then resulting in the engagement of the driven pinion 22 with the idler pinion 28, which effects the low speed operation. In this form of apparatus, if the position of the ribbon 14 is such, whenever it is desired to use the directory, that the desired name is close enough to the field of vision as not to require high speed operation of the apparatus, then it is unnecessary to move the shaft 21 and driven pinion 22 through their high speed positions in order to effect the necessary gear engagement which will produce the low speed operation.

What I claim is:

1. A directory comprising a casing member, rolls mounted therein, a flexible ribbon adapted to be wound upon and unwound from the rolls by the rotation of the latter, said ribbon having a multiplicity of varying characters displayed thereon, means for turning the rolls including a movable operating member extended exteriorly of the casing member and a plurality of selective varying speed mechanisms intermediate of and connected to said operating member and said rolls, said selective varying speed mechanisms comprising a pinion rotatable by said operating member, a transmission element having an external gear operatively connected to said rolls and also having an internal gear, and two transmission means operable by said pinion in different positions of said movable operating member, one of which transmission means is secured to said transmission element and the other of which engages the internal gear of said transmission element.

2. A directory comprising a casing member, rolls mounted therein, a flexible ribbon adapted to be wound upon and unwound from the rolls by the rotation of the latter, said ribbon having a multiplicity of varying characters displayed thereon, means for turning the rolls including a movable operating member extended exteriorly of the casing member, said operating member being manually adjustable inwardly and outwardly of the casing member, a lamp supported by the casing member and adapted to illuminate the field of the ribbon between the rolls, and conductors for the lamp including in part a flexible spring switch, said switch being normally open and tending to hold the operating member in an inmost and ineffective position, said switch and the roll-turning means becoming effective by the adjustment of the operating member outwardly.

3. A directory comprising a casing member, rolls mounted therein, a flexible ribbon adapted to be wound upon and unwound from the rolls by the rotation of the latter, said ribbon having a multiplicity of varying characters displayed thereon, a shaft rotatably mounted in the casing member and having one end extended therefrom and an operating wheel secured to said extended end, said shaft being movable inwardly and outwardly of the casing member, means tending to hold the shaft normally in its inmost position, a driven pinion secured to the inner end of said shaft, a second pinion mounted in the casing member and adapted to be engaged by the driven pinion in an intermediate position of the shaft, an internal gear and an external gear mounted in said casing member and formed integrally one with the other and with said second pinion, an idler pinion in engagement with the internal gear and adapted to be engaged by the driven pinion in the outmost position of the shaft, and means for turning the rolls from the external gear, the outward movement of the shaft effecting first the engagement of the driven pinion with the second pinion and then the disengagement of the driven pinion and the second pinion and the engagement of the driven pinion with the idler pinion.

4. A directory comprising a casing member, rolls mounted therein, a flexible ribbon adapted to be wound upon and unwound from the rolls by the rotation of the latter, said ribbon having a multiplicity of varying characters displayed thereon, a shaft rotatably mounted in the casing member and having one end extended therefrom and an operating wheel secured to said extended end, said shaft being movable inwardly and outwardly of the casing member, means tending to hold the shaft normally in its inmost position, a driven pinion secured to the inner end of said shaft, a second pinion mounted in the casing member and adapted to be engaged by the driven pinion in an intermediate position of the shaft, an internal gear and an external gear mounted in said casing member and formed integrally one with the other and with said second pinion, an idler pinion in engagement with the internal gear and adapted to be engaged by the driven pinion in the outmost position of the shaft, a pair of shafts to which the respective rolls are secured, pinions secured to said shafts and engaging the external gear, the outward movement of the first-mentioned shaft by said operating wheel effecting in sequence, first, the engagement of the driven pinion with the second pinion, and then the disengagement of the driven pinion and the second pinion and the engagement of the driven pinion with the idler pinion.

5. A directory comprising a casing member, rolls mounted therein, a flexible ribbon adapted to be wound upon and unwound from the rolls by the rotation of the latter, said ribbon having a multiplicity of varying characters displayed thereon, a magnifying lens supported by the casing member and whose field coincides with the path of travel of the film between adjacent rolls, a lamp supported by the casing member and adapted to illuminate said field, a shaft rotatably mounted in the casing member and having one end extended therefrom and an operating wheel secured to said extended end, said shaft being movable inwardly and outwardly of the casing member, means tending to hold the shaft normally in its inmost position, a driven pinion secured to the inner end of said shaft, a second pinion mounted in the casing member and adapted to be engaged by the driven pinion in an intermediate position of the shaft, an internal gear and an external gear mounted in said casing member and formed integrally one with the other and with said second pinion, an idler pinion in engagement with the internal gear and adapted to be engaged by the driven pinion in the outmost position of the shaft, means for turning the rolls from the external gear, conductors for the lamp including in part a flexible spring switch, said switch being normally open and being the means that tend to hold the first-mentioned shaft in its inmost position, the outward movement of said shaft by said operating wheel against the resistance of the spring effecting in sequence the following stages of operation, first, the closing of the lamp switch, second, the engagement of the driven pinion with the second pinion, and third, the disengagement of the driven pinion and the second pinion and the engagement of the driven pinion with the idler pinion.

6. A directory comprising a casing member, rolls mounted therein, a flexible ribbon adapted to be wound upon and unwound from the rolls by the rotation of the latter, said ribbon having a multiplicity of varying characters displayed thereon, a magnifying lens supported by the casing member and whose field coincides with the path of travel of the film between adjacent rolls, a lamp supported by the casing member and adapted to illuminate said field, a shaft rotatably mounted in the casing member and having one end extended therefrom and an operating wheel secured to said extended end, said shaft being movable inwardly and outwardly of the casing

member, means tending to hold the shaft normally in its inmost position, a driven pinion secured to the inner end of said shaft, a second pinion mounted in the casing member and adapted to be engaged by the driven pinion in an intermediate position of the shaft, an internal gear and an external gear mounted in said casing member and formed integrally one with the other and with said second pinion, an idler pinion in engagement with the internal gear and adapted to be engaged by the driven pinion in the outmost position of the shaft, a pair of shafts to which the respective rolls are secured, pinions secured to said pair of shafts and engaging the external gear, conductors for the lamp, the outward movement of the first-mentioned shaft by said operating wheel effecting in sequence, first, the engagement of the driven pinion with the second pinion, and then the disengagement of the driven pinion and the second pinion and the engagement of the driven pinion with the idler pinion.

7. A directory comprising a casing member, rolls mounted therein, a flexible ribbon adapted to be wound upon and unwound from the rolls by the rotation of the latter, said ribbon having a multiplicity of varying characters displayed thereon, a magnifying lens supported by the casing member and whose field coincides with the path of travel of the film between adjacent rolls, a lamp supported by the casing member and adapted to illuminate said field, a shaft rotatably mounted in the casing member and having one end extended therefrom and an operating wheel secured to said extended end, said shaft being movable inwardly and outwardly of the casing member, means tending to hold the shaft normally in its inmost position, a driven pinion secured to the inner end of said shaft, a second pinion mounted in the casing member and adapted to be engaged by the driven pinion in an intermediate position of the shaft, an internal gear and an external gear mounted in said casing member and formed integrally one with the other and with said second pinion, an idler pinion in engagement with the internal gear and adapted to be engaged by the driven pinion in the outmost position of the shaft, a pair of shafts to which the respective rolls are secured, pinions secured to said pair of shafts and engaging the external gear, conductors for the lamp including in part a flexible spring switch, said switch being normally open and being the means that tend to hold the first-mentioned shaft in its inmost position, the outward movement of said shaft by said operating wheel against the resistance of the spring effecting in sequence the following stages of operation, first, the closing of the lamp switch, second, the engagement of the driven pinion with the second pinion, and third, the disengagement of the driven pinion and the second pinion and the engagement of the driven pinion with the idler pinion, a second idler pinion engaging one of the pinions secured to said pair of shafts, a screw mounted transversely of the path of travel of the ribbon and having secured thereto a pinion engaging said second idler pinion, a traveling nut engaged by said screw, a follower secured to said nut, and a pointer secured to said follower.

8. A directory comprising a casing member, rolls mounted therein, a flexible ribbon adapted to be wound upon and unwound from the rolls by the rotation of the latter, said ribbon having a multiplicity of varying characters displayed thereon and arranged in a plurality of relatively laterally arranged rows each comprising longitudinally arranged characters, a pointer for each row of characters movable transversely of the field of travel of the ribbon, a plurality of series of characters mounted on the casing adjacent the respective pointers and respectively related to the characters of said plurality of rows of characters, means for turning the rolls including a movable operating member extended exteriorly of the casing member and a plurality of selective varying speed mechanisms intermediate of and connected to said operating member and said rolls, and means controlled by the roll-turning means for moving the pointers.

9. A directory comprising a casing member, rolls mounted therein, a flexible ribbon adapted to be wound upon and unwound from the rolls by the rotation of the latter, said ribbon having a multiplicity of varying characters displayed thereon, a movable operating member extended exteriorly of the casing member, said operating member being manually adjustable inwardly and outwardly of the casing member, a lamp supported by the casing member and adapted to illuminate the field of the ribbon between the rolls, conductors for the lamp including in part a flexible spring switch, said switch being normally open and tending to hold the operating member in an ineffective intermediate position, and selective high speed and low speed mechanisms located respectively upon the two sides of the intermediate position of the operating member, said speed mechanisms being connected to said operating member and said rolls.

10. A directory comprising a casing member, rolls mounted therein, a flexible ribbon adapted to be wound upon and unwound from the rolls by the rotation of the latter, said ribbon having a multiplicity of varying characters displayed thereon, a shaft rotatably mounted in the casing member and having one end extended therefrom and an operating wheel secured to said extended end, said shaft being movable inwardly and outwardly of the casing member, means tending to hold the shaft normally in an intermediate ineffective position, a driven pinion secured to the inner end of said shaft, a second pinion mounted in the casing member and adapted to be engaged by the driven pinion in the inmost position of the shaft, an internal gear and an external gear mounted in said casing member and formed integrally one with the other and with said second pinion, an idler pinion in engagement with the internal gear and adapted to be engaged by the driven pinion in the outmost position of the shaft, and means for turning the rolls from the external gear, the movement of the shaft to its inmost position effecting the engagement of the driven pinion with the second pinion, and the movement of the shaft to its outmost position effecting the engagement of the driven pinion with the idler pinion.

11. A directory comprising a casing member, rolls mounted therein, a flexible ribbon adapted to be wound upon and unwound from the rolls by the rotation of the latter, said ribbon having a multiplicity of varying characters displayed thereon, a shaft rotatably mounted in the casing member and having one end extended therefrom and an operating wheel secured to said extended end, said shaft being movable relatively to the casing member, a pinion driven by the rotation of said shaft, a transmission element mounted in the casing member and formed with an internal gear and an external gear, means for turning the rolls from the external gear, gear ele-

ments respectively engageable by said driven pinion in different positions of said shaft, one of said gear elements being fixed to said transmission element, and the other of said gear elements meshing with said internal gear.

12. A directory comprising a casing member, rolls mounted therein, a flexible ribbon adapted to be wound upon and unwound from the rolls by the rotation of the latter, said ribbon having a multiplicity of varying characters displayed thereon, means for turning the rolls including a manually movable operating member extended exteriorly of the casing member, a lamp supported by the casing member and adapted to illuminate the field of the ribbon between the rolls, and a flexible spring switch for the lamp, said switch tending to move the operating member to one of its positions.

13. A directory comprising a casing member, rolls mounted therein, a flexible ribbon adapted to be wound upon and unwound from the rolls by the rotation of the latter, said ribbon having a multiplicity of varying characters displayed thereon, a shaft rotatably mounted in the casing member and having one end extended therefrom and an operating wheel secured to said extended end, said shaft being movable inwardly and outwardly of the casing member, means tending to hold the shaft normally in its inmost position, a driven pinion secured to the inner end of said shaft, an internal gear and an external gear mounted in the casing member, said gears being connected together so as to rotate at the same speed and said external gear being of larger diameter than said internal gear, means rotatably connecting said driven pinion to said gears in an intermediate position of the shaft, means rotatably connecting said driven pinion to said internal gear in an outer position of said shaft, and means for turning the rolls from the external gear.

14. A directory comprising a casing member, rolls mounted therein, a flexible ribbon adapted to be wound upon and unwound from the rolls by the rotation of the latter, said ribbon having a multiplicity of varying characters displayed thereon and arranged in a plurality of relatively laterally arranged rows each comprising longitudinally arranged characters, a pointer for each row of characters movable transversely of the field of travel of the ribbon, said pointers being in a spaced series arranged crosswise of the casing, a plurality of series of characters mounted on the casing adjacent the respective pointers, said series of characters comprising one row arranged crosswise of the casing, the characters of the several series being respectively related to the characters of said plurality of relatively laterally arranged rows of characters, means for turning the rolls including a movable operating member extended exteriorly of the casing member and a plurality of selective varying speed mechanisms intermediate of and connected to said operating member and said rolls, and means controlled by the roll-turning means for moving the pointers.

GEORGE J. CHAPMAN.