To all whom it may concern:

Be it known that I, FREDERICK SEDGWICK, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Cipher Type-Write rs, of which the following is a specification.

In my United States Letters Patent No. 737,213, issued May 5, 1898, there is shown and described an invention the object of which is to construct a cipher typewriting machine that it may automatically, as the result of an arbitrarily predetermined arrangement of the printing characters in their relation to a given key board, transform any desired message into a cipher form incapable of translation except by one having a like machine and possessing the key or combination by which it may be set to translate the previously printed cipher.

The invention also provides one or more character forms, preferably in the shape of disks or type wheels, each character form having a series of characters thereon from which a printed impression may be taken, and each being provided with means whereby said characters may be arranged in a predetermined and arbitrary relation with respect to an arbitrary zero point, as well as to a set of operating keys, the arrangement of which latter is permanent and constant, the relation between the two being such that when a given key is actuated another and different character from that represented thereon may be printed.

The purpose of the invention is to so arrange the characters and keys with respect to each other that when the latter are actuated the result will be an apparent heterogeneous conglomeration of printed characters constituting a cipher, the translation of which can only be made by one having the key to or a knowledge of the relative combination of the printed forms, and having such key the printed forms may be arbitrarily re-arranged to harmonize therewith so that the striking of the keys in the order of the printed cipher will result in the automatic translation of said printed cipher and the printing of the message in its original form.

The aforesaid invention also provides automatic means for changing the relation between the characters represented by the respective keys and those upon the type form at predetermined intervals, and also provided means for measuring the intervals automatically, whereby the relation of the characters to the keys could be changed, consecutively or otherwise, so that the depression of a given key would cause different characters to be printed at different times.

The present invention relates more particularly though not necessarily to an improvement on the above referred to patent and comprises means whereby unlimited changes of the printing characters with respect to the keys may be automatically effected to not only produce unrecognizable ciphers, each differing from the others, but will also produce cipher messages which are of a very complex character.

A further object is to provide an attachment preferably in the form of interchangeable revolving disks constructed in cooperating pairs, one disk of the pair, when attached to the machine, being adapted to automatically change the relation of the characters with respect to the keys to produce a cipher and the other being adapted to translate the cipher by automatically shifting or changing the relation of the characters with respect to the keys in the direction or directions reverse from the respective directions in which the characters were shifted by the cooperating disk which produces the cipher.

A further object is to provide an improved disk adapted for attachment to cipher producing machines, which disk is provided with a series of spaced portions adapted to control or effect an automatic change of the relation of the characters with respect to the operating keys.

A further object is to provide a pair of disks of this character, each provided with two or more series of apertures, recesses or depressions, the series being arranged in different radii, one series being adapted to automatically effect a shifting of the characters with respect to the keys in one direction and another series being adapted to automatically effect such shifting of the characters in the opposite direction, the corresponding series of apertures, recesses, or depressions of the cooperating disks being arranged in reverse orders.

A further object is to provide an improved stop for controlling or positioning the type characters when shifted, and a still further
object is to provide improved means where-
by the type bearing member may be bodily
shifted at will with respect to the remaining
mechanism to compensate for the wear of the
5 parts, and for the purpose of obtaining a
proper alignment.

From the foregoing it follows that with
two machines of identical construction, and
two pairs of disks to cooperate therewith,
located in different places, a message may be
printed in cipher in one place and the cipher
(which may be transmitted by telegraph,
mail or otherwise) may be translated by the
use of the machine at the receiving station
by merely striking the keys corresponding to
the characters of the cipher, provided the
party receiving the message is in possession
of the secret key of the sender of the mes-
5 sage and sets his machine to conform thereto,
after which the proper disk may be attached
and the latter set to conform to the key re-
ceived.

To the attainment of these ends and the
accomplishment of other new and useful ob-
jects thus will appear, the invention consists in
the features of novelty in the construc-
tion, combination and arrangement of the
several parts hereinafter more fully de-
scribed and claimed and shown in the accom-
panying drawings illustrating an embed-
moment of the invention, and in which—

Figure 1 is a vertical sectional view of an
improved machine of this character con-
structed in accordance with the principles of
this invention and taken on line 1—1 of Fig.
4, and with one of the disks applied thereto.

Fig. 2 is an enlarged detail view taken on
line 2—2 of Fig. 5. Fig. 3 is a diagram-
matic view showing the printing characters
on the typewheels of character form. Fig.
4 is a detail top plan view of Fig. 1 with
parts omitted. Fig. 5 is an enlarged detail
sectional view similar to Fig. 1 of the head
of the machine and with parts removed and
parts broken away. Fig. 6 is a detail sec-
tional view of the supporting arm and the
mechanism for automatically changing the
relation of the character form or printing
wheel with respect to the operating keys.

60 taken on line 6—6 of Fig. 8, and looking in
the direction of the arrows. Fig. 7 is a de-
tail view on line 7—7 of Fig. 1. Fig. 8 is a
detail view on line 8—8 of Fig. 6. Fig. 9 is
a detail elevation taken on line 9—9 of Fig.
6.

Fig. 10 is an enlarged detail sectional
view taken on line 10—10 of Fig. 4. Fig. 11
is a view of the obverse face of one of the
disk attachments. Fig. 12 is the reverse face
of the disk shown in Fig. 11. Fig. 13 is an
enlarged detail sectional view on line 13—13
of Fig. 12. Fig. 14 is a view of the obverse
face of the disk cooperating with the disk
shown in Fig. 11. Fig. 15 is a view of the
reverse face of the disk shown in Fig. 14,
showing the means for automatically lock-
ing the disk and for imparting rotation
thereof.

While the present invention is capable of
being applied to various forms of typewrit-
ing machines, it is preferably applied to
some form of machine in which the type
characters are placed upon wheels, disks or
segments, and for the purposes of illustra-
tion the invention is shown as applied to
that type of machine known to the public as
the "Hammond."

Referring more particularly to the draw-
ings and in the present exemplification of
the invention the numeral 20 designates the
frame of the machine, which is mounted
upon the usual base 21. A series of typ-
25 evers 22, provided with keys 23, are mount-
ed in the frame and are in operative con-
nection with the usual ratchet mechanism
for feeding the paper roll 24, (Fig. 1) and
for actuating the type hammer 23, all of
which mechanism forms no part of the pre-
sent invention but is well understood in the
machine referred to.

An upright shaft 26 mounted in suitable
bearings is centrally located in the machine
and is provided with a pinion 27 which is
preferably located beneath the base. Con-
ected with the pinion is a train of gears 28
upon the arbor of one of which is mounted
a motor preferably in the form of a spring
29 for actuating the gears. The shaft 26
therefore is adapted to be rotated through the
action of the spring and gears, subject, how-
ever, to the automatic control of the mecha-

95 nism hereinafter set forth.

Mounted upon the shaft 26 is a gear wheel
30 which meshes with a pinion 31 secured
to the character form or type wheel 32, for
rotation therewith. This character form or

95 type wheel is loosely mounted upon an axle
33 which in turn is supported by an annular
member 34 mounted in the train face of the
head 35 (Figs. 2 and 5), and this annular
member 34 is provided with a handle 36 pro-
jecting beyond the head 35 and in a conven-
ient position for the operator, and is adapt-
ed for the purpose of correcting the align-
ment of the type as the mechanisms wear, in
a manner to be hereinafter set forth. The

110 character form or type wheel is adapted to
bodily shifted upon the axle 33 at the
will of the operator so as to move the gear
31 out of mesh with the gear 30, and this

gear 31 and character form or type wheel
32 are held against such bodily shifting
movement so that the gear 31 will remain
in mesh with the gear 30 in any desired or
suitable manner, preferably by means of an
elastic member 37 in the form of a coil

120 spring which surrounds the axle 33 be-
tween a shoulder thereon and the extremity
of the hub 38 of the character form or type
wheel.

It will be obvious that when the gear
31 is in mesh with the gear 30, it will be re-

eas
A character formed on or type wheel, with its periphery, is arranged around the axle of the character form or type wheel so that the character form may be shifted bodily upon the axle by raising the former against the tension of the elastic member. This permits the character form or type wheel to be moved out of engagement with the gear 30. In this position the character form or type wheel and the character form or type wheel 31 may be rotated about the axle 32 to any desired position (for a purpose described in the patent). When released the elastic member 37 will move or return the character form and gear 31 on the axle 32 so that the gear 31 will again mesh with the gear 30 to be operated thereby when the shaft 36 is rotated. A knowledge of the relative position of the character form or type wheel with respect to the operating keys forms a portion of a key to the automatic translator of the cipher as will be hereinafter more fully set forth.

The gear 30 may be remotely connected to the shaft 36 in any desired manner so that the head 35 may be removed for any purpose without entirely dismantling the remaining portion of the machine and for this purpose there is provided a short shaft 40 to which the gear 30 is directly secured. One extremity of the shaft 36 has a bearing in the head 35 and projects therethrough, and a fastening device 41, such as a screw or the like, is provided which passes through a suitable bearing or support 42 on the head and has engagement with the adjacent extremity of the shaft 40. The other extremity of the shaft 40 is preferably reduced and is angular in cross section, as shown more clearly in Fig. 5, which angular portion is adapted to enter a socket 44 in the extremity of the shaft 36 which socket is of a shape to conform to the configuration of the extremity 45 of the shaft 40. With this construction it will be apparent that when the head 35 is removed, the short shaft 40 may be readily detached from the shaft 36. Secured also to the shaft 40 and for rotation therewith and preferably below the gear 30 is an arm 45 which projects radially from the shaft (see Figs. 2, 5 and 6), which is adapted to engage a detent 46, which latter is adapted to be moved into and out of the path of movement of the arm and this arm is adapted to normally engage the detent. The detent is pivotally mounted intermediate its ends as at 47 (see Figs. 1 and 2) so that when rocked about its point of pivotal support one end will be moved into or out of the path of movement of the arm according to the direction of movement of the detent. The free end of the detent is connected by means of a rod or bar 48 to the usual releasing lever 49, which is in operative connection with all of the key levers 52. When the keys are at rest and the detent is in its normal position, the arm 45 is adapted to engage the detent and prevent the rotation of the type wheel or character form 32 and hold it in its normal position. When, however, a key is depressed, the detent is caused to yield or to be moved about its point of pivotal support by the upward pressure of the rod or bar 48 so as to move the detent out of the path of movement of the arm 45, thereby permitting the type wheel or character form to make one revolution before it is again arrested by the detent, which latter assumes its normal position upon the release of the key. In order to form a cushion so as not to jar the mechanism and to gradually stop the arm 45 when it strikes the detent, a cushion is provided for the arm which may be of any construction suitable for the purpose. Suitable and efficient mechanism for this purpose comprises a member 50 (see Fig. 6) which is pivotally supported by one end as at 51 to the arm 45 and is arranged on the side of the arm, to engage the detent. This member 50 is of a length to extend slightly beyond the free extremity of the arm 45 and is provided with a bifurcated portion 52 (see Fig. 9) into which bifurcated portion a projection 53 on the arm is adapted to extend. An elastic member 54, preferably in the form of a spring, is provided between the member 50 and the adjacent face of the arm 45 and is secured in position against displacement in any suitable manner. This elastic member 54 tends normally to hold the member 50 away from the arm 45 but is adapted to yield when the member 50 strikes the detent 46 and thereby form a cushion to gradually arrest or stop the movement of the arm 45. This arresting movement of the arm 45 is necessary before the revolution of the type wheel or character form 32 is completed, so as to present the desired character at the proper point to enable the usual impression to be taken therefrom. This is accomplished by means of the following described mechanism: Inserted loosely in bores formed in a semi-circular frame work 55 is a series of vertical pins 56, corresponding in number 225 with the keys, each pin being placed above and arranged to engage with the type lever so that the depression of a given key will lift a corresponding pin. Spiral springs 57 (Fig. 1) serve to depress the pins 120.
and also the key levers and to hold both in normal positions. The pins 56 are preferably arranged in the arc of a circle and attached to the top thereof respectively are arms 58, all of which extend inwardly toward a common center formed by the shaft 26. A semi-circular guide ring 59 (see Fig. 7) is secured to the frame, and this ring is provided with a series of vertical slots 57 adapted to receive the arms 58 and to serve as guides therefor. The radial position of the several arms is thus preserved while they are free to be moved vertically.

Loosely mounted upon the short shaft 40 is a Geneva stop wheel 59, which serves a double purpose, viz., to arrest the type wheel or character form at points conforming, respectively, to the characters to be printed and to shift the relative positions of said wheels so that the characters printed will be constantly and systematically changed with respect to given keys, thereby complicating the printed cipher. The first function, where it is not for the continuous shifting feature, might be performed by the gear wheel 39. The wheel 59 is positively connected in the manner to be hereinafter described, with the arm 45, so as to rotate therewith and hence the rotation of the type wheel or character form is controlled thereby, the arrest of the former serving to stop the latter.

Attached to the wheel 59 and depending therefrom are yielding stops 60, any number of which may be provided preferably not over three, and each comprises a member pivoting supported by the wheel 59 and the members are provided with an inclined or beveled face 61. An elastic member 62 is provided for normally holding the stop member 60 in position. The path of these members 60 as the wheel is rotated is immediately above the arms 58 but are adapted to be arrested by any one of the arms when the latter are raised. The depression of a key thereof serves to step the printing wheel, so as to cause that type to be brought into position which corresponds to the key depressed. Should it so happen that one of the detents 60 assumes a position directly over the edge of one of the arms 58 which is elevated, it will be apparent that the gear 59 would not be arrested at the proper position and in order, therefore, to prevent any damage to the mechanism and to permit the arm 58 to be raised to its full extent when it strikes one of the detents 60, the latter when struck by the arm will yield or will be moved about its point of pivotal support against the tension of the elastic member 62. The arc described by the detents 60 between the ends of the two outside arms 58 preferably represents, in the present exemplification of the invention, one-third of a circle and is equal to the circumference of the type wheel as to character form 32 and the gears 30, 31, are so proportioned that the movement of the detents 60 throughout the length of the arc described will cause, one complete revolution of the type wheel. This construction is preferred in adapting the invention to the particular typewriter referred to, although a larger type wheel might be employed and the gears dispensed with; but this would be objectionable owing to the greater weight and momentum.

It will thus be seen from the foregoing description that when a given key is depressed the arm 45 is released and the type wheel or character form 32 is caused to revolve by means of the spring 29, gears 28 and shaft 20, until one of the detents 60 is engaged by an arm 58 corresponding to the key 28 depressed. This contact occurs at the time when the desired character is presented opposite to the type hammer 25, and while this presentation is taken by the action of the hammer, when upon releasing the key the type wheel or character form completes its revolution and is arrested in its normal position by the engagement of the arm 45 with the detent 40.

An indicator comprising a series of graduations and figures designated generally by the reference numeral 63 (see Fig. 4) cooperates with the type wheel 32 and the latter is provided with a marker or pointer 64 cooperating therewith. As has been before stated, the characters on the type wheel are as shown in the present exemplification of the invention are arranged sequentially and the marker or pointer 64 on the type wheel is so arranged with respect to the characters that when the pointer is adjusted to the zero position, or the position shown in Fig. 4, when one of the keys 28 is depressed, the corresponding character on the type wheel will be printed and the characters will be printed as they appear on the key-board or in the same manner as in the ordinary typewriter. An arbitrary position of the type wheel should be chosen from which to determine the key, or what might be termed the initial cipher position. The arbitrary or zero point may be any given one; but for the sake of convenience and simplicity it may be assumed that it is represented by the character "a." Said character having been chosen to represent the zero position or the arbitrary position on the type wheel opposite the type hammer, when the type wheel is at rest, then upon depressing the "a" key, "a" will be printed. If, then, the wheel is arbitrarily shifted one notch by raising the wheel so as to disengage the gear 51 from the gear 30 so that "b" would stand at the zero point, then upon pressing the "a" key, "b" would be printed. It follows therefore that "b" would represent the initial cipher position.
This knowledge is essential in utilizing the cipher. Inasmuch as the art of translation is the reverse of that which takes place in printing the cipher, the translating position of the type wheel would be as many points or characters upon one side of the zero point as the initial cipher position is upon the other side. If the initial cipher position were “a,” one step to the right of the zero point, then the “initial translating position” will be the first character to the left or “a,” assuming the characters to be arranged in regular order. It is manifest, therefore, that in setting the type wheel for translation it should be reversed as many points in one direction from the zero point or “a” as it is moved in the opposite direction when starting to print the cipher. Assuming, for example, that the operator were desirous of printing in cipher the word “Paris” and that “m” were to represent the initial position of the type wheel and that “k’k’k’k’” were the characters upon the type wheel attached to the wheel for rotation therewith, and in the present exemplification of the invention is a star wheel 71, having three spaced radial arms as shown, which is adapted to be intermittently rotated in either direction, in a manner as will be set forth. In order to lock the star wheel against overthrow and to arrest its movement after being rotated one-third of a complete rotation, a stop or brake 73 is provided which preferably comprises a notched head and an elastic body portion. The body portion is secured to the arm 45 in such a position that the teeth or fingers 65 will enter the notch and the star wheel will be yielingly held against rotation.

Mounted in the head 35 are pins 73, 74, which are of a length somewhat greater than the thickness of the head, and these pins are adapted to be projected through the head so that one extremity thereof may be moved into the path of movement of the arms 71, so that when the arm 45 is advanced by the rotation of the shaft 40, and one of the pins 72, 73, is projected into the path of movement of the arms 71 of the star wheel, the arm of the star wheel will strike the pin and as the arm 45 continues to advance, the star wheel will be rotated with respect to the axis in either direction according to which one of the pins 72, 74, is depressed, it being understood that the pins 73, 74, are arranged on opposite sides of the pin of the rotation of the star wheel so that one of the pins will rotate the star wheel in one direction while the other pin will rotate it in the opposite direction. Each time the star wheel is rotated, one third of a step of rotation will be imparted thereto and as it is rotated, the finger 65 adjacent the periphery of the wheel 59 will enter one of the notches 70 and impart a corresponding rotation to the wheel 59 to adjust the wheel.
59 with respect to the gear 30 and thereby alter or change the position of the detected 60 with respect to said gear and also with respect to the character form or type wheel 52. This automatic rotation of the star wheel 71 may be controlled in any suitable manner by the automatic control of the pins 73, 74. The pins 73, 74, are each preferably provided with a shoulder 75 which is adapted to move in a recess 76 in the head 35 and an elastic member 77 is provided which tends normally to hold the extremities of the pins elevated and out of the path of movement of the star wheel 71. It will thus be seen that the motion pins 73, 74, are actuated or depressed, the operation of the mechanism will be as already described, but if either one of the pins should be actuated either manually or automatically, then an adjustment of the wheel 69 with respect to the character form or type wheel 32 and the gear 30 will be effected which would produce a cipher of a complex nature. As has been before stated these pins 73, 74, may be actuated automatically either at predeterm ined intervals or arbitrarily so as to effect this change. If one of the pins is actuated at regular intervals, then the star wheels 71 will always be rotated in the other direction. If, however, mechanism is provided for automatically and arbitrarily actuating first one and then the other of the pins 73, 74, it will be apparent that the star wheel will be rotated first in one direction and then in the other direction, or it may be given two or more steps of rotation in the same direction and then one or two or more steps in the reverse direction. If both of the pins 73, 74 are actuated simultaneously the star wheel will not be rotated in either direction, and consequently, the printing mechanism will not be shifted in either direction. It follows, therefore, that in order to translate a cipher which is produced by the automatic shifting or rotation of the star wheel, the action of the mechanism should be reversed in the same order and in the same manner in which the mechanism was operated to transmit or produce the cipher, and in order to produce this reverse and correct operation of the mechanism, the person receiving or who is to translate the cipher must be provided with the key by means of which the cipher was produced.

A suitable and efficient means for automatically actuating or shifting the pins 73, 74, comprises a rotatable disk provided with spaced portions, perforations or apertures arranged in any suitable manner and adapted when the disk is rotated to automatically shift one or the other of these pins and the spaced portions, perforations or apertures are arranged in two separate series in different such as to alternately act upon the pins, one series, say, the inner series, acting to control one of the pins 73, 74, and consequently the movement of the type wheel or character form 32 in one direction, while the outer series controls the movement of the other pin and therefore the shifting of the type wheel or character form in the opposite direction, when this disk revolves. The disk being given an intermittent rotation, in a manner which will be hereinafter set forth, it will be manifest that as the writing proceeds, the shifting of the type wheel from a normal printing position, will be very erratic and of a complicated nature, but at the same time it has a certain sequence relating to the spaced portions, recesses or apertures in the disks. It will also be manifest that a disk having portions, recesses or apertures arranged in exactly the reverse order and interchanged with the former disk and placed in the exact position (initial) as was the first disk, and when given an intermittent or step-by-step rotation, in the same direction as the first disk, will, as it revolves as the writing proceeds, produce a corresponding reverse order of presentation of the characters when the cipher characters are struck on the machine, thereby producing a literal translation of the cipher message that was written in the first instance. The spaced portions, perforations or apertures in these disks need not be arranged in any fanciful order, providing that no two of the operating portions, apertures or recesses co-incide, that is, to say, both radii upon which the spaced operating portions, recesses or apertures are arranged should not have an order of arrangement that would cause both pins, which are depressed or released by the operation of bringing the spaced portions, recesses or apertures over the pins, to be held down at the same time, as the result of depressing a given key on the machine. Unless these portions were so arranged both pins would operate at the same time and upon both sides of the arms 71 of the star wheel, thereby blocking the whole operation of the machine. Therefore in the arrangement of these operating portions, recesses or apertures at the disks, it is necessary to so lay out a given system with a view of either having two of the portions, recesses or apertures co-incident, which causes the type wheel to make no change as the star wheel is not acted upon in this instance, or, in lieu thereof, there is an operating portion, recess or aperture in the outer or other radii, (assuming two series to be employed), a space free from such operating portion, recess or aperture may be left to aid in the complexity of the series or an operating portion, perforation or recess may be added.
in the other radii, but no spacing of these series can be made that does not provide that both pins which act upon the star wheel must not be held down in their operating position at the same time. In the present exemplification of the invention the disks 78, 79 represent one pair and are formed with two series of apertures or recesses 80, 81, and the series are arranged in different radii. On one of the disks, for instance, the disk 78, one of the series 80 is arranged within the other series 81. On the other disk 79, the series corresponding with the series 81 on the disk 78 is arranged within the series corresponding with the series 80 on the disk 78. In other words, the series of apertures or recesses on one of the disks is reverse to the series on the other disk. These apertures, or apertures or openings are adapted to respectively pass over the ends of the pins 73, 74, and when one of the apertures is over the respective pin, the elastic member 74 will raise the pin to permit its extremity to move out of the path of movement of the arms 71 of the star wheel. When a blank space passes over the pin, the extremity of the pin will be pushed down into the path of movement of the arm 71. Each of the disks is provided with a series of indications 82 preferably in the form of characters or numbers and a designating character 83 is also provided on the disks. These disks are mounted on a suitable support 84 preferably in the form of an axle secured to the head 35 and the disks are further provided with a handle 85 by means of which they may be freely rotated. The disks may be of any desired thickness or may be constructed of a plurality of elements secured together. If cut from a single piece of material, the lower portion or face is reduced in diameter, or if secured by two elements fastened together the lowermost element is of a diameter smaller than the diameter of the upper element, and the periphery of the reduced portion or element 86 is provided with a series of curved faces 87 around its periphery separated from each other by means of notches or recesses 88. The disk is secured against accidental displacement upon the axle or support 84 in any suitable manner, preferably by means of a latch 89 which is pivotally supported as at 90 and is provided with a bifurcated portion 91 adjacent its face end, and this bifurcated portion is adapted to receive a reduced portion 92 of the axle 84. When the disk is in place, the latch 89 is adjusted so as to lock the disk against accidental displacement but not against rotation. Suitable means may be provided for independently rotating the disks and for the purpose there may be provided a one-toothed gear 93 which latter may be secured to the short shaft 49 above the head 35, and the one tooth 94 of this gear 93 is adapted to enter the spaces 88 between the faces 87 so that each time the short shaft 49 makes one complete revolution, the one tooth 94 of the gear 93 will impart one step of rotation to the disk 78 or 79, whichever disk is secured in position. The periphery of the gear 93 is constructed to co-incide with the faces 87 and when the one tooth 94 is not projecting into one of the spaces 88, the disk will be locked against rotation and this one-toothed gear and the faces 87 form the ordinary Geneva lock. It will thus be seen that each time the tooth 94 of the gear 93 enters one of the spaces 88, the disk will be moved one step of rotation and as the disk is rotated, the recesses or apertures 80, 81, will be moved into positions to permit the respective pins 73, 74, to be elevated so that they will not act upon the arms 71 of the star wheel. As has been already stated, these apertures are arranged in any arbitrary manner and it will therefore be evident that the star wheel will be rotated in one direction or the other according to which of the pins 73, 74, is depressed into the path of movement of one of the arms of the wheel. This operation of the pins is controlled by the rotation of the disks, and in order to permit the extremities of the pins to enter the respective recesses 80, 81, as the latter advances, a portion of the wall of the recess may be inclined or beveled as at 95 shown more clearly in Fig. 12.

In order to adjust or position the disks to a predetermined position or an arbitrary position to determine the cipher, and in order to be able to place the deciphering disk under the machine when the key is received, mechanism must be provided for indicating the initial position of the disk. For this purpose a pointer 96 may be employed (see Fig. 4) and the disk is adjusted about its axle 84 after detaching the latch 89 and elevating the disk so as to move it out of engagement with the one-toothed gear 93, so as to position a predetermined one of the characters 83 with respect to the pointer 96. This position of 218 the disk constitutes the cipher or a portion thereof. It will therefore be manifest that having applied one of the disks 75, 78, or 80 to transmit or form the cipher message, if the position of the disk which has been employed, is communicated to another person, this other person may by placing the cooperating disk upon a machine, and placing it in the same relative position as the transmitting disk, by the operation of the keys 235 23 of the typewriter corresponding to the characters in the cipher message, translate the message. This is accomplished by means in the receiving disk are arranged reversely to 123.
the apertures or recesses in the transmitting disk.

It is thought that the operation of the mechanism will be clearly understood from the above, but briefly stated it is as follows: The type wheel or character form 92 is first adjusted to its initial position, that is to say, with the letter "a" in such a position that when the type key "a" is depressed, the letter "a" will be printed on the paper. When in this position and in order to form a cipher message, the type wheel or character form 92 may be adjusted to any arbitrary or desired position by rotating the type wheel or character form so that the gear 31 will be moved out of mesh with the gear 30 after which the type wheel may be spun or, rotated about the axle to place the point 94 in any position either to the right or to the left of the zero and into a position that the point will register with one of the graduations 63, for instance, to say that the point 94 is moved to the right of the zero. This will form a portion of the cipher key. Having thus adjusted the type wheel it may be returned to its initial position by the depression of the space bar of the typewriter and while the space bar is thus held in a depressed position, the disk 78 or 79 is then placed on the axle 84 and is adjusted so that any one of the characters 82 will be opposite the pointer 96. After the disk is locked in position, the space bar is released and the parts will then be in position to transmit the message.

The position of the disk with respect to the pointer 96 forms the outer portion of the key of the cipher. With the parts thus adjusted and as has been before stated the message may be written upon the typewriter in the ordinary or usual manner, that is to say, by operating the keys 93 and the space bar or space key usual in machines of this character. The result of this operation of the machine will be a conglomeration of characters and it will be impossible for any one to ascertain even the operator of the machine, just what character will be printed by the depression of any of the keys of the typewriter. After the message has been thus written it may be transmitted by mail, telegraph or other manner to the person for whom it is intended. It is also necessary that the key to the cipher be transmitted, which may be done by mail, telegraph or in any other manner. Upon receipt of the key and the message, the person to translate the message will first adjust the type wheel or character form 92 to the initial position, that is, to the position so that when the key designating the letter "a" is depressed, the letter "a" will be printed on the paper. If the key indicates that the position of the type wheel or character form 92 was adjusted, say, to the third graduation on the right hand side of the zero, then the operator who is to translate the message adjusts the type wheel to the corresponding position on the left hand side of the zero, that is to say, in a direction reverse to the direction in which it was adjusted to send the message. The other disk of the pair, the one which was used to transmit the message is then placed upon the axle 84 and adjusted so that the character of the series 82 corresponding to the character of the series 82 on the sending disk is opposite the pointer 96. With this adjustment the machine is in condition to translate the message. The operation may be effected by simply operating the key 93 directly reverse to the operation by the other disk and the arms 71 of the star wheel will be moved in the opposite directions and the message will thereby be correctly and automatically translated; as the original characters will be presented to the printing position in the same manner as they occur in the cipher. As the mechanism is adjusted to operate reversely from the direction of operation when sending the cipher and as the series of apertures 80, 81 in the receiving disk are directly reverse to those in the transmitting disk, they will operate on the pins 72 and 73, directly reverse to the operation by the other disk and the arms 71 of the star wheel will be moved in the opposite directions and the message will thereby be correctly and automatically translated; as the original characters will be presented to the printing position in the same manner as they occur in the cipher.

It will be apparent that in the present construction, no matter what movements may have been caused to act upon the printing mechanism, producing a variable cipher, if a corresponding reverse movement be given to the printing mechanism, said mechanism—being started from the same point as in the first instance, the cipher characters being struck upon the key board of the machine in the order in which they were printed in the first instance, the original characters will be printed as the cipher characters are successively struck.

While in the present exemplification of the invention the disks are provided with a comparatively small number of recesses, it is obvious that any number of recesses may be provided and the recesses arranged in any manner, the only thing necessary being that the companion disk be provided with a similar number of recesses which are arranged in the direct reverse order. It will also be apparent that with this improved disk attachment, a cipher may be re-written into a second cipher, using the same disk set to some other position, or another disk may be used. In this case two translations would be necessary to reduce the same, one translation rendering the second cipher back to the first, and the second translation rendering the first translation to the original.
A typewriter in which is combined a keyboard, the keys of which denote certain characters, printing mechanism so arranged that the actuation of a key denoting one character shall print a different character upon the paper, means for automatically changing the relation between the characters and keyboard as the keys are actuated, said means embodying a controlling element for controlling the actuation of the last said means, mechanism for automatically actuating the said controlling element, and means for changing the primary relation between said controlling means and the characters.

1. A typewriter in which is combined a keyboard, the keys of which denote certain characters, printing mechanism so arranged that the actuation of a key denoting one character shall print a different character upon the paper, means for automatically changing the relation between the characters and keyboard as the keys are actuated, said means embodying a controlling element for controlling the actuation of the last said means, mechanism for automatically actuating the controlling element, and means for intermittently actuating the last said mechanism, and means for locking the controlling mechanism after each movement thereof.

2. A typewriter in which is combined a keyboard, the keys of which denote certain characters, printing mechanism so arranged that the actuation of a key denoting one character shall print a different character upon the paper, means for automatically changing the relation between the characters and keyboard as the keys are actuated, said means embodying a controlling element for controlling the actuation of the last said means, mechanism for automatically actuating the last said means, and means for changing the primary relation between said controlling means and the characters.

3. A typewriter in which is combined a keyboard, the keys of which denote certain characters, printing mechanism so arranged that the actuation of a key denoting one character shall print a different character upon the paper, means for automatically changing the relation between the characters and keyboard as the keys are actuated, said means embodying a removable controlling element for automatically controlling the actuation of the last said means, and means for intermittently actuating the controlling element.

4. A typewriter in which is combined a keyboard, the keys of which denote certain characters, printing mechanism so arranged that the actuation of a key denoting one character shall print a different character upon the paper, means for automatically changing the relation between the characters and keyboard as the keys are actuated, said means embodying a removable controlling element for automatically controlling the actuation of the last said means, and means for intermittently actuating the controlling element.
said means, and means for changing the primary relation between said controlling means and the characters.

9. A machine of the class described, in which is combined a key-board representing the characters of the ordinary alphabet, a type carrier bearing characters representative of those of said alphabet, means for varying said representative characters after a predetermined period of use and embodying means for measuring said period automatically, means for automatically controlling the last recited means, and means for automatically actuating the said controlling means.

10. A machine of the class described, in which is combined a keyboard representative of the ordinary alphabet, a carrier bearing a set of characters to represent those of the ordinary alphabet, means for automatically changing said set of characters and embodying means for automatically measuring the periods of said change, whereby the same letter of the alphabet will be represented in different parts of the message by different characters, means for controlling the last recited means, and means for automatically actuating the said controlling means.

11. A machine of the class described, in which is combined a keyboard representative of the ordinary alphabet, a carrier bearing a set of characters to represent those of the ordinary alphabet, means for automatically changing said set of characters and embodying means for automatically measuring the periods of said change, whereby the same letter of the alphabet will be represented in different parts of the message by different characters, means for controlling the last recited means, means for automatically actuating the said controlling means, and means for changing the primary relation of the said controlling means and type.

12. A machine of the class described, in which is combined a suitable type, a series of keys for taking impressions from said type, means for automatically changing the relation between the type and keys at determined intervals and embodying means for measuring said intervals automatically, mechanism for controlling the last recited means, and means for automatically actuating the controlling means.

13. A machine of the class described, in which is combined a suitable type, a series of keys for taking impressions from said type, means for automatically changing the relation between the type and keys at determined intervals and embodying means for measuring said intervals automatically, mechanism for controlling the last recited means, means for automatically actuating the controlling means, and means for changing the primary relation of the said controlling means and type.

14. A machine of the class described, in which is combined a series of type, keys for manipulating the same, means for changing the relation between the type and keys at determined intervals and embodying means for measuring said intervals automatically, controlling means for the last recited means, means for automatically actuating the said controlling means, and means for changing the primary relation of the controlling means and type.

15. A machine of the class described, in which is combined a movable and adjustable type carrier having characters thereon, means for adjusting the position of said carrier at determined intervals and embodying means for measuring said intervals automatically, suitable keys for actuating said carrier whereby the relation between the type characters and keys is automatically changed, the first said means including controlling mechanism, and means for automatically controlling the latter, and means for changing the primary relation of the said controlling means and type.

16. A machine of the class described, in which is combined a movable and adjustable type carrier having characters thereon, means for adjusting the position of said carrier at determined intervals and embodying means for measuring said intervals automatically, suitable keys for actuating said carrier whereby the relation between the type characters and keys is automatically changed, the first said means including controlling mechanism, and means for automatically controlling the latter, and means for changing the primary relation of the said controlling means and type carrier.

17. In a typewriting machine, the combination of a type carrying device, keys for bringing the individual type on the carrier into printing position, a paper carrier, means for impressing a primary type on paper on the paper carrier, means for automatically and progressively changing the relation between the characters on the type carrier and the keys employed for operating the type carrier and embodying means for controlling the last recited means, and means for automatically actuating the said controlling means.

18. In a typewriting machine involving the combination of a type carrying device, a plurality of keys for bringing individual type characters into printing position and impressing the same upon a sheet of paper, means for automatically and progressively changing the relation between the type characters on the type carrier and the respective type-carrier operating keys, said means embodying means for altering any original or primary relation between the characters on the type-carrier and the devices employed for causing said characters to be printed, whereby variations may be made at will in adapting the typewriter for use according to
a predetermined code of cipher, means for automatically controlling the last recited means, and means for automatically actuating the said controlling means.

19. In a typewriting machine involving the combination of a type carrying device, a plurality of keys for bringing individual type characters into printing position and impressing the same upon a sheet of paper, means for automatically and progressively changing the relation between the type characters on the type carrier and the respective type-carrying operating keys, and embodying means for altering any original or primary relation between the characters on the type carrier and the devices employed for causing said characters to be printed, whereby variations may be made at will in adapting the typewriter for use according to a predetermined code of cipher, means for automatically controlling the last recited means, means for automatically actuating the said controlling means, and means for altering any primary relation of the said controlling means and the type characters.

20. A typewriter in which is combined a series of keys denoting certain characters, printing mechanism shiftable in opposite directions and so arranged that the actuation of a key denoting one character shall print a different character upon the paper, and means for automatically shifting the printing mechanism in both directions by the operation of the keys in writing a message.

21. A typewriter in which is combined a series of keys denoting certain characters, printing mechanism shiftable in opposite directions and so arranged that the actuation of a key denoting one character shall print a different character upon the paper, and means for automatically shifting the printing mechanism in both directions by the operation of the keys in writing a message.

22. A typewriter in which is combined a series of keys denoting certain characters, printing mechanism shiftable in opposite directions and so arranged that the actuation of a key denoting one character shall print a different character upon the paper, and means for automatically shifting the printing mechanism in both directions by the operation of the keys in writing a message.

23. A typewriter in which is combined a series of keys denoting certain characters, printing mechanism shiftable in opposite directions and so arranged that the actuation of a key denoting one character shall print a different character upon the paper, means for automatically shifting the printing mechanism in both directions by the operation of the keys in writing a message, the last recited means including a controlling member, and an interchangeable companion member, said companion member operating to correspondingly shift the printing mechanism in the opposite directions to translate the message.

24. A typewriter in which is combined actuating keys denoting certain characters, printing mechanism so arranged that the actuation of a key denoting one character shall print a different character upon the paper, means for automatically changing the relation between the characters and keys as the latter are actuated, said means including a shiftable element, an actuating member therefore, means tending normally to render the said actuating member inactive, and mechanism for automatically projecting said member into the path of movement of the shiftable element to automatically shift the latter, and means for automatically controlling the said mechanism.

25. A machine of the class described in which is combined suitable type, a series of keys for actuating said type, means for automatically changing the relation between the type and keys at determined intervals, said means embodying a rotatable element, means for automatically shifting said element embodying a shifting member, means tending normally to render said member inactive, and means for automatically controlling said member.

26. A machine of the character described in which is combined suitable type, a series of keys for actuating the type, means for automatically changing the relation between the type and keys, as the keys are actuated, embodying a controlling disk having a constant degree of motion, and means connecting the controlling disk with the type embodying means permitting adjustment of the type with respect to the controlling means for varying the movement of the type while the degree of motion of the controlling disk remains constant.

27. A machine of the character described in which is combined suitable type, a series of keys for actuating the type, means for automatically changing the relation between the type and keys as the keys are actuated, embodying a controlling disk having a constant degree of motion, means connecting the controlling disk with the type embodying means permitting adjustment of the type arbitrarily in two directions with respect to the controlling means for varying the movement of the type while the degree of motion of the controlling disk remains constant.
28. A machine of the character described in which is combined suitable type, a series of keys for actuating the type, means for automatically changing the relation between the type and keys as the latter are actuated embodying a controlling disk having a constant degree of motion, means connecting the controlling disk with the type embodying means permitting adjustment of the type with respect to the controlling means for varying the movement of the type while the degree of motion of the controlling disk remains constant, the latter means for changing any primary relation of the said controlling disk and the type.

29. A machine of the character described in which is combined suitable type, a series of keys for actuating the type, means for automatically changing the relation of the type and keys as the latter are actuated embodying a rotatable element, means for rotating said element embodying a shifting member adapted to be projected into the path of movement of the member to be engaged thereby, means tending normally to hold said member inactive, and means for automatically shifting the member into the path of movement of said disk to operate the latter.

30. A machine of the character described in which is combined suitable type, a series of keys for actuating the type, means for automatically changing the relation of the type and keys as the latter are actuated embodying a rotatable element, means for rotating said element embodying a shifting member adapted to be projected into the path of movement of the member to be engaged thereby, means tending normally to hold said member inactive, means for automatically shifting the member into the path of movement of said element to operate the latter, and means for automatically actuating the last recited means.

31. A machine of the character described in which is combined suitable type, a series of keys for actuating the type, means for automatically changing the relation of the type and keys as the latter are actuated embodying a rotatable element, means for rotating said element embodying a plurality of shifting members adapted to be respectively projected into the path of movement of said element and on opposite sides of the pivot thereof to be engaged by said element to rotate the latter, means tending normally to hold said members inoperative, and means for automatically and arbitrarily shifting said members into the path of movement of said element.

32. A machine of the character described in which is combined suitable type, a series of keys for actuating the type, means for automatically changing the relation of the type and keys as the latter are actuated embodying a rotatable element, means for rotating said element embodying a plurality of shifting members adapted to be respectively projected into the path of movement of said element and on opposite sides of the pivot thereof to be engaged by said element to rotate the latter, means tending normally to hold said members inoperative, and means for automatically and arbitrarily shifting said members into the path of movement of said element.

33. A machine of the character described in which is combined suitable type, a series of keys for actuating the type, means for automatically changing the relation of the type and keys as the latter are actuated embodying a rotatable element, means for rotating said element embodying a plurality of shifting members adapted to be respectively projected into the path of movement of said element and on opposite sides of the pivot thereof to be engaged by said element to rotate the latter, means tending normally to hold said members inoperative, and means for automatically and arbitrarily shifting said members into the path of movement of said element.

34. A machine of the character described in which is combined suitable type, a series of keys for actuating the type, means for automatically changing the relation of the type and keys as the latter are actuated embodying a rotatable element, means for rotating said element embodying a plurality of shifting members adapted to be respectively projected into the path of movement of said element and on opposite sides of the pivot thereof to be engaged by said element to rotate the latter, means tending normally to hold said members inoperative, and means for automatically and arbitrarily shifting said members into the path of movement of said element.

35. A machine of the character described in which is combined suitable type, a series of keys for actuating the type, means for automatically changing the relation of the type and keys as the latter are actuated embodying a rotatable element, means for rotating said element embodying a plurality of shifting members adapted to be respectively projected into the path of movement of said element and on opposite sides of the pivot thereof to be engaged by said element to rotate the latter, means tending normally to hold said members inoperative, and means for automatically and arbitrarily shifting said members into the path of movement of said element.
of keys for actuating the type, means for automatically changing the relation between the type and keys as the keys are actuated embodying a rotatable disk having a constant degree of motion, means for rotating the disk, and means connecting the disk with the type actuating means embodying means permitting automatic adjustment of the type with respect to the disk for varying the movement of the type while the degree of motion of the disk remains constant, the last said means embodying a rotatable shifting member and pins actuated by the disk and adapted to be respectively projected into the path of movement of the shifting member and on opposite sides of its pivot, and means for arbitrarily changing any primary relation of the disk and the type.

37. A machine of the class described, in which is combined suitable type, a series of keys, means for automatically changing the relation between the characters and the keys as the latter are actuated, and means for correcting the alignment of the type.

38. A machine of the class described, in which is combined suitable type, a series of keys, means for automatically changing the relation between the characters and the keys as the latter are actuated, and means for bodily shifting the type to correct the alignment thereof.

39. A machine of the class described in which is combined a rotatable type form having characters thereon, a series of keys, means for automatically changing the relation between the characters and the keys as the latter are actuated, a shiftable support upon which the type form is mounted, and means for shifting the support to correct the alignment of the type.

40. A machine of the class described in which is combined a rotatable type form having characters thereon, a series of keys, means for automatically changing the relation between the characters and the keys as the latter are actuated, a shiftable support mounted in the head of the machine upon which the type form is rotatably mounted, and a handle connected with said support and projecting beyond the head for shifting the support to correct the alignment of the type.

41. A machine of the class described in which is combined a rotatable type form, a series of keys, means for automatically rotating the type form when the keys are actuated to present the corresponding type to the paper, and means for bodily adjusting the type form to correct the alignment of the type.

42. A machine in which is combined suitable type, operating keys, and means for automatically shifting the type form when the keys are actuated embodying a detent, and a yielding stop operatively related to and shiftable with the type form and adapted to engage the detent to arrest the movement of the type form.

43. A machine in which is combined suitable type, operating keys, and means for automatically shifting the type form when the keys are actuated embodying a detent, and a stop yieldable in one direction and operatively related to and shiftable with the type form and adapted to engage the detent to arrest the movement of the type form.

44. A machine in which is combined suitable type, operating keys, and means for automatically shifting the type form when the keys are actuated embodying a detent, and a stop operatively related to and shiftable with the type form and adapted to engage the detent to arrest the movement of the type form, said stop being provided with a beveled portion adapted to be engaged by the detent to be deflected thereby.

45. A machine in which is combined suitable type, operating keys, and means for automatically shifting the type form when the keys are actuated embodying a detent, and a stop operatively related to and shiftable with the type form and adapted to engage the detent to arrest the movement of the type form, said stop being yieldable in one direction only and provided with a beveled portion adapted to be engaged by the beveled portion adapted to be engaged by the detent to be deflected thereby.

46. A controller disk for cipher writing machines provided on its face with operating portions and formed as an integral structure.

47. A controller disk for cipher writing machines provided on its face with operating portions and inoperating portions arranged therebetween and formed as an integral structure.

48. A controller disk for cipher writing machines provided on its face with operating portions arranged in different series and inoperating portions arranged between the said operating portions of each series.

49. A controller disk for cipher writing machines provided on its face with a plurality of series of operating portions and inoperating portions arranged between the operating portions of each series, said series being arranged in different radii.

50. A pair of interchangeable controller disks for cipher writing machines each provided with a series of operating portions and inoperating portions arranged between, the said portions on one disk being arranged in the reverse order from the arrangement on the other disk.

51. A pair of interchangeable controller disks for cipher writing machines, each being provided with a plurality of series of operating portions, and inoperating portions arranged between the operating portions.
tions of each series, the respective series on one disk being arranged in reverse order to their arrangement on the other disk.

52. A pair of interchangeable controller disks for cipher writing machines, each being provided with a plurality of series of operating portions arranged in different radii and inoperating portions arranged between the operating portions of each series, the respective series on one disk being arranged in reverse order to their arrangement on the other disk.

53. A pair of interchangeable companion controller disks for cipher writing machines, each being provided with a plurality of series of operating portions arranged in different radii, and inoperating portions arranged between the said portions of each series, the respective series on one of the disks being arranged in different radii on the companion disk.

54. A pair of interchangeable companion controller disks for cipher writing machines, each being provided with a plurality of series of operating portions arranged in different radii, and inoperating portions arranged between the said portions of each series, the respective series on one of the disks being arranged in different radii on the companion disk and in reverse order.

55. A pair of interchangeable controller elements for cipher writing machines each provided with a plurality of series of operating portions and inoperating portions arranged therebetween, the said portions on one of said elements being arranged in reverse order from the arrangement on the other of said elements.

56. A pair of interchangeable controller elements for cipher writing machines each being provided with a plurality of series of operating portions, and inoperating portions arranged between the operating portions of each series, the respective series on one of said elements being arranged in reverse order to their arrangement on the other of said elements.

57. A pair of interchangeable controller elements for cipher writing machines each being provided with a plurality of series of operating portions arranged in different radii and inoperating portions arranged between the operating portions of each series, the respective series on one of said elements being arranged in reverse order to their arrangement on the other of the elements.

58. A pair of interchangeable companion controller elements for cipher writing machines, each being provided with a plurality of series of operating portions arranged in different radii, and inoperating portions arranged between the said portions of each series, the respective series on one of the elements being arranged in different radii on the companion element.

59. A pair of interchangeable companion controller elements for cipher writing machines, each being provided with a plurality of series of operating portions arranged in different radii, and inoperating portions arranged between the said portions of each series, the respective series on one of the elements being arranged in different radii on the companion element and in reverse order.

60. A machine of the class described in 60 which is combined with a rotatable type form, operating keys, and a yielding stop operatively related to and shiftable elements, the type form rotates for automatically rotating the type form in either direction when the keys are actuated.

61. A machine of the class described in which is combined with a rotatable type form, a series of operating keys, means for automatically shifting and locking the type form when the keys are actuated, embodying two detents, a star wheel to engage said means and one of the detents for operating the means in one direction and for rotating the means in the other direction when the other detent is engaged and for preventing the rotation of the said means when neither detent is engaged by the star wheel.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 5th day of July A.D. 1910.

FREDERICK SEDGWICK.

Witnesses:

J. H. Jochum, Jr.,
C. H. Schem.