April 20, 1926. 1,581,753

W. F. MAYER

AUTOMATIC SELECTIVE TIMING MECHANISM

Original Filed July 1, 1924 3 Sheets-Sheet 1

Fig. 1.

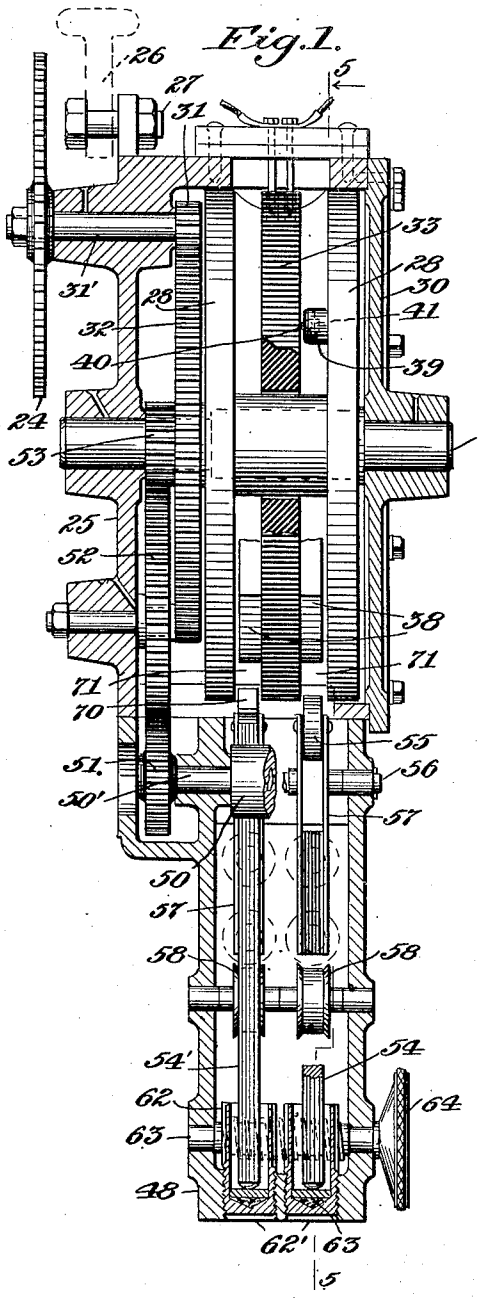
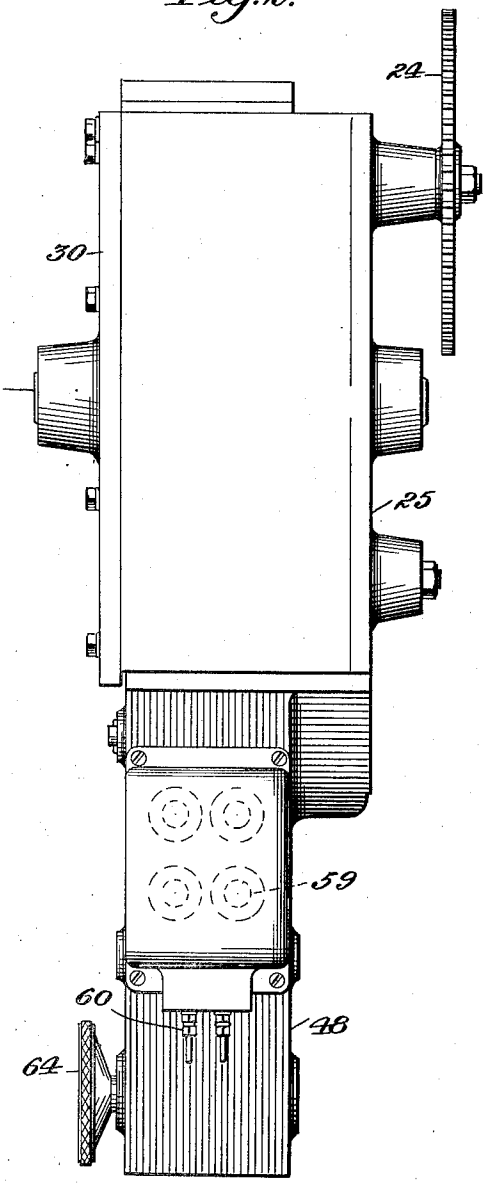



Fig. 2.




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Fig. 5.

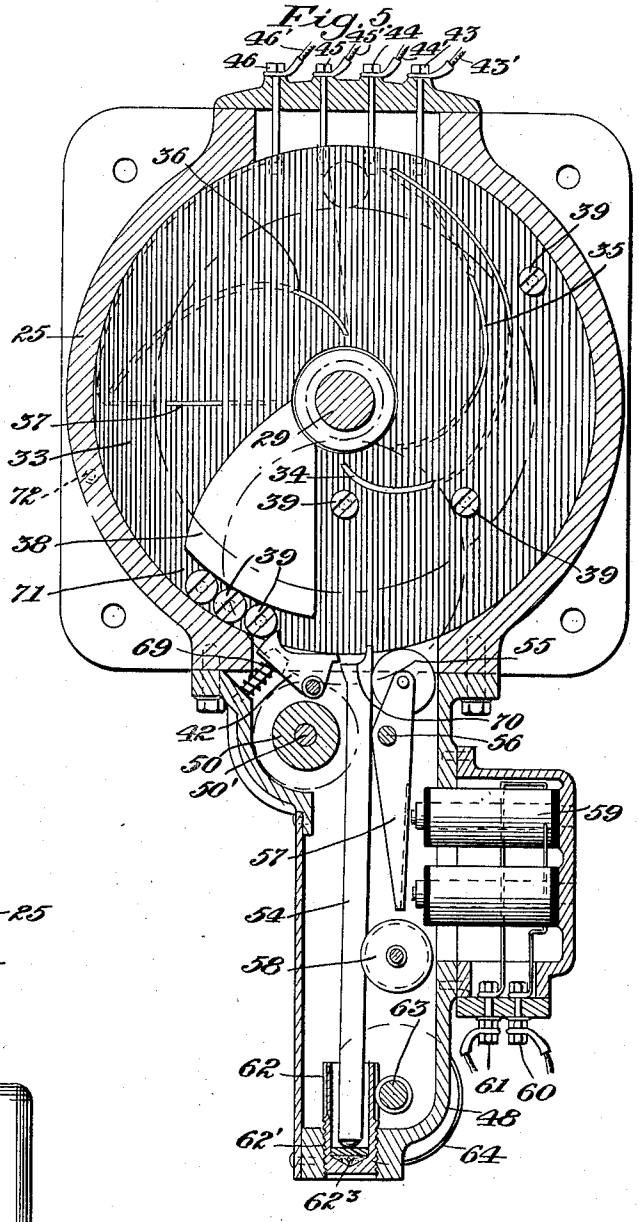



Fig. 3.

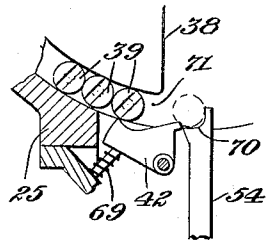



Fig. 10.

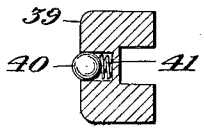
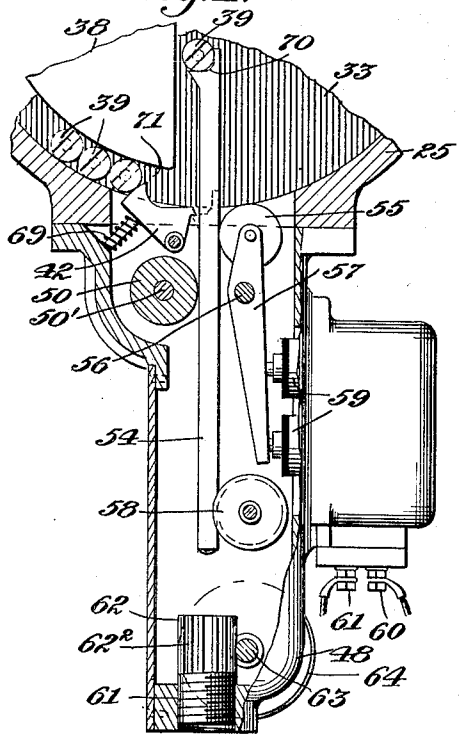



Fig. 4.




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AUTOMATIC SELECTIVE TIMING MECHANISM

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Fig. 7.

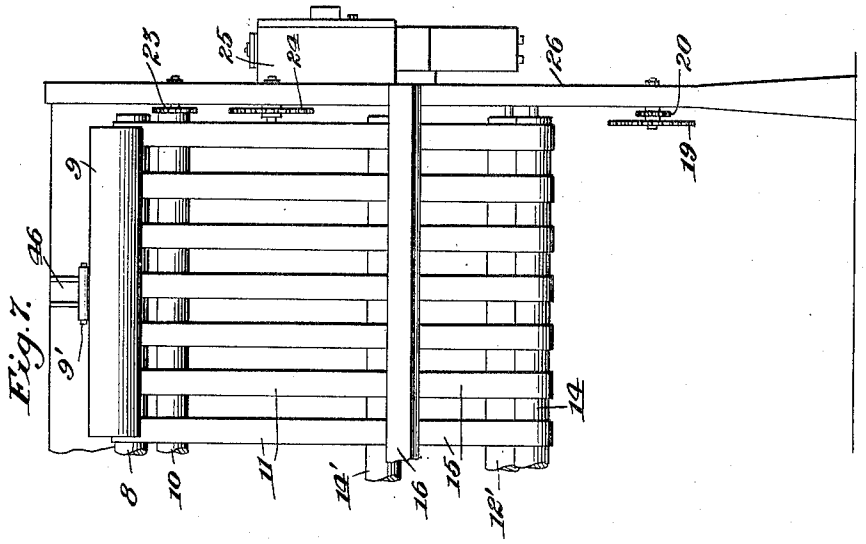


Fig. 8.

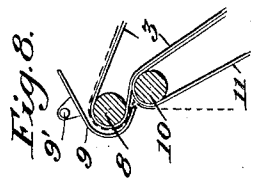
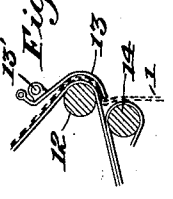


Fig. 6.



Fig. 9.



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# UNITED STATES PATENT OFFICE.

WALDEMAR F. MAYER, OF YONKERS, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS, TO GREAT EASTERN LAUNDRY MACHINERY COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

## AUTOMATIC SELECTIVE TIMING MECHANISM.

Application filed July 1, 1924, Serial No. 723,603. Renewed March 11, 1926.

*To all whom it may concern:*

Be it known that I, WALDEMAR F. MAYER, a citizen of the United States, residing at Yonkers, in the county of Westchester, State of New York, have invented certain new and useful Improvements in Automatic Selective Timing Mechanisms, of which the following is a description, reference being had to the accompanying drawing and to the figures of reference marked thereon.

My invention relates to automatic timing mechanism for folding and other machines.

The object of the invention is to provide an improved timing mechanism whereby it is possible to control, in a predetermined way, the operation of machines which fold, measure, divide or cut off the material fed to them at random, as used in textile, laundry, rolling mill, paper and blue printing industries, and also in starting and stopping apparatus. The improved timer may be designed to handle every length of piece in different ways, but it will be described in the present instance in connection with a folding machine, wherein said timer will control the folding as follows: Long pieces may be folded in four equal parts; medium length pieces in three equal parts; short pieces in two equal parts. By adding an additional timing plate, the same folder can be operated so that each length of piece will be folded either in four, three or two equal parts depending on the way the timer is set.

The above objects are accomplished by the construction shown in the accompanying drawings, in which—

Figure 1 is a central vertical section of the timer;

Fig. 2 is a sectional side elevation thereof;

Fig. 3 is a detail view of the release mechanism of the timer in the act of releasing a contact button;

Fig. 4 is a sectional elevation showing mechanism for lifting the contact button to the adjusted position on its rotating carrier;

Fig. 5 is a sectional elevation of the timer at right angles to Fig. 1;

Fig. 6 is a sectional elevation of a folding machine having my improved timing mechanism, and arranged to receive articles from an ironing machine;

Fig. 7 is a fragmentary front elevation of the same;

Fig. 8 is a detail of the first folding device, and

Fig. 9 is a similar view of the second folding device,

Fig. 10 is a detail sectional view of one of the magnet buttons.

The folding machine is placed adjacent to the roller 2 at the delivery end of an ironing machine, from which the ironed articles pass to the endless tape 3 of the folding machine. These tapes 3 pass around a roller $3'$ up to and around a roller $3^2$, thence forwardly to a roller $3^3$, thence rearwardly and around the first folding roller 8, over the folding roller 10, downwardly and forwardly and under the roller $3^4$, upwardly to roller $3'$. Overlying the upper run of the tapes 3 is a series of endless tapes 5 passing around rolls 4 and $3^2$ parallel to the tapes 3 and from rolls $3^2$ back to roll $3^3$, thence inwardly and upwardly to roll $4'$, forwardly to roll $4^2$ and down to roll 4. The articles to be folded enter at roll 4 between the two sets of tapes and are carried thereby up to roll 8, over which they hang as shown at 1 in Fig. 6. Over the roll 8 is mounted the first folder blade 9 curved as shown, to fold the article inwardly between the folding rolls 8 and 10. A third set of tapes 11 extend downwardly from roll 10 to and around a lower folding roll 12, thence over a folder roll 14, around a guide roll $12'$ and upwardly to the folder roll 10 so that the article folded between rolls 8 and 10 will be carried between tapes 3 and 11 to the lower roll 12 at which point the second folder blade 13 is mounted so as to force the article between folding rolls 12 and 14, whence it passes rearwardly to a fourth set of tapes 15 which extend around roll 14 and rearwardly to and around a roll $14'$ at which point the folded articles are delivered to any suitable table 16. The folding action of the two folder blades 9 and 13 is clearly shown in Figures 8 and 9, respectively.

The folder blade 9 is pivoted on its upper side between its ends as at $9'$ to any suitable support at the underside of a solenoid 46, the plunger 73 of which is pivotally con-

nected at its lower end to the adjacent end of the folder blade 9 as shown in Fig. 6. The second folder blade 13 is pivoted in like manner as at 13′ to a suitable support and connected by a link $13^2$ to the plunger 74 of a second solenoid 47.

A measuring switch 7 is mounted at an incline below the roller 4 and is provided with a pivoted finger 6 which, at its upper end passes up between the tapes 3 and 5 so as to lie in the path of the sheets or articles passing therebetween. The lower end of the switch finger 6 works between two contacts 65 and 66 and is normally drawn away from contact 66 by a spring 7′; the article passing over the finger 6 holds the finger down and its lower end in contact with the contact 66 until the end of the article or sheet passes beyond the upper end of finger 6. The contacts 65 and 66 are connected by wires 65′ and 66′ with supply and return wires controlled by switches 67 and 68, respectively. Should it be desired to pass the sheets 1 through the folding machine without folding them, the folding blades 9 and 13 are rendered inoperative and the sheets will fall over roll 8 and down upon table 16 unfolded. The ironer, folder and timer are all mechanically connected, and therefore, travel in certain definite speed ratio.

The housing 25 of the timer mechanism is bolted to the frame 26 of the folding machine by means of bolts 27, and said timer serves to control the actuation of the folder blades 9 and 13, as will be presently described.

Within the casing 25 and its cover 30 is mounted a shaft 29 provided with a drive pinion 32 meshing with a smaller pinion 31 on a short counter shaft 31′ provided with a drive sprocket 24 driven by the sprocket chain 21 which is driven by a sprocket 17 from the ironing machine by sprocket chain 18 and sprockets 19 and 20.

The sprocket chain 21 also drives the roll $3^2$, and the roller 10 through its sprocket 23 so that both the folding machine and its timing mechanism are driven from the ironing machine. On shaft 29 there is secured a pair of contact carriers in the form of iron disks 28, 28, between which is a fixed non-electric control disk 33 of fiber or bakelite, which has a series of fixed curved contact strips 34, 35, 36 and 37 inserted therein, and exposed through both faces of the support 33, said contact strips being exposed for their full length on the gear side of the timer, but only partly exposed on the cover side of the timer, and these strips are in electric contact at their outer ends with the respective binding posts 43, 44, 45 and 46. Wires 43′, 44′ lead from posts 43, 44, to the first folder solenoid 46 (see Fig. 6) and wires 45′, 46′ lead from the posts 45, 46 to the second folder solenoid 47. The solenoid 46 is also connected by wiring to the leading in or main return wire 67′ controlled by switch 67, while solenoid 47 is wired to the return wire 68′ controlled by switch 68. The case 25 of the timer is connected by a wire $25^3$ to the main wire 67′.

The lower portion of the control disc or carrier 33 is provided with a return cam 38 on each side and between the lower edges of these two cams 38 and the bottom of the circular casing 25 are spaces forming two throats 71, in back of which is placed a plurality of loose contact buttons 39. These loose contacts 39 are permanent magnets so that they will adhere by magnetic attraction to the faces of the iron disks 28 and be carried around thereby into contact with the above described fixed contact strips 34, 35, 36 and 37 according to their adjusted distance radially toward and from the axis 29 of the iron disks. Each contact button 39 is formed as a permanent magnet so as to adhere to the iron disks, and each has mounted therein a contact ball 40 pressed outwardly by spring 41 into engagement with contact strips 34 to 37.

Below the outlet end of each of the throats 71, 71 is placed a spring pressed, pivoted detent or releaser 42, the upper ends of which project up into the path of the lowermost contact button 39, so that said buttons will be held in the throats 71 until released by detents 42. The springs 69 press the toe of each detent or trigger 42 upwardly into the path of the contact buttons 39, while the opposite or heel end is raised to release a contact button 39, by means of what I term measuring plungers 54, 54′, the upper ends of which plungers are provided with a recess 70, the lower wall of which engages the detents 42 to release a contact button 39, which button adhering to the iron disk 28 will be moved into the recess 70, at which moment the measuring plunger 54 will move upwardly and carry the magnet contact button 39 to the position it is to occupy relative to the contact strips 34 to 37. The upward movement of the plungers 54 is effected by means of the friction driven rolls 50, 50 (see Figures 4 and 5) and the pressure rolls 55, 55 mounted on the upper ends of armature levers 57 pivoted between their ends as at 56. Each armature lever 57 is moved outwardly at its lower end by the energizing of the timer solenoid 59, through its connection 60, 61 with the measuring switch 7. The friction rolls 50, 50 are driven from shaft 29 by means of a pinion 53 thereon which meshes with a large pinion 52 which in turn meshes with a smaller pinion 51 on the shaft 50′ of the friction rolls 50. The plungers 54 are held to travel in a straight line by means of lower guide rolls 58, 58. When a plunger 54 is released after having raised a contact button 39 to the proper extent

radially upon the iron disk 28, it will drop by gravity, its lower end entering one of the cushioning cups or pockets 62. These cups 62 are mounted in threaded bearings 62′ in the bottom of the casing 48, and each has a worm gear $62^2$ formed upon it and engaged by a worm shaft 63 having an exterior operating handle by means of which the cups may be adjusted up or down to bring the upper ends of the plungers 54, 54 into proper relation to the triggers or detents 42 and the contact buttons 39. The bottoms of the adjusting cups 62 contain a suitable material $62^3$ to cushion the plungers 54, 54 in their fall.

The operation briefly stated is as follows— A sheet 1 upon entering the folding machine, tips the finger 6 forwardly thereby making contact at 65, 66. The current entering at main switch 67 passes through timer solenoid 59 and back into line 68. The solenoid 59 is kept energized as long as the sheet depresses the contact finger 6. The energized solenoid 59 attracts the armature lever and presses the measuring plunger 54, by means of pressure roll 55, against the revolving friction feed roll 50, which starts the measuring plunger in its upward motion. Then the upwardly moving plunger engages the trigger or detent which causes it to release one contact button 39 and block the rest of them. Spring 69 returns the trigger or detent as shown in Fig. 4. When a contact button is so released, it will be carried by the iron disk 28 at a higher rate of speed than the motion of the plunger and is caught by the recess 70 of the plunger as shown in Fig. 3. The contact button is carried upward as long as the sheet 1 passes over switch finger 6, and the moment that the passing edge of the sheet breaks the contact 65, 66, the solenoid 59 will be deenergized whereupon the roll 55 will be relieved of pressure and plunger 54 will drop from its raised position (Fig. 4) to its down position shown in Fig. 5, this leaving the contact button in its elevated position, and carried around by the iron disk to which it is held by magnetic force. The button so positioned will first cross the contact strip 3, and it will be carried around on the same circle till it strikes the return cam which will guide it back radially and concentrically into the throat 71 where it will be stopped by the button ahead of it, the iron disk continuing to revolve.

The contact strips are laid out so that by the time the released button 39 reaches strip 34, the sheet 1 will have traveled over the roll 8 a certain predetermined length, for instance, half its original length. When the ball 40 of contact button 39 touches the strip 34, it closes the electric circuit. The current entering the timer housing at 72 from line 67 passes through casing, shaft and iron disk 28, through magnetic button 39, spring 41, ball 40, strip 34, to terminal 43, thence to first fold solenoid 46 energizing the plunger 73, and back to the line 68′. The energized plunger 73 swings the folder blade 9 at the proper moment into the folding position as shown in Fig. 8. As the contact button 39 passes from strip 34, plunger 73 will be de-energized and it drops back and opens the folder blade 9 again.

The singly folded sheet 1 is then carried over roll 12 and when the quarter length of the original sheet length passes over, the button 39 will have arrived at the contact strip 36 which closes the electric circuits 67′, 72, 45, 47 and 68′, thereby energizing the second fold solenoid 47, which actuates plunger 74 to throw the second folder blade 13 into its operative position thereby forcing the sheet between rolls 12 and 14, from which it will be delivered, doubly folded in four equal parts to the table 16.

It is obvious that the same length of sheet will cause the contact button 39 to travel in the same circular path, but should a sheet of medium length pass the measuring switch 6, 7, the plunger 54 will not be fed as high as it was by the former long sheet. The passing shorter sheet will break the circuit of solenoid 59 earlier and let the plunger 54 drop, thus releasing the button 39 on its path indicated in Fig. 5 where the button in its new position is indicated at 39′. When the button 39′ reaches strip 35, the sheet hangs two-thirds of its original length over roll 8 and the blade 9 folds it in that position because button 39′ closes the circuit of solenoid 46. When the button 39′ reaches strip 37, circuit for solenoid 47 is closed and at that time one-third of original sheet length is hanging over roll 12 whereupon blade 13 will be actuated from the solenoid 47 and make the second fold and the sheet will be delivered, folded in three equal parts, upon the table 16.

A short piece will cause the plunger 54 to feed the button a short distance radially upon the iron disk and the plunger then releases it to travel on the circular path as indicated by the path of the button indicated by $39^2$ in Fig. 5, passing only strip 34, and therefore, making one fold only. It will be seen therefore, that the length of the sheet passing over switch 6, 7 causes the buttons to be fed to the iron disks a distance depending upon the length of the sheet; the buttons thus traveling in different circular paths. The revolving iron disk will bring the button at certain intervals in contact with the strips, actuating the solenoids which may be employed to perform any function desired, folding blades being the parts so actuated herein.

The other side of the control disk 28 is laid out with continuous strips of which either

34 and 36 are operative to give quarter folds for all lengths of sheets, or strips 35 and 37 are made operative to give folds so that all sheets are folded in three equal parts. By simply turning switch 75 over to the dotted position 76 the solenoid 59 for the second plunger 54' is rendered operative and solenoid 59 is rendered inoperative.

Contact buttons shiftable along the face of a rotary carrier toward and from the axis to vary the circular paths does away with and greatly simplifies the previously known constructions in which contacts were alternately connected to the peripheries of wheels of different speeds.

While I have shown the timer operatively connected with a folding machine, I do not restrict myself to such use, as it may be used in connection with various machines where such a mechanism is required. Nor do I restrict myself to the particular construction of parts shown, as these may be widely varied without departing from the spirit of my invention.

I have termed the contacts 39, buttons, merely for clearness in referring to them, and do not thereby restrict myself to any particular configuration of such contacts.

It will be understood that a broad feature of my invention includes the shifting of the contact buttons in any direction on the face of a rotary character. It would be within the purview of my invention to create a magnetic field through the whole timing device, under which conditions plain steel buttons would adhere to the iron disks in any adjusted position. Should the rotary carriers be arranged horizontally, the buttons might be shiftably held by friction alone, by making the revolving side surface of larger frictional resistance than the contact side. Or, if desired, the buttons might be held to the carrier by suction or vacuum.

Having thus described the invention, what I claim as new and desire to secure by Letters-Patent, is—

1. The combination of timing mechanism; of a rotary contact carrier and a contact button held on the face of the carrier and shiftable in any direction on the face of said carrier.

2. The combination in a timing mechanism, with a rotary contact carrier and a support adjacent to one face thereof provided with fixed contacts, of a plurality of contact buttons adapted to be picked up by the rotary contact carrier and held movably to the face thereof, and means for shifting the contact buttons along the face of the rotary carrier toward and from the axis and into operative relation with certain of the fixed contacts.

3. The combination in a timing mechanism, with a rotary contact carrier and a support adjacent to one face of said carrier provided with fixed contacts, of a plurality of contact buttons adapted to be picked up by said rotary carrier and held movably to the face thereof, means for successively releasing said carriers to the rotary action of said carrier, and means for shifting the released contact button toward the axis of the rotary carrier, and means for returning the said contact to its original position.

4. The combination in a timing mechanism with a rotary contact carrier and a support adjacent to one face of said carrier provided with fixed contacts, of a plurality of contact buttons between which and said rotary carrier magnetic relation exists to cause the contact buttons to adhere movably to the face of the rotary carrier in any adjusted position, means for releasing one contact button at a time to the action of the rotary carrier, means for shifting the button movably along the face of the rotary carrier to a predetermined position in proper relation to any one of said fixed contacts, and means for returning the contact button to its original position.

5. The combination in a timing mechanism with a rotary iron contact carrier, and a fixed support parallel to one face thereof and having a series of spaced fixed contacts, of a series of loose permanent magnets having contact points for engagement with said spaced fixed contacts, means for successively releasing said magnets to permit them to be picked up by the adjacent face of the iron disk, and carried thereby in a circular path into electric contact with the said fixed spaced contacts.

6. The combination in a timing mechanism with a rotary iron contact carrier, and a fixed support parallel to one face of said iron contact carrier, a series of fixed spaced contacts on said fixed support next to the face of the iron contact carrier, of a series of permanent magnets past which the face of the iron contact carrier travels, means for releasing one of said magnets at a time to the pick up action of the rotary carrier, means for shifting the magnet, so picked up radially along the face of said iron carrier into operative relation to any of said fixed contacts, and means for returning the magnet so released back to its original position.

7. The combination in a timing mechanism with parallel rotary contact carriers, and an intermediate control member having contact blades on its two faces variably spaced and exposed, of two series of movable contact buttons adapted to be picked up by the inner faces of the respective rotary carriers and carried into contact with said fixed contact blades, means for releasing the contact buttons of either series to the pick up action of the respective rotary carriers, and means for shifting the released button

of either series radially on the face of its rotary carrier, and means for returning the button so carried back to its original position.

8. The combination in a timing mechanism, with a rotating iron contact carrier and a control member having fixed contact blades variably spaced next to one face of the said rotary carrier, a series of permanent contact forming magnets adapted to be picked up by the face of said rotating carrier and carried into contact with the proper contact blades, a trigger or detent in the path of the magnets, a plunger adapted to actuate the said trigger or detent and release one of the magnets and in its further movement move the magnet radially along the face of the rotary carrier a predetermined distance to make contact with the proper fixed contact blade, and means for returning the magnet back to its original position.

9. The combination in a timing mechanism, with two parallel rotating iron contact carriers, and an intermediate member having contact blades variably spaced and exposed on both sides, of a series of loose permanent contact forming magnets adapted to be picked up by the inner faces of the respective iron contact carriers and carried thereby into contact with the proper contact blades, triggers or detents in the paths of said contact forming magnets, plungers held to move vertically and first actuate the trigger or detent to release a contact magnet and then in its further upward movement move the contact magnet radially along the face of the rotary carrier a predetermined distance to contact with the proper fixed contact blade, means for throwing either of said plungers into operation, and means for returning the contact magnet back to its original position.

10. The combination in a timing mechanism, with the rotary contact carrier, and a series of loose contacts co-acting therewith at the lower side thereof, of a plunger adapted at its upper end to receive and move a loose contact radially along the face of said rotary carrier a predetermined distance, a rotary drive wheel at one side of the plunger to raise it, and normally out of operative relation therewith, and an electrically controlled device for throwing the plunger into operative relation with said drive wheel and releasing it at predetermined time.

11. The combination, in a timing mechanism, with a rotary contact carrier and a series of loose contacts therebelow and constructed to be picked up by said carrier, of a plunger adapted at its upper end to move a loose contact radially to different positions on said rotary carrier, a drive wheel adjacent to one side of said plunger, an armature lever pivoted at the opposite side of said plunger, an armature lever to force the plunger into engagement with the drive wheel, and a solenoid for actuating and releasing the plunger operating armature lever.

12. The combination, in a timing mechanism, with a rotary contact carrier and a contact button slidingly held on one face of the said carrier, of a plunger adapted to move the said contact radially on said carrier to predetermined positions, means for raising and releasing the plunger and a vertically adjustable cup to receive the lower end of the falling plunger.

13. The combination, in a timing mechanism, of a rotary contact carrier and contact buttons magnetically held and shiftable upon a face of said rotary carrier and each having a spring pressed contact on its side opposite the part engaging the carrier.

14. The combination, in a timing mechanism, of a rotary contact carrier, and a contact button magnetically held to one face of the carrier and shiftable radially thereon, and a spring pressed ball in the button opposite its end engaging the rotary carrier.

15. The combination, in a timing mechanism, of a rotary iron disk, and a contact button constructed as a permanent magnet to adhere at one end to a face of the disk and shiftable radially thereon, said magnet having a spring pressed contact at its opposite end.

16. The combination with a machine provided with means for carrying an article therethrough and provided with a switch controlled by the passing article, means for acting upon the article after it passes and opens the switch, solenoids for actuating the means acting upon the article, and a timing mechanism having fixed contacts electrically connected to said solenoid, a rotary contact carrier adjacent to said contacts, radially shiftable contact buttons adapted to be picked up and carried by the rotary contact carrier, electrically controlled means for shifting the contact buttons to bring them into operative relation with the fixed contacts and in the line controlled from the article operated switch.

17. The combination in a timing mechanism, with the vertically operating plunger for actuating the movable contact buttons, of a vertically adjustable cup to receive the lower end of the plunger, said cup having a screw threaded engagement with a supporting element and provided therebeyond with a worm and a manually operable worm shaft engaging said worm to adjust said cup and the plunger resting therein.

18. The combination with a folding machine including a series of sheet carriers, sheet folding rolls and folder blades to press the sheets to the rolls for successive folding operations, electically controlled means for

actuating the folder blades, an article controlled switch in the path of the article, a timing mechanism having a driven rotary contact carrier, loose magnetic contact buttons supported adjacent to the face of the rotary carrier at its lower edge and constructed to be successively picked up and carried around by said carrier, fixed spaced contacts adjacent to the face of said rotary carrier, electrically controlled shifting means for moving the said contact buttons radially on the face of the rotary carrier to engage the proper fixed contact said shifting means being in turn controlled from the article controlled switch and said fixed contacts being in circuit with electric controls of the folder blades.

19. The combination in a timing mechanism with the vertically operating plunger for actuating the movable contact buttons, of a vertically adjustable cup to receive the lower end of the plunger, said cup having a screw threaded engagement with a supporting element and provided therebeyond with a worm and a manually operable worm shaft engaging said worm to adjust said cup and the plunger resting therein, a trigger or detent to release the contact buttons one at a time and operable by the above contact button shifting means, and means for returning the contact buttons to their original position for succeeding operations by said rotary carrier.

20. A timing mechanism comprising a suitable casing, a driven shaft journaled transversely in the upper portion of the casing, two parallel iron disks secured to said shaft, a control disk mounted between said iron disks and provided with curved spaced fixed contact blades exposed for different lengths at opposite sides of said control disk, binding posts at the outer ends of said fixed contact blades, return cams, a throat below the cams, two series of magnetic contact buttons mounted in said throats, two pivoted spring pressed triggers or detents, one end of each of which lies in the path of said contact buttons, a lower casing depending from the bottom of the first-named casing, plunger actuating wheels driven from the shaft of the rotary iron disks, vertically movable plungers adjacent to said two wheels, armature levers pivoted alongside said plungers and movable at their upper ends toward said plungers to force them into operative contact with said plunger actuating wheels, electro-magnetic means for actuating the lower ends of the armature levers and binding posts connected to said electro-magnetic means, the upper ends of the plungers first actuating the triggers to release a contact button and then receiving the contact button so released and carried by the iron disk and secondly moving said contact button radially along the iron disk to a predetermined position relative to any of the fixed contact blades.

In testimony whereof, I affix my signature.

WALDEMAR F. MAYER.