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[33] Switzerland
[31] 16377/67

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[54] MOTION-CONVERTING MECHANISM 16 Claims, 25 Drawing Figs.

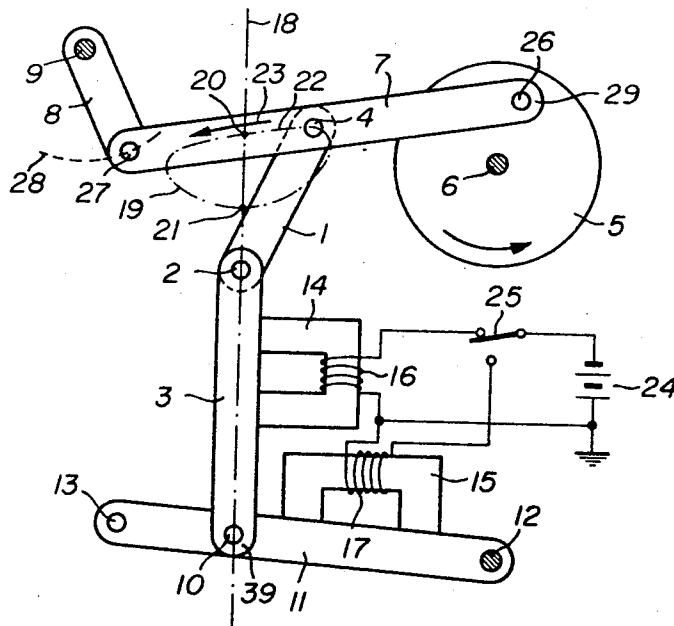
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575, 42, 45

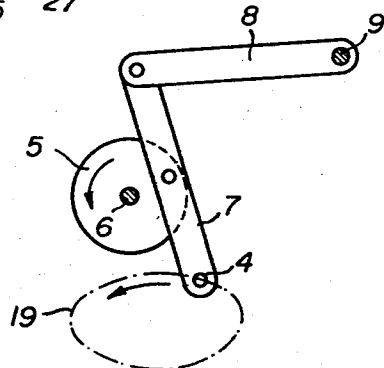
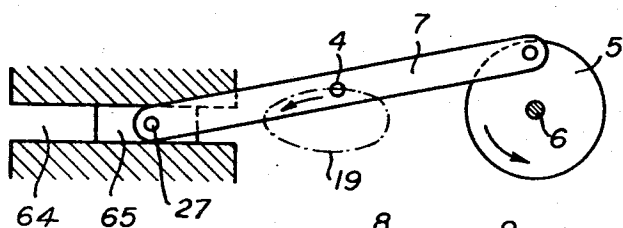
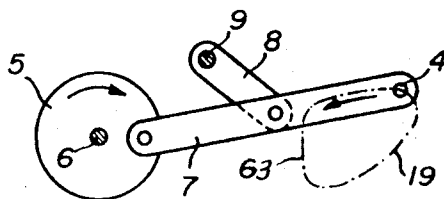
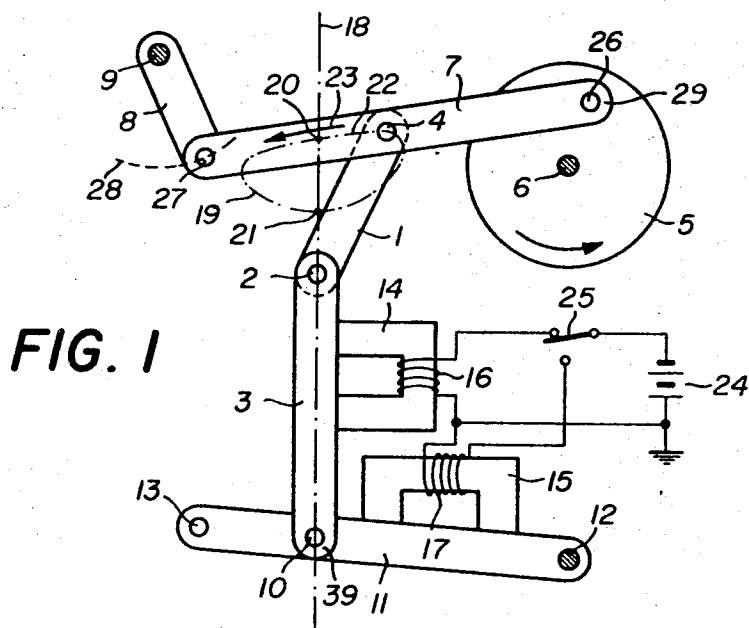
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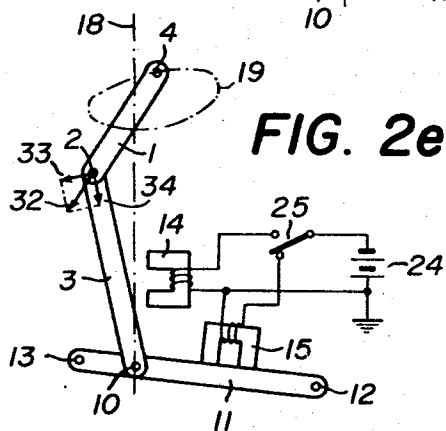
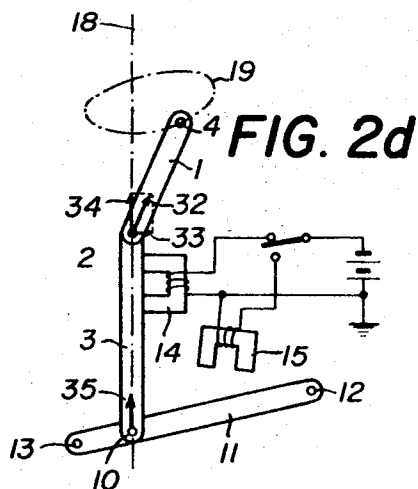
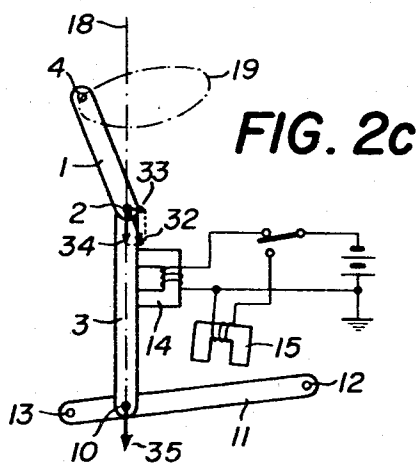
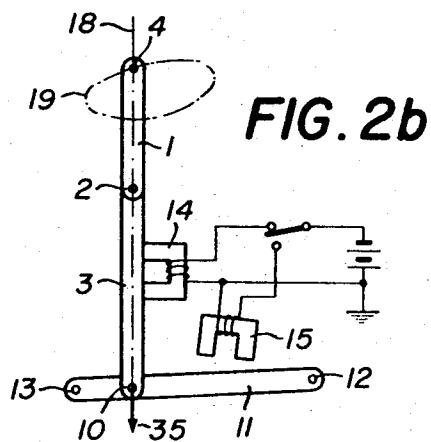
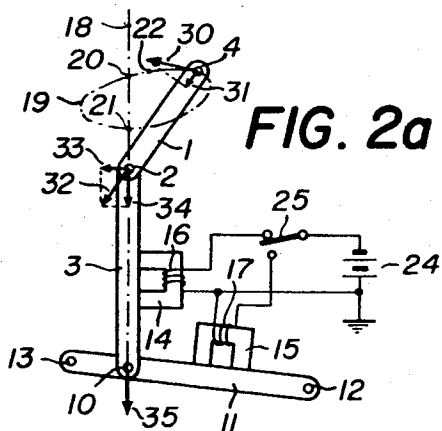
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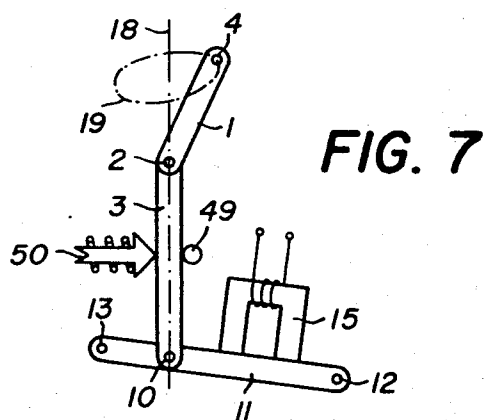
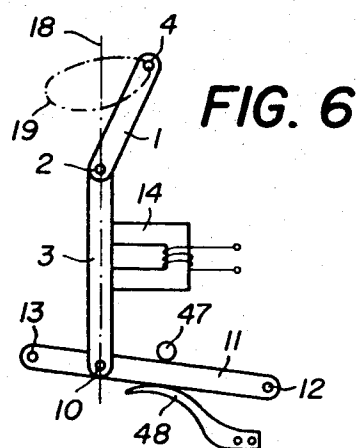
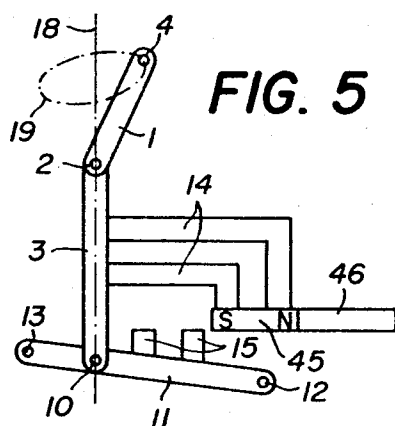
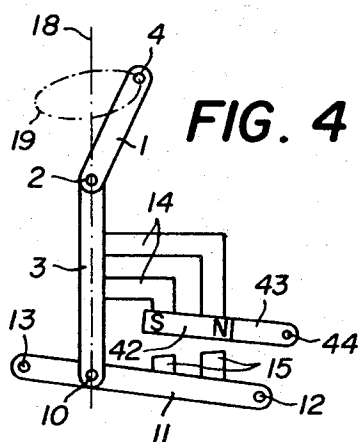
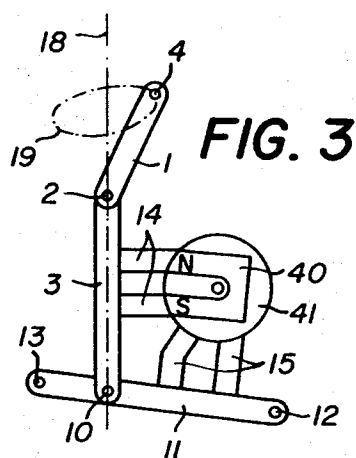
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ABSTRACT: A mechanism for converting the continuous rotational motion of a crankpin into an alternating motion of a lever by means of two hinged levers, the free end of one lever being connected to the crankpin and the free end of the other lever able to move along a substantially rectilinear path (output). The connection between the crankpin and the free end of the first lever is such that the latter may describe cyclically a closed drive path located on opposite sides of the extended rectilinear path described by the free end of the second lever. Two holding members act respectively on the second lever to prevent it from moving otherwise than by a sliding motion along the latter rectilinear path, and on the guide element to immobilize it at a fixed point coinciding with the upper end of this alternating motion. Either one or the other of the holding members is made operative and the first is arranged so as to form, when energized an abutment against which the second lever can back on to as soon as the free end of the first lever has crossed the rectilinear path (working stroke), and from which the second lever may move away when it is not energized by pivoting about the fixed point (idle stroke).









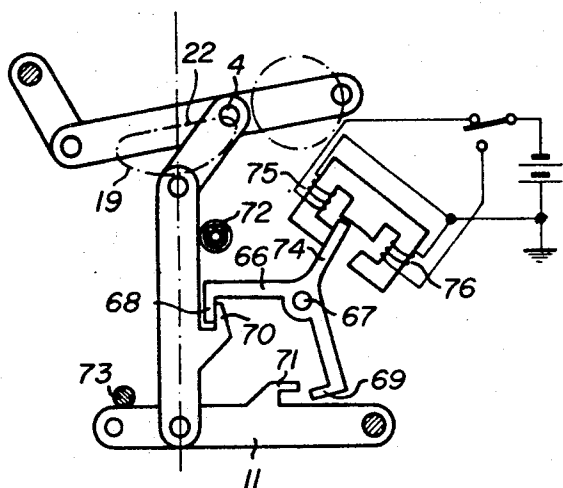


FIG. 8

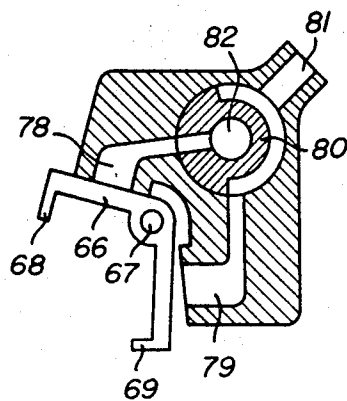


FIG. 9

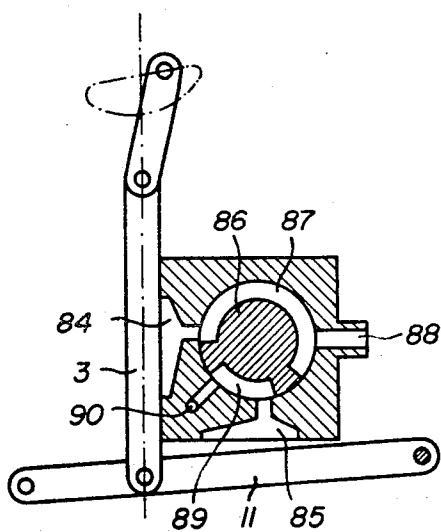


FIG. 10a

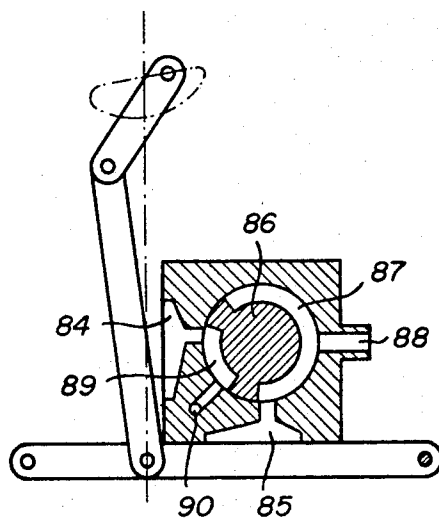


FIG. 10b

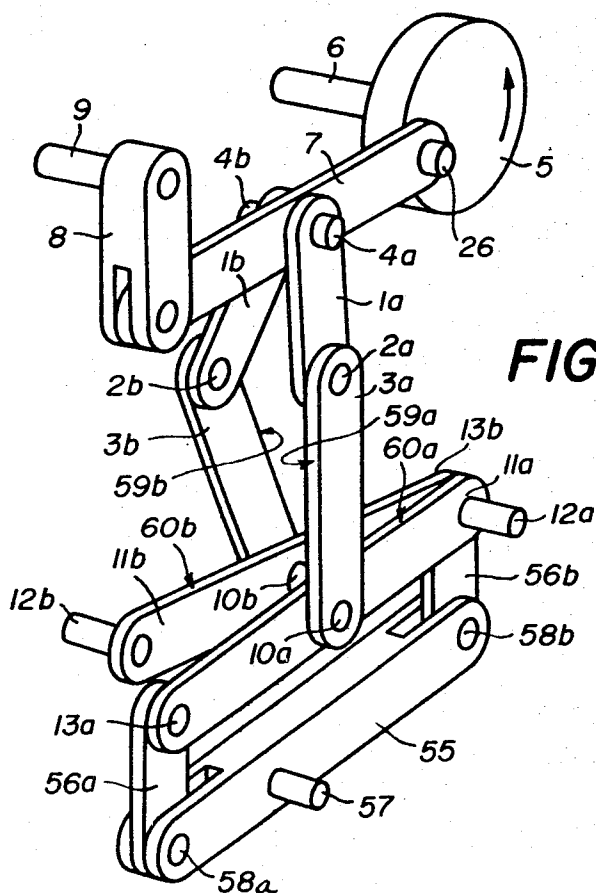


FIG. II

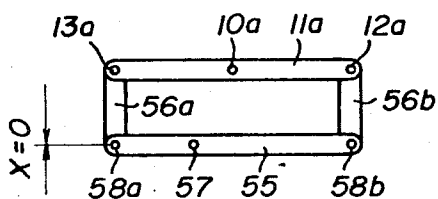


FIG. 12a

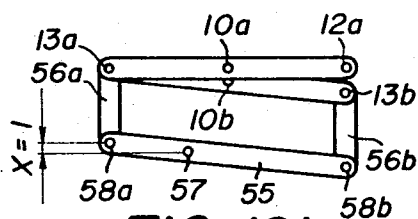


FIG. 12b

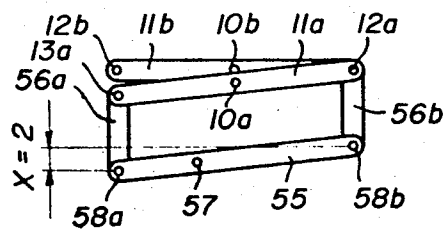


FIG. 12c

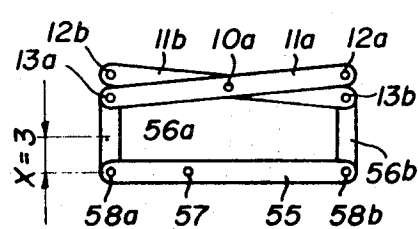


FIG. 12d

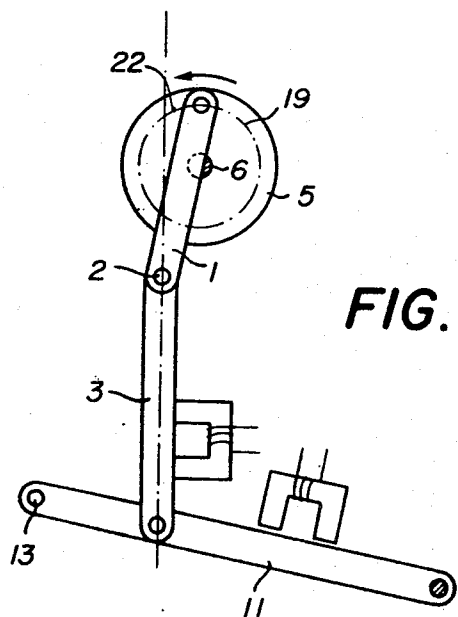


FIG. 16

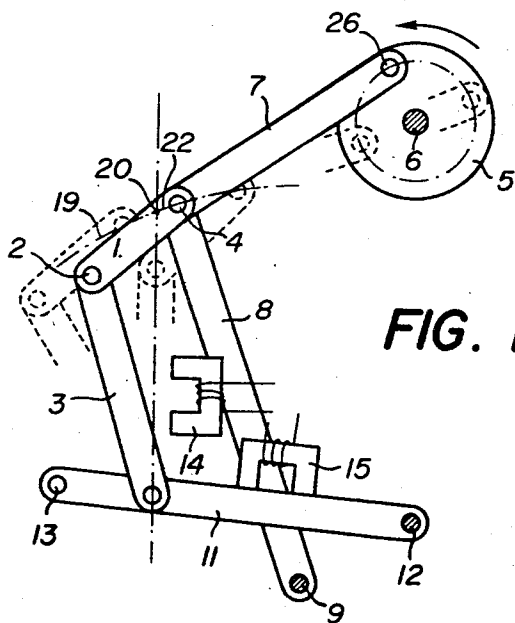


FIG. 17

MOTION-CONVERTING MECHANISM

DISCLOSURE

This invention provides a converting mechanism for transforming continuous rotational motion into alternating motion, which comprises an input shaft that carries at least one eccentric pivot pin, and at least one pair of levers hinged to one another at one of their ends by a central hinge, the free end of a first of said levers being connected to said eccentric pivot pin and the free end of the second of said levers being connected to a blocking element which guides this latter end along a substantially rectilinear path delimited by a top dead point and a bottom dead point.

There are to be found numerous known mechanisms of this kind, in particular in keypunch machines, in presses and sewing machines, and they are all designed to enable selective interruption of the alternative motion without it being necessary to interrupt the continuous rotational motion of the input shaft, since the pair of hinged levers constitutes as it were a bendable rod arranged between a crankpin secured to said input shaft and an output member performing a to-and-fro alternating motion. As long as the rod is prevented somehow from bending or as long as the lever which is connected to the output member is made to move along a straight line, the device imparts to the output member the required to-and-fro motion; but as soon as the rod can bend or as soon as the lever that is connected to the output member is allowed to move out of the path of travel of the output member, the alternating motion ceases to be transmitted. However, in the known devices, the means for keeping the rod stiff are required to perform their stiffening function during at least half of each revolution of the input shaft, i.e., the half during which the rod exerts a thrust on the output member. Consequently, the motion of the output member can be interrupted at any instant of its cycle, even when a portion of this cycle has already taken place. The fact that when the mechanism is operative the stiffening means are required to perform their function for at least half a cycle, thus are required either to be mobile and accompany the lever in its movement, or perform their function without preventing the latter from moving, complicates the design; and the fact that the alternating motion of the output member can be interrupted at any instant of its cycle does not make it possible to have the output member carry out with complete certainty a single cycle without taking special precautions for accurately synchronizing the beginning and the end of the period during which the stiffening means are operative.

The mechanism provided by the present invention does not suffer from these drawbacks. It is characterized in that the connection between the eccentric pivot pin and the free end of the first lever being so arranged that, upon rotation of the input shaft, this free end describes, from a periodic motion, a drive path which meets said rectilinear path at at least one point of intersection such that, upon this free end reaching said one point, the two levers are in alignment along said rectilinear path, said motion taking place in a direction such that this point of intersection may be reached after the free end of the second lever has crossed said top dead point, in that it comprises two holding members associated with said pair of hinged levers and operating in mutually excluding relationship, the first being able, when operative, to hold the free end of the second lever immobilized at a fixed point which coincides with said top dead point and the second being able, when operative, to compel the second lever to remain aligned along said rectilinear path, control means being provided for selectively rendering one of said holding members operative to the exclusion of the other, and vice versa, this operative state being brought about before the free end of the second lever has reached said top dead point and being maintained at least until the free end of the first lever has crossed said point of intersection, so that, when the first holding member is operative, said pair of levers may carry out an idle stroke during which the second lever may pivot about said fixed point, and so that, when the second holding member is operative, said pair of

levers may carry out a working stroke during which the blocking element performs a to-and-fro motion between the top dead point and the bottom dead point.

The accompanying drawings illustrate by way of example two embodiments of the amplifying converter mechanism provided by the invention, and also a number of variants. In the drawings:

FIG. 1 illustrates the first embodiment;

FIGS. 2a to 2e diagrammatically illustrate the operation thereof;

FIGS. 3 to 5 illustrate three magnetic variants of a particular element of this first embodiment;

FIGS. 6 and 7 illustrate two magnetomechanical variants of this same particular element;

FIG. 8 diagrammatically illustrates a mechanical variant of this particular element;

FIG. 9 illustrates pneumatic means for actuating the particular element diagrammatically illustrated in FIG. 8;

FIGS. 10a and 10b illustrate, in two operative positions, a pneumatic variant of this selfsame particular element;

FIG. 11 is a perspective view illustrating the second embodiment;

FIGS. 12a to 12d diagrammatically illustrate its operation; and

FIGS. 13 to 17 illustrate five variants regarding the manner in which the mechanism is driven.

The mechanism shown in FIG. 1 comprises a selection stage consisting of a first lever 1 which is hinged, via a central hinge 2, to a second lever 3. The end of lever 1 is provided with a driving pin 4 through which it is indirectly connected to an eccentric pin 26 carried by a disc 5 which is continuously rotated by a drive shaft 6. This connection is indirect inasmuch as it is made through a driving rod 7 of which one end 29 is driven by the eccentric pin 26 and of which the other end 27 is hinged to an oscillating lever 8 which pivots about a fixed point 9 and which obliges the end 27 to describe an arc 28. The end 39 of lever 3 is connected by an immobilizing pin 10 to a blocking element 11 consisting of a lever which pivots about a fixed point 12. The end 13 of this lever 11 provides the output of the selection stage, whereas the drive shaft 6 provides the input of the mechanism. This selection stage comprises moreover holding means consisting of two holding members 14 and 15. The latter are electromagnets which are energized by windings 16 and 17 and levers 3 and 11, with which they respectively cooperate, are made, at least in part, of a ferromagnetic material. The holding member 14 is so arranged that, when it is energized, it will prevent the lever 3 from describing a motion other than a simple, practically rectilinear, reciprocatory motion along an axis 18 passing through the immobilizing pin 10 and through the central hinge 2. The holding member 15 is so arranged that, when it is energized, it will prevent the blocking element 11 from moving about pin 12 and keep the immobilizing pin 10 fixed in the position shown in FIG. 1. The relative position of the linkage formed by the two levers 1 and 3 in relation to the axis of plate 5 is so chosen that the axis of sliding 18 may meet the drive path 19 described by pin 4 at two points: an upper point 20, remote from immobilizing pin 10, an a lower point 21, nearer said locking pin 10. Further, this relative position is so chosen that the instantaneous speed of the driving pin 4, when being moved in the direction of arrow 23 along path 19, may have, at least along the portion 22 immediately preceeding the upper point 20, a centripetal component directed towards the central hinge 2.

As for windings 16 and 17 they are connected to a source of electric current 24 through the intermediary of a switch 25 for selectively supplying one or other of the windings but never both together, so that they operate in a mutually excluding relationship.

The operation of the mechanism is as follows. Let us consider the motion of the driving pin 4 starting from the moment it occupies the position shown in FIG. 2a and let us suppose that the holding member 14 is energized with its winding 16 being supplied by source 24 in accordance with the position

occupied by switch 25. In that case, holding member 15 is inoperative. The driving pin 4 is located at the beginning of section 22 and its instantaneous velocity, represented by arrow 30, has a centripetal component 31 directed towards the central hinge 2. This centripetal component 31 produces a force 32 that is applied to the central hinge 2, which force in turn can be decomposed into two components, one 33, which extends transversely to the lever 3, the other 34, which extends longitudinally of this lever 3. Since holding member 14 is operative and holding member 15 is inoperative, the transverse component 33 of this force 32 is balanced by that exerted by the holding member 14. As for the longitudinal component 34, it is not balanced so that lever 3 performs the only movement which it is allowed to do, i.e., a longitudinal sliding motion along axis 18, this sliding motion being represented by arrow 35. The blocking element 11 pivots about its pin 12 and reaches, when the driving pin 4 crosses axis 18, the position that is represented in thick lines in FIG. 2b. At that instant, the levers 1 and 3 are in alignment with one another. As the motion of the driving pin 4 continues, the linkage takes on the appearance shown in FIG. 2c. The transverse component 33 of force 32 is now directed towards the holding member 14, which thus acts as a natural abutment. The energization of the latter can thus be interrupted without disturbing the subsequent motion of the linkage since a self-locking action occurs on the part of lever 3 against holding member 14. The blocking element 11 continues its motion under the action of longitudinal force 34, then begins to move back when the driving pivot 4 enters upon the ascending portion of its drive path 19, since, from then on, force 32, which was directed away from driving pin 4, is reversed so as to be directed towards the latter, but the transverse component 33 remains directed towards the holding member 14, as shown in FIG. 2d. Once the driving pin 4 has returned back to the position it occupied in FIG. 2a, a fresh cycle will begin, provided the holding member 14 is reenergized before the instantaneous speed acquires a centripetal component.

It will thus be observed that as long as holding member 14 is operative, the output 13 of the selection stage thus performs a working stroke. It will also be observed that the holding member 14 need only be operative during part of the motion of the driving pin 4, i.e., that part which begins when the instantaneous speed of the driving pin 4 acquires a centripetal component and which ends when this driving pin 4 crosses axis 18. During the remainder of the cycle, the holding member 14 can be made inoperative since the lever 3 finds itself self-locked against the holding member 14.

If it is now supposed that it is the holding member 15 which is made operative, with holding member 14 left inoperative, the transverse component 33 of force 32 produced by the centripetal component 31 of the instantaneous velocity 30 of driving pin 4 will cause the central hinge 2 to turn and the lever 3 to move away from the holding member 14, whereas the blocking element 11 remains blocked against the operative holding member 15 as shown in FIG. 2e. The immobilizing pin 10 remains stationary, as also the output 13 of the selection stage. In this instance, the selection stage can be said to carry out an idle stroke. As in the previous instance, the energization of the holding member 15 may be interrupted during part of the cycle, to wit as soon as the driving pin 4 has crossed the lower point 21 of its path of travel 19.

It will thus be observed that with a mechanism thus constructed it is possible selectively either to transform the continuous rotational motion of the drive shaft 6 into a to-and-fro alternating motion of the output 13 or to immobilize this output, depending on whether it is the holding member 14 or the holding member 15 that is rendered operative. Moreover, the operative and inoperative functions of the two holding members can be permutated at each revolution of the drive shaft 6 during that fraction of the revolution when the driving pin 4 is traveling along the portion of its drive path which lies between the lower point 21 and the point where its instantaneous speed acquires a centripetal component. In particular, the selection

stage can be made to perform successively a working stroke and an idle stroke, this alternation occurring at each revolution of the drive shaft 6.

It will be observed that the mechanism is able to operate intermittently and that, in the course of each intermittence, its output can carry out a whole number of to-and-fro movements, which whole number can be as small as one; further, a to-and-fro motion always includes a complete outward movement and a complete return movement, the output 13 always stopping at the end of its journey and never part of the way. In other words, the mechanism has an "intermittent stroke-by-stroke action." It will also be observed that the instant at which the holding member 14 is rendered operative is of no consequence provided that this operative state be maintained for a duration which includes the time taken by the driving pin 4 to travel over section 22 of its path of travel.

Although the end 13 of the blocking element 11 has been called the "output" of the selection stage, clearly any other point of this blocking element can act as the output, in particular the immobilizing pin 10 itself.

FIGS. 3 to 5 illustrate variants concerned with the magnetic type holding members. Instead of resorting to electromagnets, i.e. ferromagnetic circuits energized by windings through which flow electric currents, they can be made to consist of magnetic circuits energized by a permanent magnet. In FIG. 3, for instance, a permanent magnet 40 is mounted on a rotary component 41 which enables it to energize either the magnetic circuit 14 or the magnetic circuit 15. This rotary component 41 forms, as does switch 25 in FIG. 1, a control means for selectively energizing either one or the other of the holding members 14 and 15.

In the variant illustrated in FIG. 4, a permanent energization magnet 42 is mounted on a pivotal component 43 which is able, by pivoting about a stationary pin 44, to energize either one or other of the magnetic circuits 14 and 15.

In the variant illustrated in FIG. 5, a permanent magnet 45 is mounted on a sliding component 46 which enables it to occupy two positions: in one of these positions it energizes the magnetic circuit 14 and in the other it energizes the magnetic circuit 15.

In the variants illustrated in FIGS. 6 and 7, the holding means are of a mixed kind, i.e. that one of the holding members is electromagnetic, whereas the other is of the elastic type. Thus in FIG. 6, the holding member which is intended to cooperate with lever 3 consists of a magnetic circuit 14, whereas the holding member which cooperates with the blocking element 11 consists of an abutment 47 associated with a spring blade 48. The stiffness of this spring blade 48 must be such that it holds in position the blocking element 11 when the magnetic circuit 14 is nonoperative and that it yields elastically when this circuit is made operative.

In the variant illustrated in FIG. 7, it is the holding member that cooperates with lever 3 which is of the elastic type, whereas the holding member 15 which is intended to cooperate with the blocking element 11 is of the electromagnetic type. The elastic holding member consists of an abutment 49 associated with an elastic pusher member 50.

All of the above described variants are either electromechanical (FIGS. 1, 6 and 7) or magnetomechanical (FIGS. 3, 4 and 5) inasmuch as at least one of the holding members operates by magnetic action, whether this magnetic action be generated by an electric current (electromechanical variants) or by a permanent magnet (magnetomechanical variants). But variants of other types may also be designed, which do not resort to magnetic action.

Thus, FIG. 8 illustrates a purely mechanical variant wherein the holding means comprises a rocker 66 pivotally mounted on a pin 67 and provided with two lugs 68 and 69 able to cooperate with two hooks 70 and 71 respectively carried by the lever 3 of the linkage and by the blocking element 11. The length of the hook 70 is such that it remains in engagement with the lug 68 at least while the driving pin 4 is travelling along portion 22 of its drive path 19. As with the preceding

variants, the holding members, here lugs 68 and 69, can themselves act as abutments; but the friction which would result from this could hinder the pivotal action of the rocker 66. That is why it is of advantage to provide separate abutments 72 and 73 on which the lever 3 and the blocking component 11 respectively come to bear. Since the lever 3 must be able to slide along this abutment in the course of its working strokes, it is preferred to give it the form of a rotary abutment, as is apparent from FIG. 8.

It is to be noted that such a rotary abutment can with advantage also be provided in the electromechanical or the magnetomechanical variants (FIG. 1 and 3 to 6) thereby to substitute for the sliding motion over the armatures of the magnetic circuit 14 a rolling motion over this abutment: the latter must then be so placed that lever 3, while rolling thereover, brushes against the magnetic circuit 14.

As for the rocker 66 (FIG. 8) it can be actuated, via arm 74, by any suitable means. In the illustrated arrangement, electromagnets 75 and 76 provide electromagnetic control means, but any other control means can be provided, whether manual or mechanical, or even hydraulic or pneumatic. FIG. 9 illustrates pneumatic control means involving two nozzles 78 and 79 which are alternately made to communicate, by a rotary member 80, with an extension 81 through which air under pressure can be supplied from a source not shown. The rotary member 80 is formed with a central channel 82 which alternately discharges (to atmosphere) the interior of that nozzle which is not under pressure.

FIGS. 10a and 10b illustrate, with the selection stage performing a working stroke (FIG. 10a and an idle stroke (FIG. 10b) respectively, another variant wherein the holding members consist of bellmouthed suction nozzles 84 and 85 which are alternately made to communicate, by a rotary member 86, via a first channel 87, with a connector 88 connected to a negative pressure source, not shown. The nozzle 84 acts on lever 3 whereas the nozzle 85 acts on the blocking element 11. The rotary member 86 is provided with a second channel 89 for putting that one of nozzles 85 and 86 which is not connected to connector 88 into communication with the atmosphere, or as the case may be, with a source of air under pressure via a pipe 90.

In all of the above described variants, the immobilizing pin 10 describes a small arc which is centered on the stationary pin 12. In order for this arc to be assimilated, as we have done, to a straight line section, the angular motion of the blocking element 11 must be small, i.e. the distance between the stationary pin 12 and the immobilization pin 10 must be large in relation to the distance travelled by the latter. Clearly, the bulkiness of the mechanism resulting from this arrangement can be avoided by mounting the immobilizing pin 10 on a slide running along a rectilinear slideway, this slide being so arranged that it can cooperate one way or another with the holding member 15. In such an event, the immobilizing pin 10 follows a strictly rectilinear path and the same applies to the output 13.

In the embodiment described above, and in the variants thereof, the mechanism comprises only a single selection stage. It is possible however to design a mechanism which comprises several stages which are actuated by a common drive shaft. FIG. 11 illustrates an embodiment of the mechanism provided with two selection stages. This mechanism comprises a drive shaft 6, disc 5 carrying an eccentric pin 26, a driving rod 7 and an oscillating lever 8 able to pivot about a stationary pin 9. The rod 7, the lever 8 and the pin 9 form an indirect connection which is common to the driving pins 4a and 4b of the two selection stages. Each of these stages is identical to that described in relation to FIG. 1. They both comprise a linkage consisting of levers 1a and 1b and of levers 3a and 3b, which are hinged to one another by central hinges 2a and 2b; they comprise moreover blocking elements 11a and 11b able to pivot about stationary pins 12a and 12b. These blocking elements are mounted head to tail alongside one another and the outputs formed by their ends 13a and 13b

are connected to a common swing bar 55 by intermediate links 56a and 56b. This intermediate swing bar 55 carries a pin 57 positioned a third of the way between its ends 58a and 58b as shown by FIGS. 12a to 12d, this pin forming the output of the mechanism. So as not to affect the clarity of the drawings, the holding members for each of the selection stages have not been shown in FIG. 11. But it must be remembered that the holding members which are associated with selection stage a cooperate, respectively, with face 59a of lever 3a and with face 60a of blocking component 11b. As for the immobilizing pins 10a and 10b, they are respectively located, as is apparent from FIGS. 12a to 12d, halfway between the stationary pin 12a and the end 13a of blocking element 11a, and halfway between the stationary pin 12b and the end 13b of the blocking element 11b.

With this mechanism having two selection stages actuating a common swing bar 55, it is possible to achieve a variable output amplitude. FIG. 12a shows what happens when it is the two holding members associated with blocking elements 11a and 11b which are operative: the output 57 does not move, hence $X=0$. If selection stage b performs a working stroke while selection stage a is kept idle, the common output 57 carries out a stroke of length $X=1$ (FIG. 12b). If it is selection stage b that is kept idle, while selection stage a performs a working stroke, the output member 57 carries out a displacement of amplitude $X=2$, as shown by FIG. 12c. Finally, when both stages a and b perform each a working stroke, the output member 57 carries out a displacement of amplitude $X=3$ (FIG. 12d.) If a selection stage which is performing a working stroke is identified by the numeral 1 and a selection stage which is idle is identified by the numeral 0 and if X designates the value of the amplitude of the displacement carried out by the output member 57, the various possible combinations are given in the following table:

a	b	X
0-----	0	0
0-----	1	1
1-----	0	2
1-----	1	3

It will thus be observed that the amplitude of the movement of the output member 57 is represented by a translation into decimal notation of the binary number representing the working and idle states, respectively, of each of the selection stages.

Since there is nothing to prevent several selection stages from being juxtaposed one behind another and from being connected up by swing bars similar to swing bar 55, it will be seen that it thus is possible to produce a mechanism whose output member performs a movement having an amplitude which is dependent on the "idling" and "working" combination of the various selection stages; this selector thus becomes a binary decoder.

The drive path 19 can be given different shapes by suitably arranging the indirect connection between the driving pin 4 and the eccentric pin 26, this indirect connection consisting, as stated earlier, of the driving rod 7, the oscillating lever 8 and the stationary pin 9. Thus FIG. 13 illustrates an arrangement by means of which the drive path 19 can be given an asymmetrical shape which includes a fast plunging section 63. FIG. 14 shows a particular arrangement for the indirect connection which provides the drive curve 19 with a near-elliptical shape. The oscillating lever 8 is replaced by a slide 65 running in a slideway 64. FIG. 15 shows a third arrangement which also provides the drive path 19 with a near-elliptical shape.

A circular drive path may also be resorted to, for instance by directly connecting the driving pin 4 to the disc 5 (FIG. 16). The drive path 19 then consists of a circle which is centered on the drive shaft 6, and the linkage formed by levers 1 and 3 is so arranged that the sliding axis 18 may be offset in relation to the drive shaft 6 so that the velocity may have, along the portion 22 of path 19 which precedes the upper

point 20 (intersection of the axis 18 and of the drive path 19), a centripetal component in relation to the central hinge 2.

It may also be desired to have a drive path which, whilst still being circular, does not form a closed loop. In the variant illustrated in FIG. 17, this is achieved by arranging the indirect connection between the end of the lever 1 and the eccentric 5 differently: thus the driving pin 4 is connected both to the end of the driving rod 7 and to the end of the oscillating lever 8 whose pin 9 is located beneath the blocking element 11. The drive path 19 then coincides with the arc described by the end of the oscillating lever 8 and this arc is alternately traveled along by the driving pin 4. The stationary pin 9 occupies a position such that the velocity may have, along the portion 22 of path 19 which precedes the upper point 20 a centripetal component in relation to the central hinge 2.

The described mechanism has a large number of uses in a wide range of fields. For example, it may be used in a keypunch machine wherein the punch would be secured to the blocking element 11, for instance at its end 13. It may also be used in a sewing machine, its needle being fixed to the blocking element 11: this makes it possible to carry out sewing operations stitch by stitch without having to interrupt the motion of the drive shaft between each stitch. It can also be used in a printing mechanism and, in such as event, it includes with advantage several selection stages, the outputs of each of these stages actuating a printing character.

In these various applications, the mechanism, when operating, exerts a thrust; but it may also exert a pull. Such would, for instance, be the case with a textile machine (e.g. an embroidering or knitting machine) wherein the output of the mechanism would move a hook for hooking and lifting a thread.

Among the uses to which can be put the mechanism having multiple selection states (binary decoder may be cited: a pump in which the piston, connected to the output 57 (FIG. 11) performs a variable stroke so that its output may be varied in discrete steps and may even be reduced to nothing without stopping the drive shaft; a variable-speed sprocket mechanism which enables films to be projected at normal speed, frame by frame (stroke $X=1$) or to be projected at increased speed (stroke $X=2$ or $X=3$), or which enables continuously to project a particular frame (stroke $X=0$), without it being necessary to modify the speed of the drive shaft. It is also possible to connect output 57 to the mobile portion of a press, through the intermediary of a compression spring: in this way a press can be produced whose pressure can be varied at each stroke in discrete steps, the force that is transmitted by the spring being dependent on its deformation rate, and hence on the stroke of its output 57.

I claim:

1. A motion-converting mechanism comprising rotating means for moving a driver point on an input member cyclically along a predetermined drive path, a first link having an input point connected to the driver point and a common point hinged to, a common point on a second link having also an output point, guide means connected to the output point for constraining it to movement between a top dead point and a bottom dead point along a substantially linear path that crosses the drive path, stop means positioned on one side of the second link for preventing it from moving away from the linear path on that side while permitting it to move away from the linear path on the opposite side, means for selectively urging the second link against the stop means and thus constraining it to movement in alignment with the linear path, means for selectively holding the output point at its top dead point, and control means for selectively making operative either the urging means or the holding means, but not both, from the time during the input cycle when the output point is

necessarily at its top dead point to the time when the input point first crosses the linear path,

whereby, when the urging means is made operative the second link abuts against the stop means during the remaining part of the input cycle, and thus imparts to the output point a to-and-fro movement constituting a working stroke, and

whereby, when the holding means is made operative the second link pivots away from the stop means at the hinged common point, and thus provides an idle stroke.

2. A mechanism as in claim 1, wherein an eccentric point on the rotating means is connected to a first point on the input member, and including means for constraining a second point on the input member to a predetermined path.

3. A mechanism as in claim 2, wherein the driver point coincides with the second point on the input member.

4. A mechanism as in claim 2, where the second point on the input member is hinged to a point on a link that is hinged at a fixed pivot point so that the predetermined path of the second point is a circular arc centered on the fixed pivot point.

5. A mechanism as in claim 2, wherein the second point on the input member is hinged to a slidable member in a straight slideway so that the predetermined path of the second point is a segment of a straight line.

6. A mechanism as in claim 4, wherein the driver point is spaced from the second point on the input member, so that the drive path is a closed loop.

7. A mechanism as in claim 1, wherein the rotating means is the input member, and the driver point is an eccentric point thereon, so that the drive path is a circle.

8. A mechanism as in claim 1, wherein the guide means comprises a link hinged at a fixed pivot point.

9. A mechanism as in claim 1, wherein at least one of a. the urging means and b. the holding means comprises a magnetizable member positioned to contact, at least once during each input cycle; the part with which it selectively cooperates, which part comprises a ferromagnetic portion able to close the magnetic circuit, and the control means comprises means for selectively magnetizing the means a. or b., so that the magnetized means attracts the part in the closed magnetic circuit.

10. A mechanism as in claim 9, wherein each means a. and b. comprises a magnetizable member and the control means selectively magnetizes one or the other said member during each input cycle.

11. A mechanism as in claim 10, wherein each means a. and b. comprises an electromagnet and the control means comprises switching means for selectively energizing either of them.

12. A mechanism as in claim 10, wherein the magnetizing means comprises a movable permanent magnet, and the control means positions the magnet to magnetize selectively either the magnetizable member of the urging means or the magnetizable member of the holding means.

13. A mechanism as in claim 1, wherein the urging means comprises a first hook on the second link adjacent to a first lug at one end of a rocker, the holding means comprises a second hook on the guide means adjacent to a second lug at the opposite end of the rocker, the rocker being pivotable to a first position where the first lug engages the first hook and the second lug is disengaged, and to a second position where the second lug engages the second hook and the first lug is disengaged, and the control means positions the rocker at its first or second position selectively.

14. A mechanism as in claim 1, wherein each of a. the urging means and b. the holding means comprises a suction nozzle positioned to be covered, at least once during each input cycle, by the part with which it selectively cooperates, and the control means comprises valve means for selectively connecting suction means to one nozzle or the other, to make the means a. or b. operative.

15. A mechanism as in claim 1, comprising a plurality of the hinged link arrangements connected to a common input member, and output means for combining the individual out-

put strokes additively, with a working stroke of each link arrangement contributing in a different predetermined proportion to the combined output.

16. A mechanism as in claim 1, comprising a pair of the hinged link arrangements connected to a common input member, means for transmitting the output stroke of the first hinged link arrangement to a first point on a swing bar, means for transmitting the output stroke of the second hinged link ar-

angement to a second point on the swing bar, and means on the swing bar for providing a combined output at a point between the first and second points and closer to the first point so that a working stroke of the first hinged link arrangement provides a greater displacement than does a working stroke of the second hinged link arrangement, at the combined output point.

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Dedication

3,580,089.—*Serge Ramseier*. Carouge, Geneva, Switzerland. MOTION CONVERTING MECHANISM. Patent dated May 25, 1971. Dedication filed Aug. 2, 1974, by the assignee, *The Battelle Development Corporation*.

Hereby dedicates to the People of the United States the entire remaining term of said patent.

[*Official Gazette November 12, 1974.*]