June 21, 1932. A. BAUMANN ET AL 1,863,646

DRIVING MECHANISM FOR CALCULATING MACHINES

Filed March 29, 1929 2 Sheets-Sheet 1

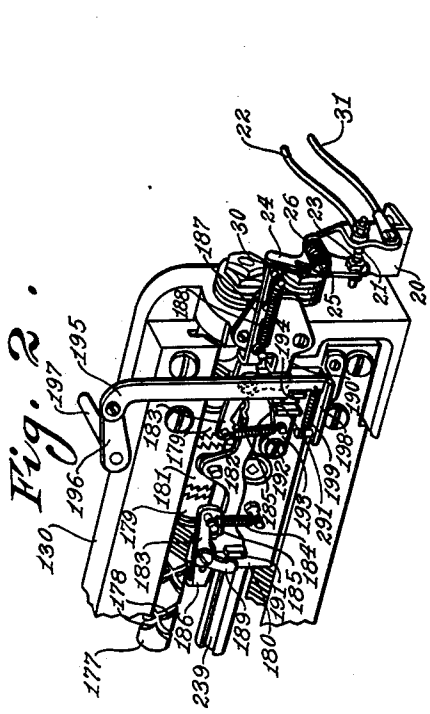


Fig. 2.

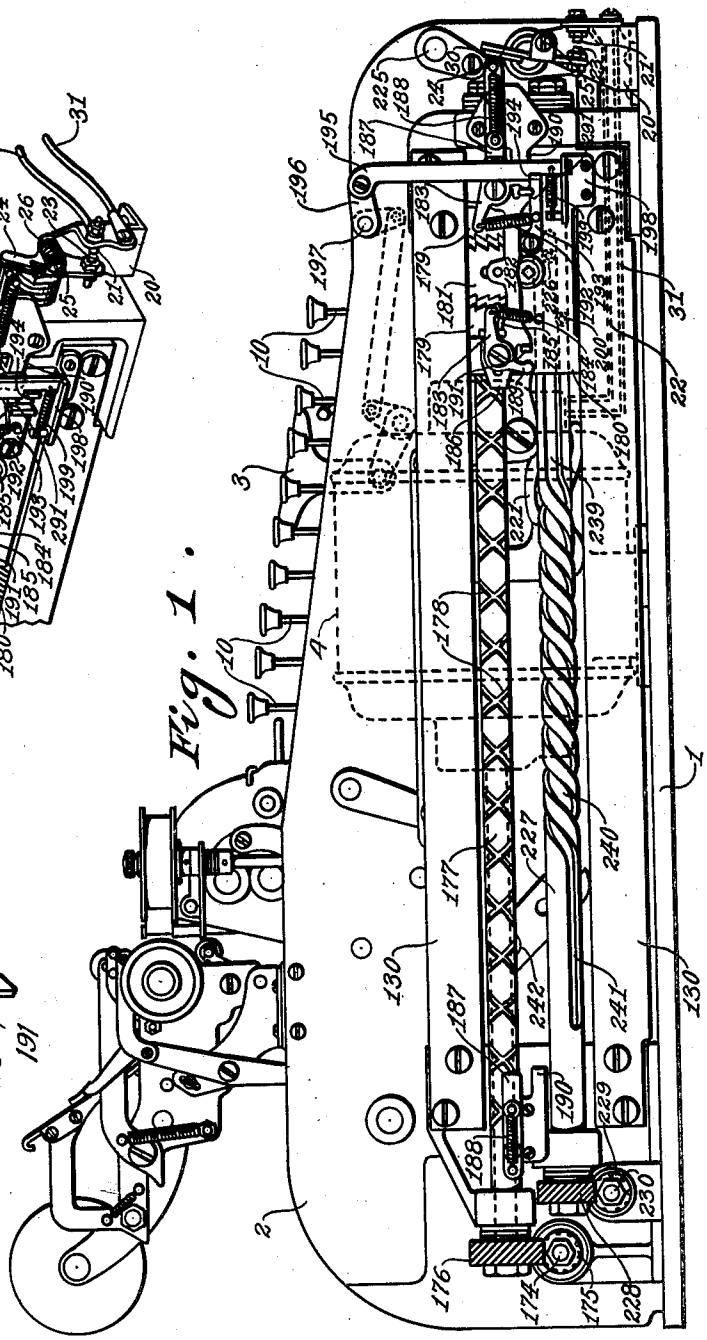


Fig. 1.

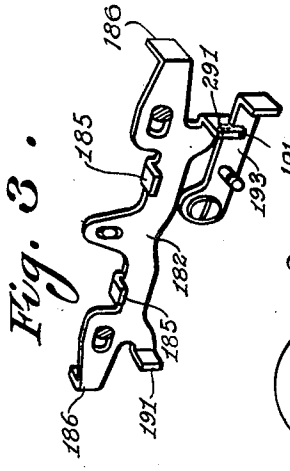


Fig. 3.

Inventors:
ADOLF BAUMANN and CARL P. HORLACHER,
By John N. Bruninga
Their Attorney.

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Fig. 4.

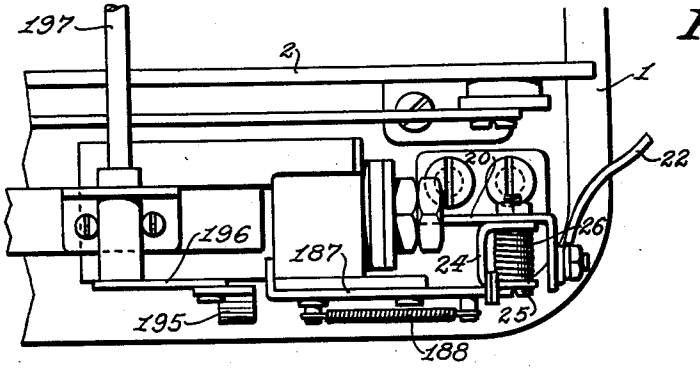


Fig. 5.

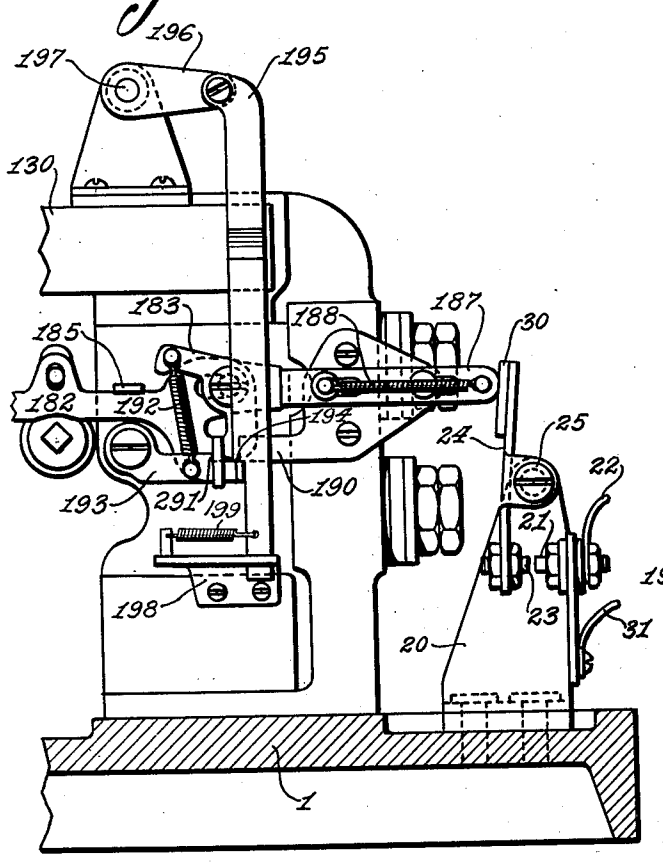
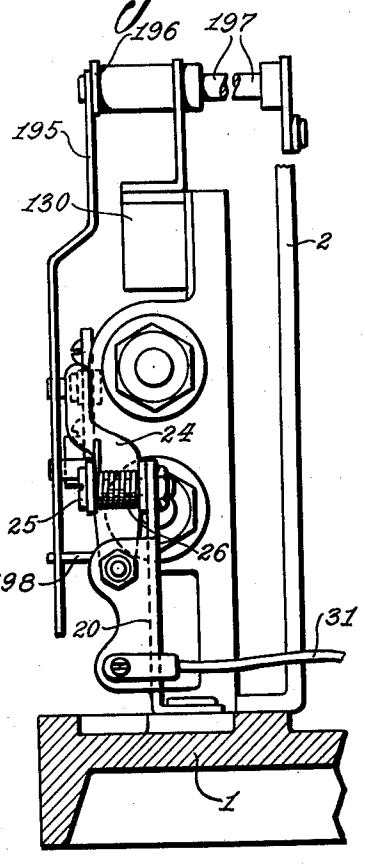


Fig. 6.



Inventors:
ADOLF BAUMANN and CARL P. HORLACHER,
By John N Brumiga
Their Attorney.

Patented June 21, 1932

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UNITED STATES PATENT OFFICE

ADOLF BAUMANN AND CARL P. HORLACHER, OF ST. LOUIS, MISSOURI, ASSIGNORS, BY MESNE ASSIGNMENTS, TO THE AMERICAN EXCHANGE NATIONAL BANK OF ST. LOUIS, A BANKING CORPORATION

DRIVING MECHANISM FOR CALCULATING MACHINES

Application filed March 29, 1929. Serial No. 351,060.

This invention relates to driving mechanism adapted more particularly for the operation of calculating machines of the character described in our copending application S. N. 182,766, filed April 11, 1927, of which this application is a continuation in part as to common subject-matter.

One of the objects of this invention is to provide a driving mechanism of the character described, which is adapted to operate various mechanical parts of a machine in order more particularly to secure a cycle of operations.

Another object is to provide a machine of the character described, which is adapted for reliable control by suitable manipulative means.

Another object is to provide an electrically driven mechanism of the character described, in which the circuit of the driving motor is opened when its operation is not required.

Further objects will appear from the detail description, taken in connection with the accompanying drawings, in which—

Figure 1 is a side elevation of a calculating machine, showing driving mechanism embodying this invention;

Figure 2 is a detail perspective view;

Figure 3 is a further detail;

Figure 4 is a plan, showing particularly the switch controlling mechanism as co-ordinated with the other mechanism;

Figure 5 is a side elevation of Figure 4, the base being shown in section; and

Figure 6 is an end elevation with the base also shown in section.

Referring to the accompanying drawings and more particularly to Figures 1, 2 and 3, the machine is shown as provided with a base 1, on which is mounted a framework 2. The keys of the calculating machine are shown at 10, the trip bar at 3 and an electric driving motor at 4.

The motor is connected through suitable gearing (not shown) to a shaft 174 whose end has a gear 175 meshing with a gear 176 on a shaft 177. The shaft 177 has two helical grooves 178 crossing one another, each groove cooperating with its particular nut 179 journaled loosely in a crosshead 180 guided to reciprocate along rails 130 on the base. A clutch 181 is arranged to engage with either nut 179 by a shifter 182 slidably mounted and guided on the crosshead and connected with the clutch. Each nut 179 will rotate with the shaft when not engaged with the clutch; but when either nut is engaged and held against rotation, it will travel along the shaft carrying the crosshead with it; the left nut carrying the crosshead to the left and the right nut carrying it to the right. The clutch shifter 182 is retained in either of its engaging positions by latches 183, pivoted on the crosshead, held by springs 184 and 192 in engagement with lugs 185 on the shifter. A bumper 186 on each end of the shifter is arranged to strike against a cushion 187 slidable on the frame and retained in projected position by a spring 188. The tail 189 of each latch is arranged to strike against a fixed stop 190 and against a lug 191 on the shifter. The right latch 183 is connected by the spring 192 with an arm 193 pivoted on the crosshead 180 and arranged to be struck by a shoulder 194 on a bar 195, pivoted to an arm 196, which latter is fixed to a shaft 197, extending across the machine and connected to be moved in clockwise direction by the trip bar 3, Figure 1. The lower end of the bar 195 projects into a slot in a bracket 198 and is acted upon by a spring 199, tending to retain the bar in its vertical or normal position. The arm 193 extends into a notch in the lug 191 on the shifter 182 and has a shoulder 291 taking behind the lug to hold the clutch in mid position, as shown.

When the crosshead 180 is moved to the right, to the position shown in Figure 1, the stop 190 will disengage the right latch 183, while the spring 188 will move the shifter until arrested by the shoulder 291; this will cause the clutch 181 to move to neutral position, and the crosshead will stop. If, now, the bar 195 is depressed by movement of the trip bar 3, the arm 193 will be depressed so as to release the shifter and cause the tensioned spring 188 to shift the clutch 181 to the left, in order to clutch the left nut 179; the left latch 183 then holds the clutch engaged. The crosshead will now travel to the

left until the left bumper 186 strikes the cushion 187, thereby tensioning the spring 188, while further movement will cause the latch 189 to engage the stop 190, thereby moving the shifter 182 to the right, carrying the clutch 181 with it to disengage the left nut 179; the tensioned spring 188 will now cause the clutch to engage the right nut 179; accordingly, the direction of movement of the crosshead is automatically reversed. As this crosshead travels back, it will again be arrested, as previously described.

It will, therefore, be seen that, upon depression of the trip bar 3, the crosshead will travel back and forth and will be arrested upon its return movement. This is true even if the trip bar remains depressed, for the bar 195 can move against the tension of its spring 199, but, when released, it will move up until its shoulder 194 takes over the arm 193. A complete reciprocation of the cross-head causes a complete operation of the machine to take place.

The crosshead 180 has a roll 200 arranged to engage operative parts of the machine, such as cam slots in the arms 221 and 242.

The crosshead 180 has two cam rolls 226, Figure 1, which travel in grooves in a shaft 227 mounted in suitable bearings and having at one end a gear 228 meshing with a gear 229 on a shaft 230. This shaft 230 is arranged to drive other mechanism; for instance, such mechanism as is described in the application referred to. The grooves on the shaft 227 are in duplicate, Figure 1, and each has a part 239 along the shaft, a part 240 helical of the shaft and another part 241 along the shaft; there is, in fact, a double thread 240 with parts 239 and 241 along the shaft. The cam rolls 226 travel in these grooves.

Upon reciprocation of the crosshead, while the rolls 226 move along the straight part 239 of the shaft 227 and during this movement, any suitable operation can be accomplished, such as the actuation of the arm 221. As the roll 226 moves along the helical part 240 of the shaft, the latter is caused to rotate and impart its movement through the connected gears to the shaft 230 and the other mechanism. While the roll 226 moves along the other terminal part 241, the shaft 227 again remains stationary, and during this movement the roll 200 can be made to operate the arm 242.

Referring now to Figures 4, 5 and 6, mounted on the base 1 is a bracket 20 having a contact 21 insulated therefrom and connected with a suitable lead 22. A cooperating contact 23 is mounted on a lever 24 pivoted at 25 on the bracket and provided with a mechanical contact part 30 arranged for engagement by the cushion slide 187. A spring 26 normally tends to hold the contacts 21 and 23 in engagement. The lever 24 and its contact 23 are in metallic contact with the base 20, to which is connected the other lead 31. The leads 22 and 31 are in the motor circuit, so that opening and closing of the contacts 21 and 22, forming as they do a switch, will serve to stop and start the motor.

When the mechanism is at rest, as heretofore described, and with the cushion slide 187 retracted as shown in Figures 1 and 5, the switch contacts will be open, so that the motor circuit is broken and the motor will be at rest. Upon depression of the trip bar 3, however, the release of the clutch shifter 182 permits the spring 188 to move the cushion slide 187 to the left, so as to not only engage the clutch, but so as to also close the switch and start the motor. The crosshead 180 can now move to the left to the end of its travel, as heretofore described; upon reversal and travel to the right, the clutch will not only be disengaged and locked in neutral position, but the cushion slide 187 will again be shifted so as to open the switch and stop the motor. It will, therefore, be seen that, in accordance with this invention, it is not necessary that the motor be kept running during the general operation of the machine, but the motor need only run when the trip bar 30 is depressed.

While this driving mechanism is particularly applicable to calculating machines, and more particularly of the character disclosed in the application referred to, it will be understood that the driving mechanism is applicable in many cases to other forms and types of calculating machines, and even for general application. It will furthermore be understood that certain features and sub-combinations are of utility and may be employed without reference to other features and sub-combinations; that is contemplated by and is within the scope of the appended claims. It will furthermore be understood that various changes may be made in details, within the scope of the appended claims, without departing from the spirit of this invention. It is, therefore, to be understood that this invention is not to be limited to the specific details shown and/or described.

Having thus described the invention, what is claimed is:

1. Driving mechanism comprising, a guide, a crosshead movable therealong, a driver connected to reciprocate said crosshead, and means for yieldingly arresting and retaining said crosshead at one end of its travel.

2. Driving mechanism comprising, a guide, a crosshead movable therealong, a driver, a clutch between said driver and said crosshead, and means for shifting said clutch to reverse said crosshead at the end of its travel adapted to yieldingly arrest said crosshead.

3. Driving mechanism comprising, a guide, a crosshead movable therealong, a driver, a clutch between said driver and said crosshead, a latch for said clutch, and means operable

at the end of the crosshead travel adapted to disengage said latch and shift said clutch.

4. Driving mechanism comprising, a guide, a crosshead movable therealong, a driver, a clutch between said driver and said crosshead, a latch for said clutch, and means engaged by said latch and clutch at the end of the crosshead travel adapted to disengage said latch. shift said clutch and yieldingly arrest said crosshead.

5. Driving mechanism comprising, a guide, a crosshead movable therealong, a driver, a clutch between said driver and said crosshead, a latch for said clutch, and a stop engaged by said latch at the end of the crosshead travel.

6. Driving mechanism comprising, a guide, a crosshead movable therealong, a driver, a cutch between said driver and said crosshead, a latch for said clutch, a stop engaged by said latch at the end of the crosshead travel, and a yielding stop engaged by said clutch at the end of the crosshead travel.

7. Driving mechanism comprising, a guide, a crosshead movable therealong, a driver, a clutch between said driver and said crosshead, a latch for retaining said clutch at the end of the crosshead travel, and manipulative means for disengaging said latch.

8. Driving mechanism comprising, a guide, a crosshead movable therealong, a driver, a clutch between said driver and said crosshead, means for disengaging said clutch at the end of the crosshead travel, a latch for retaining said clutch, and manipulative means for disengaging said latch.

9. Driving mechanism comprising, a guide, a crosshead movable therealong, a driver, a clutch between said driver and said crosshead, means for disengaging said clutch at the end of the crosshead travel, a latch for retaining said clutch, manipulative means for disengaging said latch, and means for engaging said clutch upon disengagement of said latch.

10. Driving mechanism comprising, a guide, a crosshead movable therealong, a driver, a clutch between said driver and said crosshead, means for disengaging said clutch at the end of the crosshead travel, a latch for retaining said clutch, manipulative means for disengaging said latch, and a yielding stop for said crosshead adapted to engage said clutch upon disengagement of said latch.

11. Driving mechanism comprising, a guide, a crosshead movable therealong, elements connected with said crosshead, a drive shaft adapted to move said elements in opposite directions, a clutch adapted to engage either of said elements, and automatic means for disengaging said clutch from said element at a predetermined position.

12. Driving mechanism comprising, a guide, a crosshead movable therealong, elements connected with said crosshead, a drive shaft adapted to move said elements in opposite directions, a clutch adapted to engage either of said elements, and automatic means for shifting said clutch at the end of the crosshead travel.

13. Driving mechanism comprising, a guide, a crosshead movable therealong, elements connected with said crosshead, a drive shaft adapted to move said elements in opposite directions, a clutch adapted to engage either of said elements, a latch for said clutch, and means for disengaging said latch at the end of the crosshead travel.

14. Driving mechanism comprising, a guide, a crosshead movable therealong, elements connected with said crosshead, a drive shaft adapted to move said elements in opposite directions, a clutch adapted to engage either of said elements, a latch for holding said clutch disengaged at the end of the crosshead travel, and manipulative means for disengaging said latch.

15. Driving mechanism comprising, a guide, a crosshead movable therealong, elements connected with said crosshead, a drive shaft having reverse helices each connected with an element, and a clutch operable through a cycle of events for successive engagement with said elements.

16. Driving mechanism comprising, a guide, a crosshead movable therealong, elements connected with said crosshead, a drive shaft having reverse helices each connected with an element, a clutch adapted to engage and hold either element, and means for automatically shifting said clutch at the end of the crosshead travel.

17. Driving mechanism comprising, a guide, a crosshead movable therealong, a driver connected to reciprocate said crosshead, a follower shaft extending along said guide, and a connection between said crosshead and said follower adapted to rotate said shaft upon reciprocation of said crosshead.

18. Driving mechanism comprising, a guide, a crosshead movable therealong, a driver connected to reciprocate said crosshead, a follower shaft extending along said guide, and a screw connection between said follower and said crosshead.

19. Driving mechanism comprising, a guide, a crosshead movable therealong, a driver connected to reciprocate said crosshead, a follower shaft extending along said guide and provided with a helix and with a part therealong, and a roll on said crosshead engaging said helix and said part.

20. Driving mechanism comprising, a guide, a crosshead movable therealong, a driver connected to reciprocate said crosshead, a follower shaft extending along said guide and provided with a helix and with terminal parts, and a roll on said crosshead engaging said helix and said parts.

21. Driving mechanism comprising, a guide, a crosshead movable therealong, elements connected with said crosshead, a drive shaft adapted to move said elements in opposite directions, a clutch adapted to engage either of said elements, a follower shaft extending along said guide, and a connection between said crosshead and said follower adapted to rotate said shaft upon reciprocation of said crosshead.

22. Driving mechanism comprising, a guide, a crosshead movable therealong, elements connected with said crosshead, a drive shaft having reverse helices each connected with an element, a clutch adapted to engage and hold either element, means for shifting said clutch, a follower shaft extending along said guide and provided with a helix and with terminal parts, and a roll on said crosshead engaging said helix and said parts.

23. Driving mechanism comprising, an electric motor, a circuit switch therefor, mechanism driven by said motor and including a driver, a reciprocating member connected therewith to open said switch at the end of travel of said member, and manipulative means adapted to close said switch.

24. Driving mechanism comprising, an electric motor, a circuit switch therefor, mechanism driven by said motor and including a driver, a reciprocating member, a clutch between said driver and said member, a clutch shifter, and manipulative means connected to operate said clutch and said switch.

25. Driving mechanism comprising, an electric motor, a circuit switch therefor, mechanism driven by said motor and including a driver, a reciprocating member, a clutch between said driver and said member, means operated by said member to disengage said clutch and open said switch at the end of travel of said member, and manipulative means adapted to engage said clutch and close said switch.

26. Driving mechanism comprising, an electric motor, a circuit switch therefor, reciprocating mechanism driven by said motor through a closed cycle of operations and means cooperating with said mechanism to open said switch at the end of said cycle.

27. Driving mechanism comprising, an electric motor, a circuit switch therefor, and reciprocating mechanism driven by said motor through a closed cycle of operations, said switch being actuated by said mechanism at a predetermined point in said cycle.

In testimony whereof we affix our signatures this 22nd day of December, 1928.

ADOLF BAUMANN.
CARL P. HORLACHER.