Oct. 17, 1933. R. L. MULLER 1,931,113

ALIGNING MEANS FOR REGISTERING MECHANISMS

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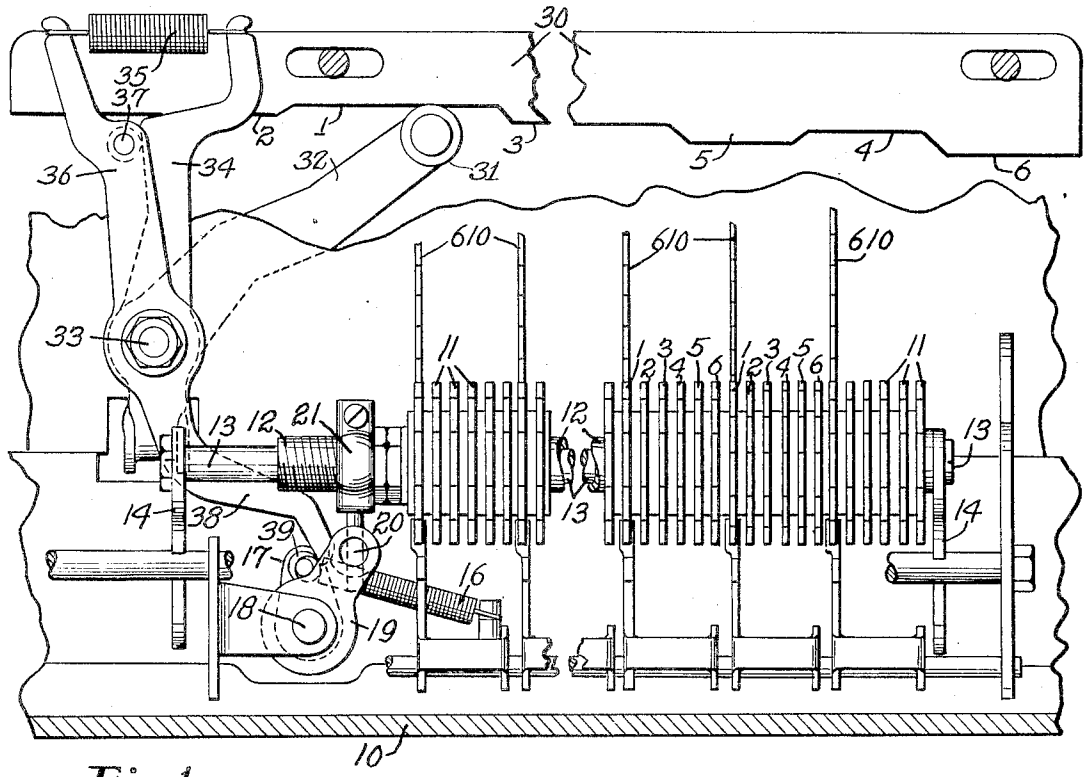


Fig. 1.

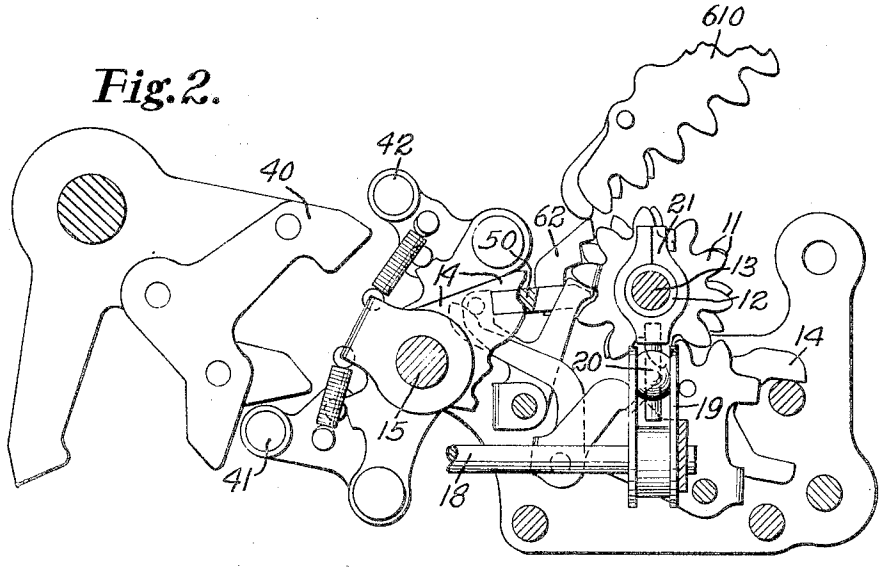


Fig. 2.

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Fig. 3.

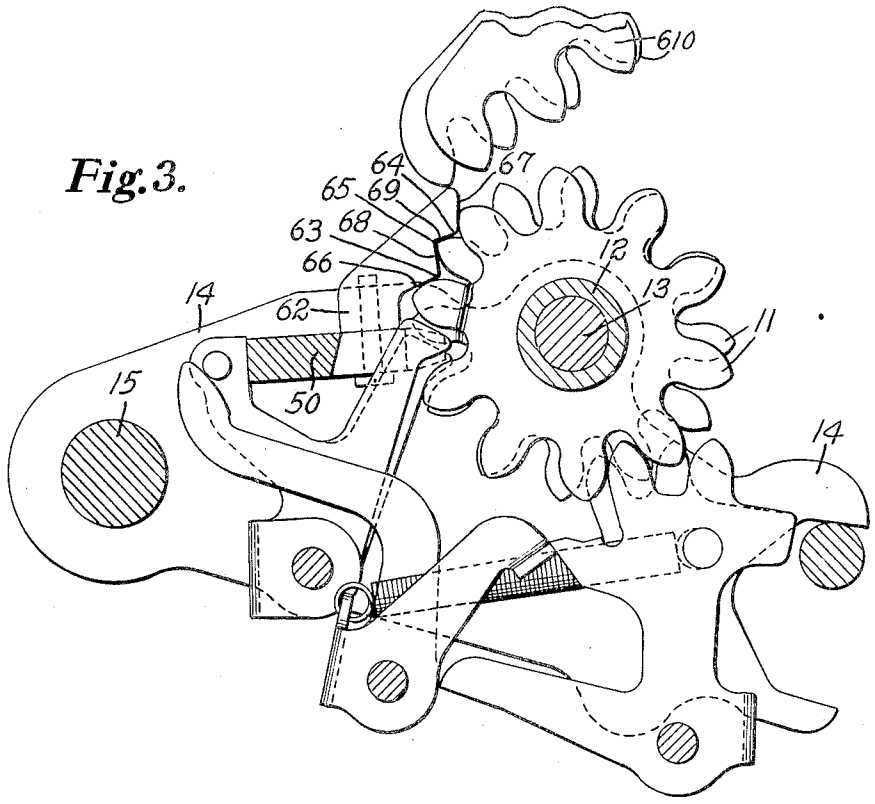
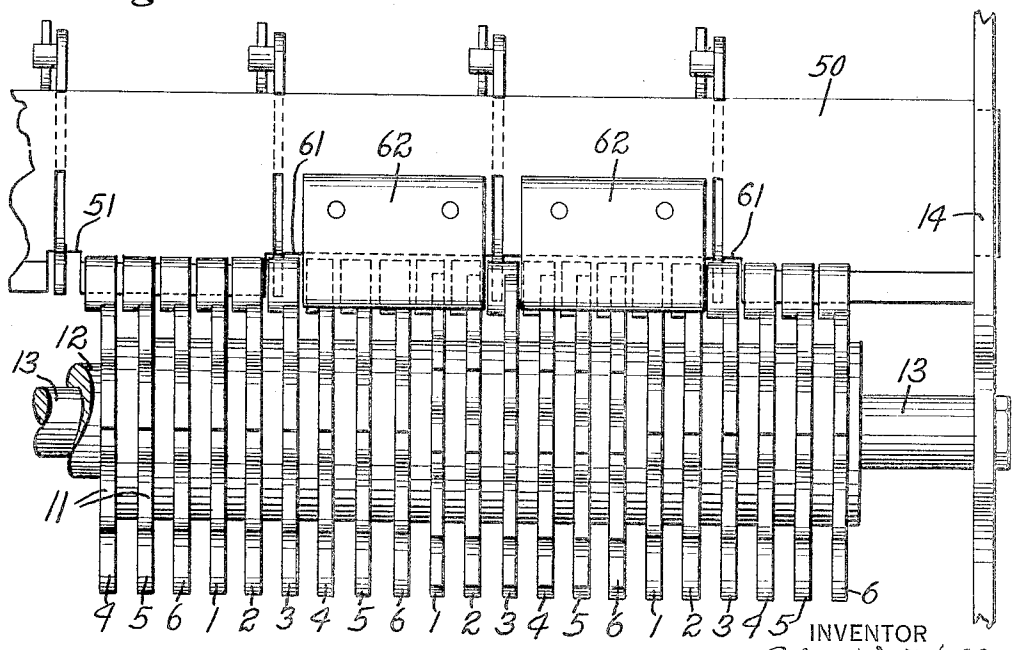


Fig. 4.



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ALIGNING MEANS FOR REGISTERING MECHANISMS

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Application February 23, 1932. Serial No. 594,574

7 Claims. (Cl. 235—60)

This invention relates to an aligning means for registering mechanisms. It is concerned principally with an improved means for aligning register pinions having teeth of different pitches.

In certain classes of work it is necessary to perform calculations according to systems other than the decimal system. For example, in the English currency system, twelve pence make a shilling and this necessitates that the pence order have a 12-pinch actuator rack with a 12-pitch register pinion. In the same system, four farthings make a pence and, if calculations are to be performed in this order, they are performed by employing a 12-pitch rack and register pinion, the latter being provided with three transfer projections spaced four teeth apart. The other orders usually employ 10-pitch racks and pinions.

In machines in which the register pinions are moved longitudinally into and out of active position relative to the actuator racks, an aligning means must be provided to prevent the pinions from rotating while they are out of active position. This usually takes the form of a bail or plate which enters the spaces between the teeth of the pinions to hold them against rotation. This is not a very difficult problem when the teeth of the register pinions are all of the same pitch but, when the teeth are of different pitch, complications arise that make it very difficult to provide an aligning means without sacrificing some of the capacity of the machine. The present invention is directed to a solution of this problem.

The object of the invention is to provide an improved aligning means for registering mechanism.

More particularly the object is to provide an aligning means that will align pinions having teeth of different pitches without requiring the capacity of the machine to be sacrificed in any way.

Other and more particular objects will appear from the following specification and drawings:

An embodiment of the invention is shown in the accompanying drawings in which;

Figure 1 is a partial front elevation of a machine with the invention applied thereto, parts of the machine being removed;

Fig. 2 is a partial left side elevation of the mechanism shown in Fig. 1;

Fig. 3 is an enlarged view of the register pinions showing how the pinions of different pitch are held in position.

Fig. 4 is a partial plan view of the registering mechanism with the invention applied thereto, the No. 3 register being shown in active position.

The invention is shown applied to a Burroughs multiple register machine whose general features are known inasmuch as the machine has been on the market for a number of years. The details of this machine need not be understood in order to understand the present invention for which reason only the general construction of the portion of machine particularly related to the present invention will be described.

General calculating machine features

The machine, of which the base 10 is shown in Fig. 1, is provided with a plurality of registers of the interspersed-pinion type. These registers comprise a plurality of toothed pinions 11 rotatably mounted upon a sleeve 12 which is slidably mounted upon a shaft 13 carried by rock arms 14 pivoted at 15 (Fig. 2). The pinions of each order are grouped together and, in the machine illustrated, there are six pinions in each group, numbered from 1 to 6, inclusive, in Fig. 1, making a machine having a six register capacity.

The sleeve 12 carrying the register pinions is urged to the position of Fig. 1 by a spring 16 acting on a crank 17 fixed to a shaft 18 having another crank 19 connected by a universal joint 20 to a clamp 21 on the sleeve 12. This normally positions the pinions of the No. 1 register in active position for cooperation with the actuator racks 610 as shown in Fig. 1.

The register pinions may be moved to the left as viewed in Fig. 1 to position the pinions of any of the other registers in active position for cooperation with the actuator racks, and the pinions may afterwards be returned to the right to either the position of Fig. 1 or to some intermediate position as desired. The positioning of the registers is preferably controlled by the paper carriage of the machine of which only the cam bar 30 is illustrated. This cam bar has a plurality of surfaces numbered 1, 2, 3, 4, 5 and 6 corresponding to the registers which said surfaces control. These cam surfaces may be arranged in any desired order on the cam bar depending upon the sequence in which it is desired to position the registers for operation. These cam surfaces act on a roller 31 on the end of an arm 32 of a yoke pivoted at 33. This yoke has another arm 34 extending upwardly and connected by a spring 35 to a lever 36 also pivoted at 33. The lever 36 carries a stud 37 normally engaging the edge of the arm 34 under the urge of spring 35. The lever 36 has a downward extension 38 positioned to engage a stud 39 on the

crank 17 controlling the position of the register sleeve 12.

In visualizing an operation of the machine it must be kept in mind that the paper carriage is tabulated from one position to another during the latter part of the return stroke of any given machine operation and that the shaft 18 which moves the register carrying sleeve 12 is locked against movement except for a momentary release during the forward stroke of a machine operation.

Assume, for example, that the carriage moves one step to the left, as viewed in Fig. 1, during the latter part of a machine operation. This rocks the arm 32 clockwise and the arm 34 is moved to the same direction. At the time this occurs, the shaft 18, whose movement moves the register sleeve 12 longitudinally, is locked. Accordingly, the arm 34 is moved clockwise but lever 36 is not, with the result that spring 35 is tensioned. During the forward stroke of the next machine operation the locking means for the shaft 18 is momentarily released and, as soon as this occurs, the spring 35 moves the lever 36—37 clockwise as viewed in Fig. 1 to move the register carrying sleeve 12 to the left. The extent of movement is determined by the limiting action of stud 37 on the movement of lever 36. Inasmuch as the position of stud 37 is determined by the cam surface 3 of cam bar 30 it is evident that the register corresponding to said cam surface, to-wit, the No. 3 register, will be positioned for operation.

After a given register has been positioned for operation it is rocked into and out of engagement with the actuator racks 610 by means of a cam 40 (Fig. 2) which acts on pass-by pawls 41 and 42 in a manner described in Pasinski Patent No. 1,778,506.

In the machine illustrated, the second actuator rack 610 from the right in Fig. 1 is of 12-pitch and all the other racks are of 10-pitch. The second set of pinions from the right in Fig. 1 are also 12-pitch and all the other sets are of 10-pitch. It is to be noted that, as the register pinions are moved to the left in Fig. 1, the set of 12-pitch pinions moves to the left to occupy the position formerly occupied by the third set of pinions from the right which are of 10-pitch and, likewise, the first set of pinions on the right which are of 10-pitch moves to the position occupied by the second set of pinions which are of 12-pitch.

The usual form of aligning means is provided for preventing certain of the pinions that are not in active position relative to the actuator racks from being rotated. This aligning means comprises a plate 50 (Figs. 2, 3 and 4) having a tooth shaped, or double-beveled, edge adapted to engage between two of the teeth of the pinions. This plate is cut out as at 51 in Fig. 4 adjacent the actuator racks so as to permit the pinion that is in active position to pass the aligning plate as the pinion is rotated. The notch 51 in the plate is made wide enough to permit the wide faced pinion constituting the transfer projection to pass.

When all of the pinions 11 are of the same pitch the aligning plate 50 operates satisfactorily but when certain of the pinions are of different pitch than the others, it will not operate properly. Referring to Fig. 3, it will be observed that when the pinions are of different pitch, the spaces between the teeth are not in alignment as viewed longitudinally or along the sleeve 12. This makes it obvious that the aligning plate 50 will not serve for all the pinions. In some cases it would block longitudinal movement of the pinions and, in other cases, it might cause a slight movement of some of the pinions resulting in incorrect operation of the machine. This problem has presented a very real difficulty and heretofore it has been thought necessary to solve it as follows:

Visualizing a set of pinions such as illustrated in Fig. 1, it is evident that the second set from the right, which is of 12-pitch, cannot move properly onto an aligning plate 50 for the third set from the right which is of 10-pitch. To avoid this difficulty it has been the practice to omit pinions in the position of the third set and to provide a special aligning plate for the 12-pitch set, said aligning plate being positioned in the space normally intended for the third set. The desired result can be obtained in this way but one of the orders of the machine is sacrificed and its capacity correspondingly reduced. Also special provision must be made about printing or there will be a space between certain orders, or a cipher will be printed where it should not be.

When it is necessary to have a set of 10-pitch pinions to the right of a set of 12-pitch pinions, as the first set to the right in Fig. 1, it again becomes necessary, under the old practice, to omit pinions in one order. For example, if a special aligning plate is provided for the 12-pitch pinions in Fig. 1, this plate is not suitable for the 10-pitch pinions of the first set on the right as the latter moves to the left during the positioning of the different registers. In order to avoid this no pinions are provided in the space where the first set is shown in Fig. 1 and the first set would occupy a position one order to the right if it were possible to expand the capacity of the machine in this direction. As a matter of fact, all the sets have to be moved over one step to the left but, in any event, another order of the machine is sacrificed and the capacity of the machine is correspondingly reduced. To put it another way, if there is to be a set of 12-pitch pinions in an intermediate position, it is necessary to leave each of the orders on two sides of the set of 12-pitch pinions blank. These two orders are sacrificed in order that proper aligning means may be provided.

This difficulty is solved in a very ingenious and simple manner by a construction as follows:

Aligning means

Referring to Fig. 4, it will be observed that the regular aligning plate 50 is cut out at 61 so as to be inoperative as far as the second and third orders from the right are concerned. Fixed to the aligning plate in the second and third orders from the right is a special aligning device, or means 62, illustrated most clearly in Fig. 3. This aligning device has two ridges or raised portions 63 and 64 between which is a V-shaped notch or valley 65. The outside surfaces 66 and 67 of these ridges are positioned so as to engage the inner faces of two adjacent teeth of the pinions of 10-pitch, as illustrated in Fig. 3, to align and hold the 10-pitch pinions by engagement with the two teeth.

The inner surfaces 68 and 69 of the ridges 63 and 64 or, to put it another way, the sides of the V-shaped notch or valley between the ridges, engage the opposite faces of one of the teeth of the 12-pitch pinions which, at the point illustrated in Fig. 3, occupy positions substantially

midway between the teeth of the 10-pitch pinions.

As will be evident from Fig. 3 the ridges 63 and 64 are positioned so that they do not interfere with either set of pinions, but tend to align both sets. If there are no 12-pitch pinions to pass into position in the valley 65, this fact does not interfere with the capability of the aligning means in aligning the 10-pitch pinions. Likewise, if there are no 10-pitch pinions to engage the outer surfaces 66 and 67 of the ridges, this fact does not interfere with the activity of the inner faces 68 and 69 in aligning the 12-pitch pinions. In other words, a single aligning means is provided having certain surfaces for aligning the 10-pitch pinions and other surfaces for aligning the 12-pitch pinions, and these aligning functions are performed without interference and without disturbing the position of either set of pinions. Put another way, the aligning device is provided with one means for aligning the 10-pitch pinions and another means for aligning the 12-pitch pinions, both surfaces operating at all times to align their respective sets of pinions without interfering with one another.

The invention has been shown applied to a multiple register machine of the interspersed pinion type, but it is to be understood that it may be used with registers of other types in which pinions of different pitch are employed and in which it is necessary to hold the pinions against rotation while they are being moved from one position to another. It is also to be understood that variations may be made in the details of construction without departing from the spirit and scope of the invention as defined by the appended claims.

I claim:

1. In a machine of the class described, a plurality of register pinions having teeth of one pitch positioned immediately adjacent a plurality of pinions having teeth of another pitch, means for moving said pinions as a group from one position to another, and an aligning device for holding certain of said pinions against rotation, said aligning device having one means for engaging the pinions of one pitch and another means for engaging the pinions of the other pitch.

2. In a machine of the class described, a plurality of register pinions certain of which have teeth of one pitch and others of which have teeth of another pitch, means for moving said register pinions longitudinally, and an aligning means for holding certain of said pinions against rotation, said aligning means having one set of surfaces for engaging the teeth of the pinions of one pitch to align and hold said pinions and another set of surfaces for engaging the teeth of the pinions of the other pitch to align and hold the latter.

3. In a machine of the class described, a plurality of register pinions some of which have teeth of one pitch and others of which have teeth of another pitch, means for moving said register pinions longitudinally to different positions, and an aligning means for holding certain of said pinions against rotation, said aligning means having surfaces for engaging the inside surfaces of two adjacent teeth of the pinions of one pitch and other surfaces for engaging the two opposite faces of one tooth of the pinions of the other pitch.

4. In a machine of the class described, a plurality of register pinions some of which have teeth of one pitch and others of which have teeth of another pitch, means for moving said register pinions longitudinally to different positions, and an aligning means for preventing rotation of certain of said pinions, said aligning means having two ridge portions separated by a valley, said ridge portions being positioned so that the outside faces of the ridges are adapted to engage the inner faces of adjacent teeth of pinions of one pitch, and the inside faces of said ridges are adapted to engage opposite faces of one of the teeth of the pinions of the other pitch.

5. In a machine of the class described, a plurality of registers of the interspersed pinion type, certain of the pinions of said registers being of one pitch and others being of another pitch, means for moving said registers longitudinally to position different ones of them for active operation, an aligning means for holding the register pinions that are not in active position against rotation, said aligning means having certain surfaces adapted to engage the inner faces of two adjacent teeth of the pinions of one pitch and certain other surfaces adapted to engage both faces of a tooth of the pinions of the other pitch whereby the pinions of both pitches that are not in active position for operation may be held against rotation.

6. In a machine of the class described, a plurality of rotatable register pinions mounted to move longitudinally as a group so that different ones of said pinions may be placed in active position relative to actuator racks, said pinions being immediately adjacent one another throughout the group, the pitch of some of said pinions being of a different multiple than that of the others, means for moving said group of pinions longitudinally, and an aligning means cooperating with said pinions to hold them against rotation after they have been moved out of active position and while the group is being moved longitudinally, said aligning means having portions cooperating with the pinions of different pitches to hold all the pinions, except those in active position, in proper position without interfering with the longitudinal movement of the group.

7. In a machine of the class described, a series of rotatable multiple register pinions of the interspersed pinion type mounted to move longitudinally as a group to enable sets of pinions comprising different registers to be moved to active position relative to actuator racks, said pinions being immediately adjacent one another throughout the group, the pitch of the pinions in certain orders being of a different multiple than that of other orders, means for moving said group longitudinally to selectively move the registers to active position, and an aligning means cooperating with the pinions to hold them against rotation after they have been moved from active position and while they are being moved as a group, said aligning means having portions cooperating with the pinions of different pitches to hold all the pinions, except those in active position, in proper position without interfering with the longitudinal movement of the group.

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