May 19, 1942. N. E. J. STÅHL 2,283,655

TENS TRANSFER DEVICE

Filed Oct. 4, 1939

Fig. 1.

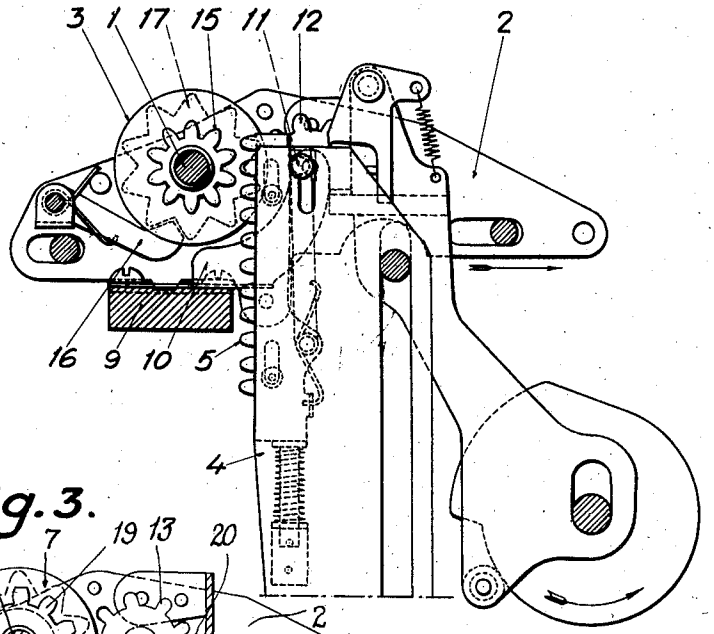
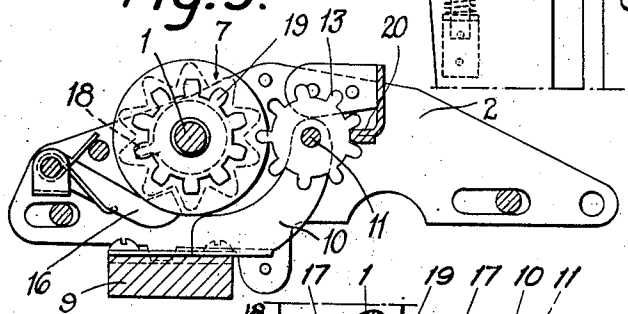



Fig. 3.



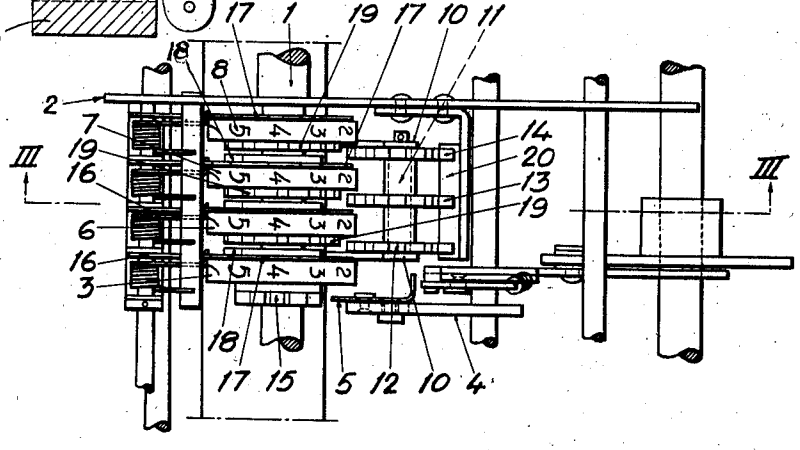




Fig. 2.

Nils Evert Johan Ståhl
INVENTOR

By Otis Munk
his Att'y.

Patented May 19, 1942 2,283,655

# UNITED STATES PATENT OFFICE

2,283,655

## TENS TRANSFER DEVICE

Nils Evert Johan Ståhl, Stockholm, Sweden, assignor to Kooperativa Förbundet Förening U. P. A., Stockholm, Sweden

Application October 4, 1939, Serial No. 297,783
In Sweden October 22, 1938

7 Claims. (Cl. 235—139)

In calculating machines, cash registers and the like having a totalizer shaft movable laterally in a plane parallel to the base of the machine for the purpose of moving the totalizer wheels into and out of mesh with the differential setting members driving said wheels, it has hitherto been difficult to obtain a satisfactory tens transfer to the overflow wheels of the totalizer, i. e. to the wheels adapted to receive amounts exceeding the capacity of those totalizer wheels which are directly driven by the differential setting members.

It is one object of the present invention to provide a tens transfer device for the overflow wheels which is of a very simple construction and which operates positively.

Another object of the invention is to produce a tens transfer mechanism for the overflow wheels including pinions mounted on a stationary shaft, the overflow wheels of the totalizer being in engagement with said tens transfer pinions, when the other wheels of the totalizer are in driving mesh with the differential setting members.

One embodiment of the invention is illustrated on the accompanying drawing, in which

Figure 1 is a side view of the device and

Figure 2 a plan view of the same.

Figure 3 shows a section taken on the line III—III of Figure 2.

In the drawing reference character 1 indicates the totalizer wheel shaft carried by a reciprocable support comprising two suitably guided brackets 2, only one of which is shown in drawing. Fig. 2 shows four totalizer wheels mounted on the shaft 1. The wheel 3 is the totalizer wheel of the highest denomination in which a totalizer actuating rack 5 and a differential setting member 4 are provided to drive the corresponding totalizer wheel. If a tens transfer is to be effected to the totalizer wheel 3, the rack 5 is displaced to such an extent relative to the setting member 4, that the wheel 3 is rotated one step, as described in U. S. Patent No. 2,091,758. The wheels 6, 7 and 8 are the overflow wheels of the totalizer, and, since these wheels do not cooperate with any differential setting members and racks, a tens transfer to each of said wheels must be effected in a different manner. In the illustrated embodiment such tens transfer is effected by means of the following device:

A stationary frame portion 9 has secured thereto two arms 10 carrying between them a shaft 11, on which three tens-transfer pinions 12, 13 and 14 are rotatably mounted. The totalizer wheel 3 has rigidly united therewith a toothed gear 15 located on one side of the indicator drum and adapted to cooperate with the rack 5, a ratchet wheel 17 located on the other side of the indicator drum and adapted to cooperate with a spring actuated pawl 16 and, finally, a tens tooth 18 located on the outer side of the ratchet wheel.

If a tens transfer is to be effected from the totalizer wheel 3 to the first overflow wheel 6, the tens tooth 18 on wheel 3 cooperates with the tens transfer pinion 12, the latter being simultaneously in mesh with a toothed gear 19 secured to the overflow wheel 6 and located on one side of the indicator drum of said wheel. On the other side of said drum, the overflow wheel 6 carries a ratchet wheel 17 adapted to cooperate with a pawl 16 and a tens tooth 18 adapted to cooperate with the next tens-transfer pinion 13. The overflow wheels 7 and 8 are identical with the wheel 6 with the exception that the wheel 8 has no tens tooth, there being no higher denomination overflow wheel of the totalizer. The tens transfer pinions 12, 13 and 14 will, consequently, effect tens transfer between the wheels 3 and 6, 6 and 7 and 7 and 8 respectively.

On the support bracket 2, shown in the drawing, there is further mounted an elongated member 20 adapted to enter the tooth spaces of the tens-transfer pinions 12, 13 and 14. This member, which participates in the reciprocal motion of the support bracket 2 and totalizer wheel shaft 1, serves the purpose of arresting the tens-transfer pinions 12, 13 and 14 in their various angular positions when they are not in mesh with the toothed gears 19 of the overflow wheels 6, 7 and 8. The tens transfer pinions 12, 13 and 14 are arranged in such a manner relative to the overflow wheels and to the locking member 20, that the tens-transfer pinions are arrested in their angular positions either by the locking member 20 or by the toothed gears 19 of the overflow wheels 6, 7 and 8, which latter are held in their various angular positions by means of the spring actuated pawls 16 cooperating with the ratchet wheels 17. The tens-transfer pinions 12, 13 and 14 will thus never be able to perform a rotating motion independently of the overflow wheels 6, 7 and 8 respectively.

The device operates as follows:

When the various elements of the device assume the positions shown in the drawing, the tens-transfer pinions 12, 13 and 14 are locked by the member 20. When the support brackets 2 are now moved in the direction indicated by the arrow in Figure 1 for the purpose of bringing

the totalizer wheels into mesh with the totalizer actuating racks on the differential setting members, said racks having previously been set to positions corresponding to the values entered into the machine, the member 20 leaves its engagement with the tens-transfer pinions 12, 13 and 14. Before this engagement has been entirely broken, however, the tens transfer pinions 12, 13 and 14 have entered into a mesh with the toothed gears 19 of the overflow wheels 6, 7 and 8, which latter, during the motion of the totalizer wheel shaft 1 are locked in their positions by means of the pawls 16. When the differential setting members return now to their initial positions, the corresponding totalizer wheels are rotated. If the totalizer wheel 3, now or during operation of the tens transfer device described in the Patent No. 2,091,758, passes from nine to zero, the tens tooth 18 of the totalizer wheel 3 moves the tens-transfer pinion 12 one step ahead. The pinion 12 in its turn rotates the first overflow wheel 6 one step, and if the wheel 6, and perhaps also the wheel 7, should then pass from nine to zero, tens transfers are also effected from these wheels. The tens transfer pinions 12, 13 and 14 are prevented from continuing the rotating motion received during a tens transfer, because each pinion is then in mesh with the toothed gear 19 of an overflow wheel 6, 7 or 8, respectively, which latter is held in the angular position reached after the tens transfer by means of a pawl 16 cooperating with a corresponding ratchet wheel 17. After the tens transfer has been accomplished, the totalizer wheel shaft 1 moves the totalizer wheels out of mesh with the differential setting members. Before the engagement between the gears 19 of the overflow wheels 6, 7 and 8 and the tens-transfer pinions 12, 13 and 14 has been broken, the member 20 has partly entered into the tooth spaces of the pinions 12, 13 and 14. It is thus impossible for the latter to rotate during the return of the various elements to their initial positions.

In addition to the positive operation obtained through the above described device, another great advantage is the facility of zeroizing the totalizer. In hitherto known tens transfer devices for the overflow wheels of a totalizer it has, generally, been necessary to provide a special device for forcing the tens transfer members, as for instance Maltese cross wheels, out of their normal positions. Through the present invention, this disadvantage is eliminated, because the tens transfer members, i. e. the pinions 12, 13 and 14, are already out of engagement with the totalizer wheels during the zeroizing operation, which takes place when the various elements of the device assume the positions shown in the drawing.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a cash register, the combination with a frame, a plurality of differential setting members adjustably mounted on said frame, a support element carrying a totalizer shaft, said totalizer shaft having rotatably mounted thereon a plurality of totalizer wheels to be driven by said setting members, respectively, and a number of overflow wheels, said support element being arranged for reciprocation relative to said frame at right angles to the axis of said totalizer shaft to alternately establish and break a meshing engagement between said setting members and corresponding totalizer wheels, of a mechanism for the transfer of tens to each of the overflow wheels, said mechanism comprising a tens tooth on the totalizer wheel of the highest denomination for which a differential setting member is provided, a tens tooth on each of the overflow wheels except that of the highest denomination, a toothed gear on each overflow wheel, and a tens-transfer pinion for each overflow wheel, each of said tens-transfer pinions being rotatably mounted on said frame in a position to mesh with the toothed gear of the corresponding overflow wheel and to be actuated by the tens tooth of the totalizer wheel or overflow wheel, respectively, of the next lower denomination when the differential setting members are in mesh with the corresponding totalizer wheels.

2. A cash register, as claimed in claim 1, including an auxiliary shaft carried by said frame in parallel relationship to said totalizer shaft, all said tens-transfer pinions being rotatably mounted on said auxiliary shaft.

3. A cash register, as claimed in claim 1, including ratchet wheels secured to said overflow wheels, respectively, and spring actuated pawls carried by said support element for cooperation with said ratchet wheels to resiliently arrest said overflow wheels and associated toothed gears in their angular positions after each tens-transfer step.

4. A cash register, as claimed in claim 1, including a stop member carried by said support element in a position to engage and arrest said tens-transfer pinions in their angular positions when the meshing engagement between the differential setting members and corresponding totalizer wheels is broken.

5. A cash register, as claimed in claim 1, including an auxiliary shaft carried by said frame in parallel relationship to said totalizer shaft, all said tens-transfer pinions being rotatably mounted on said auxiliary shaft, and an elongated member carried by said support element in parallel relationship to said auxiliary shaft on the side of the latter opposite that occupied by the totalizer shaft and in a position to enter tooth spaces of said tens-transfer pinions and to arrest the latter in their angular positions when the meshing engagement between the differential setting members and the corresponding totalizer wheels is broken.

6. A cash register, as claimed in claim 1, including means carried by said support element to resiliently arrest said overflow wheels and associated toothed gears in their angular positions after each tens-transfer step, and a stop member carried by said support element in a position to engage and arrest said tens-transfer pinions in their angular positions when the support element moves to discontinue the meshing engagement between the differential setting members and corresponding totalizer wheels and immediately before the meshing engagement between said toothed gears and tens-transfer pinions has been entirely broken.

7. In a cash register, the combination with a frame, a plurality of differential setting members adjustably mounted on said frame, a support, a totalizer shaft carried by said support and having rotatably mounted thereon a plurality of totalizer wheels to be driven by said setting members, respectively, and a number of overflow wheels, said support being arranged for reciprocation in a plane parallel to the base of said frame at right angles to the axis of said totalizer shaft to bring said totalizer wheels to be driven by said setting members alternately

into and out of meshing engagement with the latter, of a mechanism for the transfer of tens to each of the overflow wheels, said mechanism comprising a tens tooth on the totalizer wheel of the highest denomination for which a differential setting member is provided, a tens tooth on each of the overflow wheels except that of the highest denomination, a toothed gear on each overflow wheel, ratchet wheels secured to said overflow wheels, respectively, spring actuated pawls carried by said support for cooperation with said ratchet wheels to resiliently arrest said overflow wheels and associated toothed gears in their various angular positions, an auxiliary shaft carried by said frame in parallel relationship to said totalizer shaft, a tens-transfer pinion for each overflow wheel, each of said tens transfer pinions being rotatably mounted on said auxiliary shaft in a position to mesh with the toothed gear of the corresponding overflow wheel and to be actuated by the tens tooth of the totalizer wheel or overflow wheel, respectively, of the next lower denomination when the differential setting members are in mesh with the corresponding totalizer wheels, and an elongated member carried by said support in parallel relationship to said auxiliary shaft on the side of the latter opposite that occupied by the totalizer shaft and in a position to enter the tooth spaces of said tens-transfer pinions and to arrest the latter in their angular positions when said support moves said totalizer wheels to be driven by the differential setting members out of mesh with the latter and immediately before the meshing engagement between said toothed gears and tens-transfer pinions has been entirely broken.

NILS EVERT JOHAN STÅHL.