March 21, 1950 H. C. YAEGER 2,501,117

FEED-ROLL RELEASE MECHANISM
FOR TYPEWRITING MACHINES
Filed Dec. 30, 1946

Fig. 1

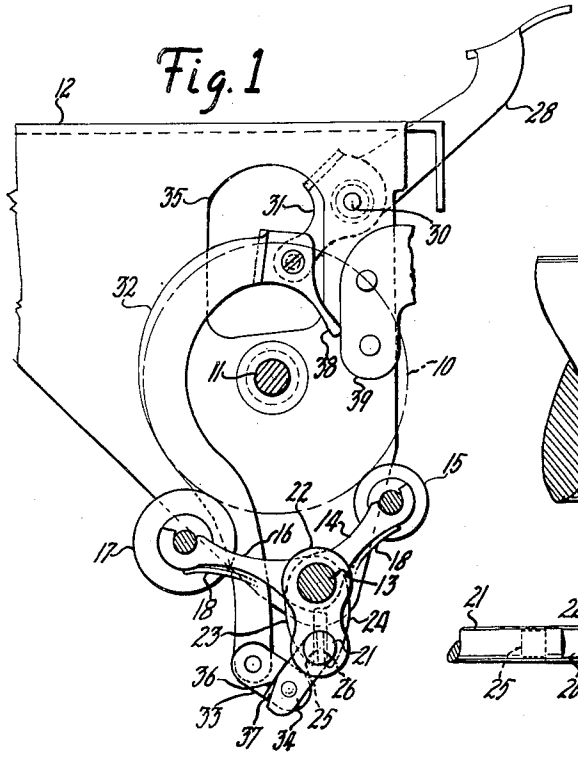



Fig. 2

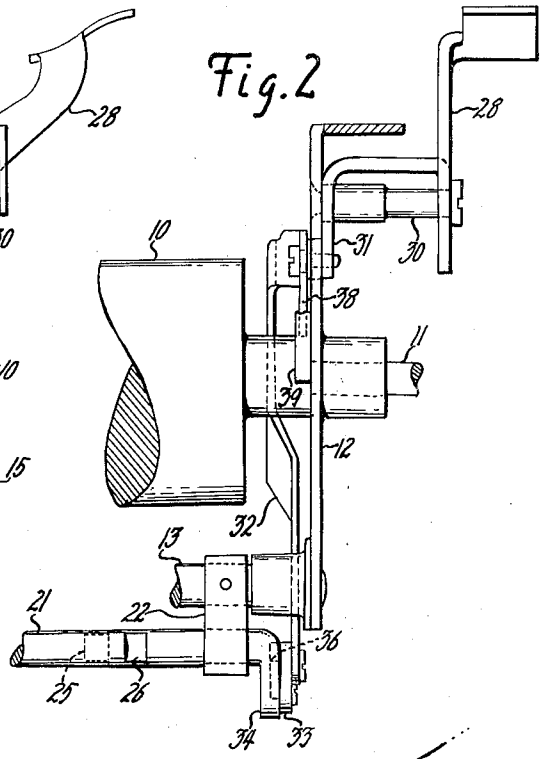
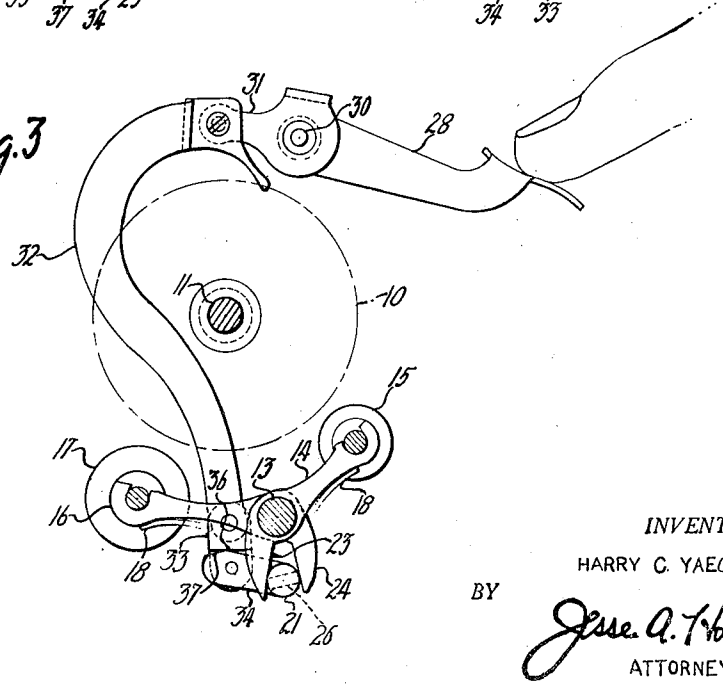



Fig. 3




INVENTOR.
HARRY C. YAEGER
BY Jesse A. Holton
ATTORNEY

Patented Mar. 21, 1950 2,501,117

# UNITED STATES PATENT OFFICE

2,501,117

## FEED-ROLL RELEASE MECHANISM FOR TYPEWRITING MACHINES

Harry C. Yaeger, West Hartford, Conn., assignor to Underwood Corporation, New York, N. Y., a corporation of Delaware

Application December 30, 1946, Serial No. 719,275

4 Claims. (Cl. 197—138)

1

This invention relates to feed-roll release mechanisms for typewriters and the like.

In the regularly manufactured Underwood Standard typewriter the feed-rolls which engage the underside of the platen are collectively released by a crank or cam-shaft, which to perform its function, requires about one-quarter turn. See, for example, the patent to Helmond, No. 1,392,940. Prior to the present invention, the said cam-shaft was given a quarter turn by a feed-roll release lever which was directly communicative with a crank arm of said cam-shaft by means of a link. Due to the arcuate operating path of the point of connection between said link and the crank arm, the line of action of the link, with respect to the crank-shaft, was of necessity unfavorably close to the crank-shaft axis at the beginning of the feed-roll releasing operation when resistance offered to the turning of the crank-shaft was at a maximum. The initial action or touch of the feed-roll release lever was thus very harsh and objectionable. The harsh action suggested often that the feed-roll release was functioning improperly, and, in fact, it resulted often in distortion, fatigue and breakage of the link or its operating lever.

According to the invention, a two-part linkage is provided between the feed-roll release lever and the crank arm of the crank-shaft, and provision is made so that the part of the linkage which has connection with the crank arm will act as an extension of the crank arm at the outset of the feed-roll releasing operation when the resistance offered to the turning of the crank-shaft is the greatest. Maximum leverage upon the crank is thus had at the beginning of the feed-roll releasing operation and the leverage decreases thereafter.

It is, therefore, an object of the invention to provide a feed-roll release mechanism which is operable with ease and which mechanism is efficient and simple in structure and operation.

It is another object of the invention to provide an efficient feed-roll release mechanism which acts with maximum leverage at the beginning of the feed-roll releasing operation and in which the leverage decreases thereafter.

Referring now to the drawings:

Figure 1 is a sectional side elevation of a platen supporting carriage, as seen from the left of the machine, and including the mechanism of the invention in paper feeding condition.

Figure 2 is a fractional front elevation of the right platen-frame-end seen in Figure 1.

Figure 3 is a view showing some of the parts seen in Figure 1 operated to release the feed-rolls.

Referring now to Figures 1 and 2 of the drawings, a cylindrical platen 10 is turnably supported by means of a platen axle 11 at the opposite ends of the platen, in platen frame ends 12, in a conventional manner, only the right hand frame-end

2

being shown. These frame ends 12 have a tie-rod 13 extending therebetween underneath the platen. On this tie-rod 13 there are pivotally carried, at spaced locations therealong, a plurality of forwardly extending arms 14 for supporting front feed-rolls 15, and a plurality of rearwardly extending arms 16 for supporting rear feed-rolls 17. Springs 18 bear resiliently against the underside of the arms 14 and 16 to press the feed-rolls 15 and 17 into feeding contact with the platen 10.

Below the tie rod 13 there extends parallel thereto a cam-shaft 21 which at several spaced points therealong has pivotal support in hangers 22, rigidly carried on the tie rod 13, only one of these hangers being shown.

The forwardly and rearwardly extending feed-roll carrying arms 14 and 16 constitute parts of levers including respectively also arms 23 and 24 reaching downwardly in back and front of the cam-shaft 21. Said cam-shaft is formed with flat faces 25 and 26 for camming cooperation with the arms 23 and the arms 24, respectively. The arms 23 and 24 stand normally slightly off said cam faces as is shown exaggerated in Figure 1, thereby to assure normally full-pressure feeding contact. In order to effect release of the feed-rolls from the platen, see Figure 3, the cam-shaft is given approximately 90 degrees turn. During such movement the cam-faces 25, 26 are active to spread the arms 23, 24 and thereby lower the feed-rolls. It will be seen that the resistance to the turning of the shaft is greatest when the cam faces 25, 26 start to act on the arms 23, 24 and that thereafter, the resistance against turning diminishes gradually.

The structure described to this point is conventional in Underwood machines and the invention provides in association therewith an efficient and easily operable mechanism for turning the crank-shaft 21. This mechanism comprises a feed-roll release handle 28 which has pivotal support upon one of the carriage ends 12 on a stud 30, the handle having a branch 31 wherefrom there depends pivotally a pitman 32. Pivotal connection of the branch 31 is had with the pitman through a hole 35 in the end 12. At the lower end of said pitman, a short link 33 has pivotal connections at one end with said pitman and at another end with a crank 34 which preferably is formed as an integral bent-off portion of the crank-shaft 21. The normal relation of the parts is established by the abutment of a finger extension 38 of the pitman 32 with an abutment 39. The crank 34 and the link 33 form normally a bent knee which points downwardly, in a direction opposite to the feed-roll releasing action of the pitman 32 which is in an upward direction. The link 33 is formed with a transverse abutment shoulder 36 which is normally in contact or virtually in contact with the

crank **34** above its pivotal connection therewith, as shown in Figure 1, so that during initial feed-roll releasing motion given to the feed-roll release lever **28**, the link **33** moves as a leverage increasing extension of the crank **34**, unitarily therewith. Preferably, the pivotal point of connection between the pitman **32** and the link **33** is normally at a point where a line from the crank axis is substantially normal to the initial line of action of the pitman **32**. Moreover, said point of connection is preferably at a greater distance from the crank axis than the point of connection of the link **33** with the crank. Greater leverage is thus had for turning the crank-shaft at the beginning of the feed-roll releasing action. In the course of moving the feed-roll release lever **28** from Figure 1 to Figure 3 position, the pitman **32** aligns itself with the link **33**, and the alignment will prevail during a later part of the feed-roll releasing motion, for the reason that, as viewed in Figure 3, some capacity for the link to turn anti-clockwise with respect to the crank **34** is provided for by a slight trimming of the crank at **37**. In effect, the link **33** functions as part of the pitman after it assumes aligned relation therewith. It follows thus that during the latter part of the feed-roll releasing motion the crank is turned by a line of action which is directly through the pivotal points of the pitman and the link **33**. This provides that during the latter part of the feed-roll releasing motion the turning leverage for the crank **34** is reasonably maintained, it being noted that if the normal relation of the link **33** with the crank were maintained throughout the feed-roll releasing action, the direction of force would at the conclusion of the action be too closely in line with the axis point of the crank **34**.

In Figure 3 the feed-roll release lever **28** is shown fully operated. The limit of operation of the lever **28** is determined by the upper edge of the frame hole **35**, see Figure 1. In the Figure 3 position the feed-rolls are held in cast-off position inasmuch as the arms **23**, **24** are then contacted by the periphery of the crank or cam-shaft **21**.

It will be noted that in the described structure the final line of action of the pitman **32** and the link **33** is nearly at full crank-length from the crank axis, and that this is so despite the fact that the initial action is applied at somewhat more than crank-length from the said axis.

To restore the feed-rolls, the release lever **28** is moved upwardly from its Figure 3 position and the link **33** will tilt away from the tie rod **13**, the motion being transmitted from the link **33** via the abutment shoulder **36** which contacts the trimmed portion **37** of the crank, the link being then moving unitarily with the crank. As the crank approaches normal position, the normal position stop finger **38** on the pitman is arrested but the crank thereafter turns a little further under the influence of the arms **23**, **24** acting on the faces **25**, **26** under the tension of the springs **18**, the final relation of the parts being then as shown in Figure 1. It will be noted that the restoration of the feed-roll mechanism is effected under favorable leverage conditions.

What is claimed is:

1. The combination with a feed-roll mechanism comprising a feed-roll releasing crank requiring a rocking movement to release feed-roll means, of means to rock said crank, comprising, a feed-roll release lever, a pitman operable by said lever, a link having a pivotal connection with said crank and having another pivotal connection with said pitman farther from the axis of the crank than the first said pivotal connection, and means to cause said link to move for a first part of the feed-roll releasing movement as a leverage increasing extension of the crank, and to cause said link to move for a later part of the feed-roll releasing movement as an extension of the pitman and no longer as an extension of the crank.



2. The combination with a feed-roll mechanism comprising a feed-roll releasing crank requiring not appreciably less than 90 degrees actuation to move feed-rolls from an applied to a released state, of means to actuate said crank, comprising, a manually operable feed-roll release lever, a pitman operable by said lever, a short link having a pivotal connection at one end with said pitman and having another pivotal connection at another end with said crank, said link and said crank forming normally a bent knee pointing away from the direction of feed-roll releasing action of the pitman, and abutment means oppositely on said link and said crank limiting pivotal motion of the link with respect to the crank in at least one direction and providing that the link constitutes a leverage increasing extension of said crank during an initial feed-roll releasing motion of said release lever, the possible pivotal motion of said link with respect to the crank permitting said link to assume and remain in an aligned relation with respect to said pitman during a later part of the feed-roll releasing motion, thereby to turn the crank without undue decrease of leverage which otherwise would result from continued swing of said link with said crank.

3. The invention set forth in claim 2, said abutment means limiting the pivotal motion of said link with respect to said crank also in the other direction to provide that reverse actuation of the feed-roll release lever will restore the crank.

4. The combination with a feed-roll mechanism comprising a feed-roll releasing crank requiring not appreciably less than 90 degrees actuation to move feed-rolls from an applied to a released state, of means to actuate said crank, comprising, a manually operable release lever, a pitman operable by said lever, a short link having a pivotal connection at one end with said crank, being outreaching therefrom, and having a pivotal connection with said pitman at a point where a line from the crank axis is substantially normal to the initial line of action of the pitman, said link and said crank forming normally a bent knee pointing away from the direction of feed-roll releasing action of the pitman, and abutment means limiting pivotal motion of the link with respect to the crank in one direction so that the link initially moves the crank as a leverage increasing extension thereof until the link assumes an aligned relation with the pitman, and functions thereafter as an extension of said pitman to turn the crank at a not too rapidly decreasing leverage.

HARRY C. YAEGER.

## REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS


| Number | Name | Date |
|---|---|---|
| 1,567,872 | Smith | Dec. 29, 1925 |