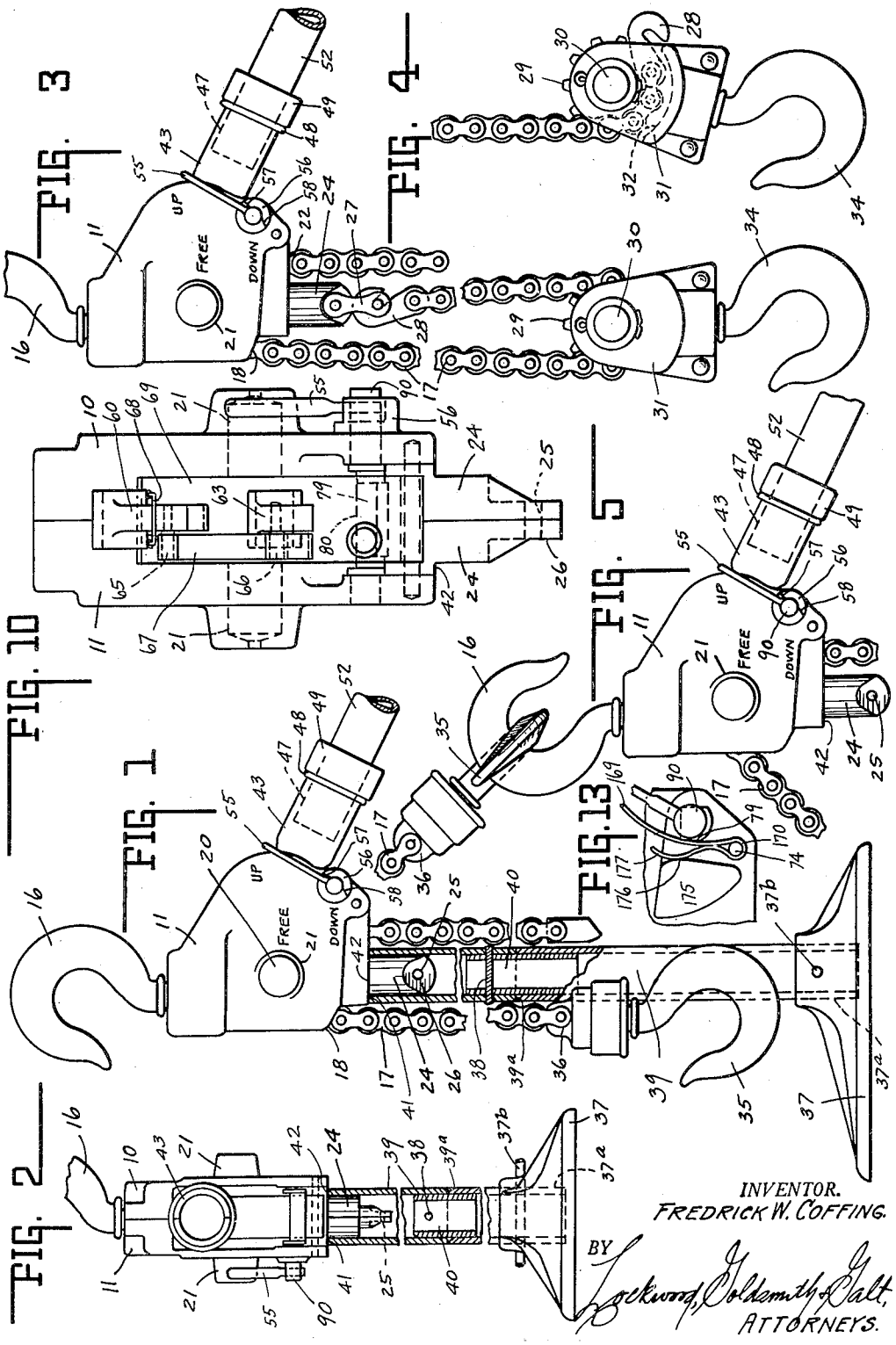
May 16, 1950 F. W. COFFING 2,507,889

FREE CHAIN COMBINATION HOIST AND WIRE STRETCHER

Filed Dec. 20, 1944 2 Sheets-Sheet 1



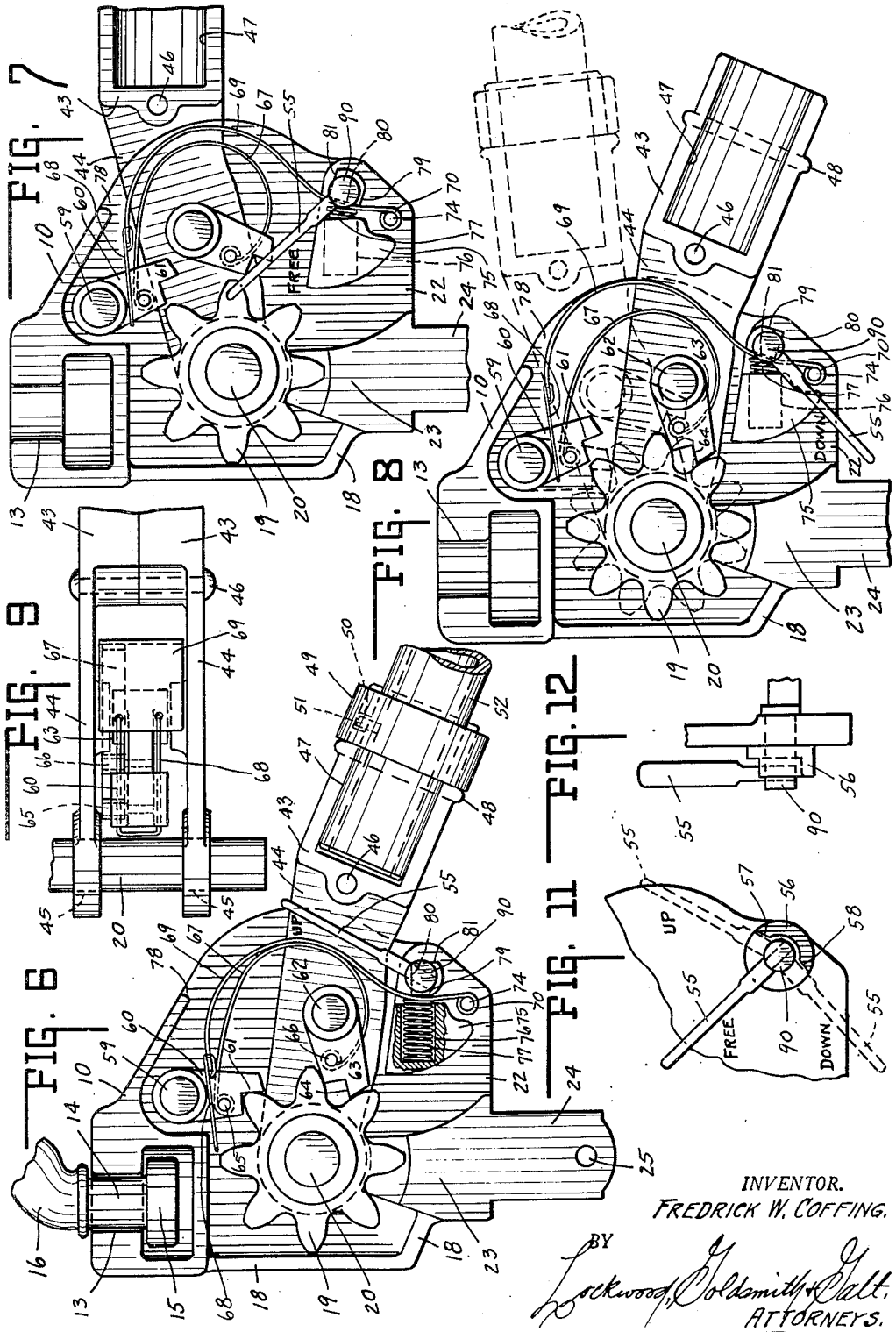
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FREE CHAIN COMBINATION HOIST AND WIRE STRETCHER

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10 Claims. (Cl. 254—164)

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This invention relates to a structure capable of operating as a hoist, a jack, a wire stretcher, a load binder and a multiple power hoist.

This invention is a continuation in part of application Serial No. 537,406, filed May 26, 1944, and entitled "Combination hoist, jack and wire stretcher," now Patent No. 2,377,324, dated June 5, 1945.

The chief object of the present invention is like that of the previous invention above identified with the additions hereinafter specified.

The chief feature of the present invention primarily resides in the means for controlling the operation of the internal parts and the provision of a second enclosing spring as it were.

Another feature of the invention resides in the reeving arrangement as well as the hoist anchoring end structure.

Other objects and features of the invention will be set forth more fully hereinafter.

The full nature of the invention will be understood from the accompanying drawings and the following description and claims.

In the drawings:

Fig. 1 is a side elevation of the invention utilized as a jack, parts of the sectional standard being broken away and shown in section to show other parts of the hoist in elevation, the manual control being shown in the load elevating controlled position, and the major portion of the handle being omitted.

Fig. 2 is a similar view taken at right angles to Fig. 1 with a considerable portion of the sectional standard being broken out and a portion thereof being shown in central section.

Fig. 3 is a side elevational view of the hoist proper when utilized as a multi-power unit and in reeving arrangement.

Fig. 4 is a side elevational view of the reeving pulley and load supporting hook, together with the elevating chain and the hook on the end thereof.

Fig. 5 is a side elevational view of the hoist and the chain in the load binding position, the load encircling portion of the chain and the load being omitted.

Fig. 6 is a side elevational view of the hoist proper with one-half of the housing removed, the control being shown in position for load elevation.

Fig. 7 is a view similar to Fig. 6 and of the same parts and with the control in the free chain position.

Fig. 8 is a similar view of the same parts, and the manual control in the load lowering position, dotted lines indicating a second position of the handle.

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Fig. 9 is a top plan view of the handle, the handle carried pawls and the associated springs.

Fig. 10 is a side elevational view of the hoist body with associated parts and is taken looking toward the sprocket and the handle side of the hoist.

Fig. 11 is a side elevational view of that part of the housing associated with the manual control and illustrates the stops for limiting the same in the load elevating and load lowering positions, three positions of the control being illustrated, two being shown by dotted lines, the full lines illustrating the free chain position of the control.

Fig. 12 is an end elevation of the last mentioned mechanism.

Fig. 13 is a side elevation of a further modified form of combined auxiliary spring and main spring and associated parts, same being illustrated in the position that the corresponding parts are illustrated in Fig. 6.

In Fig. 2, 10 and 11 indicate a split housing structure suitably secured together and at their upper ends providing a cylindrical bore 13, see Figs. 6 and 7, in which is mounted the stem 14 having the head 15 of a suspending hook 16, see Figs. 1 to 3 and 5. A load chain 17 enters the housing at opening 18, and this chain is of sprocket type and associated therewith within the housing is a sprocket 19 carried by the shaft 20 suitably supported in the bearings 21 of the two housing members 10 and 11. The free end of the chain leaves the housing as at opening 22.

Between the openings 18 and 22 there is provided the abutment 23 which reenforces each housing member. Depending from said abutment is the stem portion 24 apertured at 25. This is reduced as at 26, and said aperture may mount, see Fig. 3, a link 27 with which may be associated a hook 28 carried by the load end of the chain 17 which in Fig. 3 passes under a sprocket pulley 29 rotatable on the shaft 30 carried by a block 31 that has a channel 32, see Fig. 4, therethrough and which also similarly supports a load engaging hook 34.

When the hook 28 is detached from the link 27, it engages the pulley block 31 as shown in Fig. 4. With this arrangement each advance or retraction of the chain effects similar advance or retraction of the hook 34. When the parts are associated as shown in Fig. 3, each advance of the chain or retraction thereof provides that the hook 34 advances or retracts but half the distance

of the chain movement, and since the load is now supported by two lengths of chains instead of one, compare Figs. 1 and 4, and the load that can be accommodated by the chain, Fig. 3, is now twice that accommodated by the hook 35 suitably connected as at 36 to the load elevating end of the chain 17.

This particular use of the invention shown in Figs. 3 and 4 is also illustrated in Patent No. 2,351,665, dated June 20, 1944, and is not claimed herein but is illustrated solely for the purpose of exemplifying an additional utilization of the hoist shown herein.

Referring to Figs. 1 and 2, it will be noted that there is provided a base plate 37 socketed as at 37a to nest the lower end of the tubular standard 39, the latter being pinned thereto as at 37b. The upper end of the standard 39 as at 41 is adapted to bear on the lower base 42 of the hoist housing and to telescopically receive the projecting portion 24 apertured at 25 and to which the chain link 27 may be secured as illustrated in Fig. 3.

Herein standard 39 is sectionalized at 39a and secured by pin 38 in the lower end of the upper section is a tube 40 which projects downwardly and telescopes in the upper end of the lower section. Portion 24 may nest in this lower section and base 42 bear upon the upper end of said section when a lower standard is desired.

A yoke type handle member 43 has arms 44 that straddle the sprocket and other internal mechanism of the hoist, and this yoke is pivotally supported by the shaft 20 in bearings 45 in said arms 44, as shown in Fig. 9.

This handle 43, see particularly Figs. 1, 3, 5, 6 and 8, is a two-piece handle suitably secured together as at 45, and the outer free end thereof is socketed as at 47. Adjacent the outer end is provided a peripheral stop 48, and encircling same may be a collar 49. The outer free end of this socket structure is provided with a bayonet slot 53 which receives a pin 51 carried by a tubular handle 52 and which may be readily applied to the socket of the bifurcated handle or detached therefrom.

Whenever the hoist is to be used as a jack structure, a control member 55 is positioned as shown in Figs. 1, 5 and 6 and the hook 35, see Figs. 1 and 5, engages the load element to be elevated, and the resistance is taken by the sectional standard 39 and base plate 37, the load being elevated by reciprocating up and down the aforesaid handle structure.

When the load is to be lowered, the control member 55 is turned counter-clockwise slightly less than 180° and the handle again reciprocated up and down and the load lowered step by step.

Referring to Figs. 11 and 12, the housing forming member 11 has formed thereon the boss 56 with faces 57 and 58 which limit the positions of the manual control member 55 in the so-called up and down positions. This control member is rigid with a shaft and cam member 60 to which reference will be had more fully hereinafter.

Figs. 5 and 6 show the control member up.

Fig. 8 shows the control member down.

When the control member 55 is positioned, as shown by the full lines in Fig. 11, the hoist is then conditioned for free chain action, and this is further illustrated in Fig. 7. In this position, with no load on the chain and handle 43 lifted, the chain may be readily pulled through the hoist in one direction or the other as desired.

When the hoist is to be suspended for load elevation, the standard 39 is detached and the hoist supported from overhead by the hook 16 before mentioned, then the hook 35 is associated with the load, and it is elevated or lowered at will or held in the elevated position, if desired.

In like manner the hook 34 etc. of the multi-power modification may be similarly associated with the load for hoisting same at half the preceding rate, but having a capacity double that of the load capacity of the hoist shown in Fig. 1.

When the hoist is to be used for wire stretching and the like, the hook 35 or the hook 34 depending upon which modification is used is associated with one end of the fence or wire to be stretched and the hook 16 is then connected to some stable anchorage.

Whenever the hoist is to be used as a load binder, the hook 35 together with the chain 17 is passed around the load and the hook 35 and hook 16 are interlocked as shown in Fig. 5, and then the chain is drawn through the hoist which contracts the load and binds it together. When so bound, other binders may be applied for permanent retention of the load in bound position, and then the hoist can relieve the tension on chain 17 by moving the manual control member 55 to the down position and again reciprocating the handle to "retract" the chain as it were.

Broadly speaking, the operation of this invention is the same as that heretofore described in said patent. The following description is directed to the control cam actuated by the control member and the several springs associated with the two pawls, each operatively associated with a singular sprocket that is associated with the sprocket chain. For clearness, the chain is omitted from Figs. 6 to 10 inclusive, and except for the manually operable cam member, the description will be hereinafter directed to such figures.

Herein sprocket gear 19 has teeth of such length that the chain 17 when associated therewith have portions projecting beyond the chain. In the housing or body of the hoist there is pivoted at 59 a pawl 60 having notched end 61. Within the arms 44 there is pivoted at 62 the pawl 63 having notched end 64, see Fig. 8.

Each pawl mounts on the same side a pin retainer 65 and 66 respectively, see Fig. 6, upon which is secured, as by curling the adjacent end of strap spring member 67 of partial scroll or arch outline. Pawl 60 is straddled by U-shaped member 68 secured, as shown in Fig. 9, to the end of spring 69.

The strap spring 69 is wider than spring 67 and is similarly arched. The opposite end of spring 69 is curled at 70 and is anchored to the hoist body by pin 74 socket seated in the confronting portions of the housing. The U-shaped member 68, compare Figs. 6, 7 and 8, slides relative to pawl 60 as spring 69 is shifted and in Fig. 6 pawl 60 bears against the adjacent end of spring 69 while in Figs. 8 and 9 pawl 60 is constrained in the opposite direction by U-shaped member 68.

One half of the body has the portion 75 providing bore 76 in which is seated coiled spring 77, see Figs. 6 and 7. The bore exposed end of spring 77 bears against spring 69 at all times and constrains same outwardly as it were with reference to the sprocket axis. Such bearing is naturally spaced from anchorage 74 so as to be effective.

The body has the opening 78 from which projects the handle. Springs 67 and 69 are positioned adjacent each other and between arms 44 thereof. Spring 69 is of such width and

length that it substantially closes opening **78** except for the resulting two parallel slots in which arms **44** oscillate.

Referring more particularly to Figs. 6, 7, 8, 11 and 12, it will be noted shaft **90** of the manual control, and within the housing, has three cam faces **79**, **80** and **81** and same are juxtapositioned to anchorage **74** of spring **69** and the bearing of spring **77** thereon. When member **55** is neutrally positioned, see full lines in Fig. 7 and Fig. 11, cam face **80** bears against spring **69**. When member **55** is turned up, see Fig. 6, for load elevation in lever oscillation, cam face **79** bears against spring **69**. When member **55** is turned down, see Fig. 8, for load lowering in lever oscillation, cam face **81** bears against spring **69**.

The several cam faces are of appropriate character and appropriately positioned to secure the desired control of spring **69** which in turn, see Fig. 6, imposes its control upon spring **67**. Broadly speaking, the operation of the pawls through lever oscillation and the aforesaid control is substantially that previously described in said patent.

In Fig. 13 a simplified form of "outer" spring and auxiliary spring is illustrated. Herein the cam member is the same as before and juxtapositioned thereto is spring **169** comparable to spring **69**. It is supported upon pin **74**, seated by the housing, by the bent portion **170**. Instead of having a curl formation, the free end is extended as at **176** and this spring finger at **177** bears against the lateral abutment **175** at bearing face **176**. Spring **176—177** is the full equivalent of spring **77** in bore **76**, see Fig. 6. The operation of this simplified embodiment is the same as that previously illustrated.

While the invention has been illustrated and described in great detail in the drawings and foregoing description, the same is to be considered as illustrative and not restrictive in character.

The several modifications described herein, as well as others, which will readily suggest themselves to persons skilled in this art, all are considered to be within the broad scope of the invention, reference being had to the appended claims.

The invention claimed is:

1. In combination with a hoist body having a lifting chain carried thereby and a base, the combination therewith of a sectional standard interposed between said body and base and detachably connected to each, the hoist body including a lateral face with a projection outwardly therefrom, the projection being laterally apertured for chain end connection and the standard, at its upper end, being tubular for nesting said projection when the chain end is not attached thereto, the body bearing upon the upper end of the tubular portion of the standard.

2. In combination a standard, a base therefor, a hoist body having a lifting chain carried thereby, and means at opposite ends of the body for body selective support purposes, the standard being tubular at its upper end and the lower body support means having a lateral face with a projection directed outwardly therefrom, the projection being laterally apertured for chain end connection, said projection being nestable in the tubularity with the support means face always bearable upon the top of the standard, the body when so supported being angularly adjustable about the longitudinal axis of the standard.

3. In combination with a sprocket gear, a sprocket chain having successive openings therethrough for gear tooth exposure beyond the chain, a pair of pawls arranged for engagement with the chain exposed portion of the gear teeth, the pawls engaging different but closely adjacent teeth, and a lever for oscillating one pawl relative to the gear, the combination of a pair of comparatively independent springs having operative association with the pawls, one of said springs being permanently connected to both pawls and the other having selective connection with one of the pawls.

4. Structure as defined by claim 3 wherein means is provided having selective association with the other of said springs for selective control of said pawls.

5. In combination a sprocket gear, a sprocket chain thereon, a pair of sprocket engaging pawls, an oscillatable lever, one of the pawls being pivoted on the lever and oscillatable thereby and tiltable independently thereof, means constraining said pawls toward sprocket engagement, the pawls having selective engagement, means for removing the pawls from such engagement in opposition to said constraining means when no load is on the chain and for free chain movement, said constraining means comprising a pair of juxtapositioned arched strap springs, the arching being similarly directed for interfitting and throughout the major length of each spring.

6. In a structure with a body having at least a pair of openings for chain accommodation, a sprocket gear rotatable in the body in juxtaposition to the openings, a chain in the body and exposed at the openings and gear engageable, a lever of bifurcated type having arm portions straddling the gear and having a pivotal axis coincident with the sprocket gear axis, the body having an elongated opening in which the lever oscillates, and a pair of pawls in the body and sprocket tooth engageable, the combination of spring means connecting said pawls together, the pawls being in response to lever oscillation actuatable, and a strap spring substantially closing the third mentioned body opening and straddled by the arm portions of the bifurcated lever and operatively associated with said pawls.

7. Structure as defined by claim 6 wherein the spring is arched and the spring means is also arched and of strap type and straddled by the lever arm portions.

8. Structure as defined by claim 6 wherein there is provided means for selectively controlling sprocket gear direction of rotation incident to lever oscillation, one pawl being pivoted between the lever arm portions and upon an arm portion of the lever, the spring means also being arched and of strap type and straddled by the arm portions.

9. In combination a sprocket gear having teeth, a sprocket chain in engagement therewith, a pair of pawls arranged for engagement with certain of the chain engaged teeth, a pivoted handle mounting one of said pawls for oscillating said pawl for gear movement, spring means including a portion interconnecting the pawls for biasing the same, and manually shiftable means for selectively controlling chain advance or retraction in handle oscillation and operatively engaged with said spring means, said shiftable means comprising a pivoted cam having three adjacent spring means engageable faces for adjusting said spring means and an arm operatively connected to said shiftable means for positioning one of

said faces in operative engagement with the spring means.

10. In combination a sprocket gear having teeth, a sprocket chain in engagement therewith, a pair of pawls arranged for engagement with certain of the chain engaged teeth, a pivoted handle mounting one of said pawls for oscillating said pawl for gear movement, spring means including a portion interconnecting the pawls for biasing the same, and manually shiftable means for selectively controlling chain advance or retraction in handle oscillation and operatively engaged with said spring means, said shiftable means comprising a pivoted cam having three adjacent spring means engageable faces for adjusting said spring means and an arm operatively connected to said shiftable means for positioning one of said faces in operative engagement with the spring means, and stop means mounted

in the path of said arm for limiting the extreme pivotal movement of the cam in opposite directions.

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REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
2,244,571	Pignani et al.	June 3, 1941
2,351,665	Coffing	June 20, 1944
2,377,324	Coffing	June 5, 1945

FOREIGN PATENTS

Number	Country	Date
364,707	Great Britain	Jan. 4, 1932