

Dec. 18, 1934.

S. C. SIMMONS ET AL

1,984,659

CONVEYING AND GROUPING MACHINES

Filed Jan. 22, 1934

3 Sheets-Sheet 1

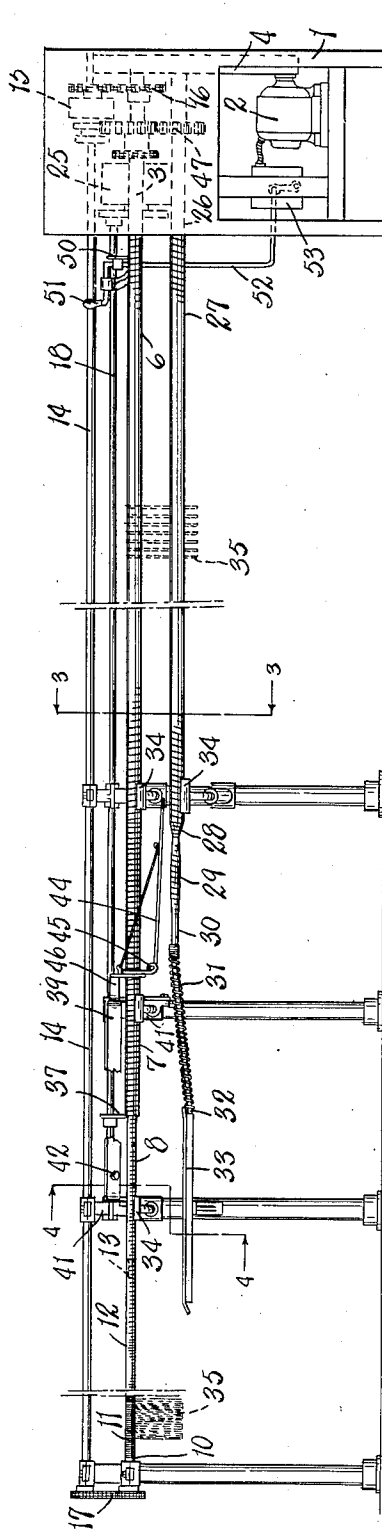


Fig. 1

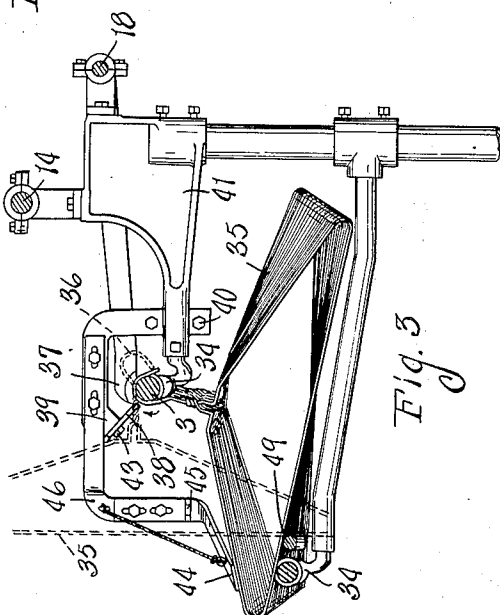


Fig. 3

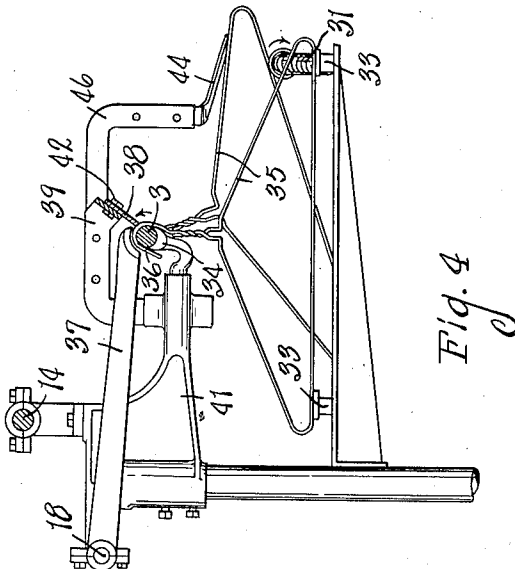


Fig. 4

INVENTORS
Stanley C. Simmons
Harry M. Simmons
BY
Chapell & Earl
ATTORNEYS

Dec. 18, 1934.

S. C. SIMMONS ET AL

1,984,659

CONVEYING AND GROUPING MACHINES

Filed Jan. 22, 1934

3 Sheets-Sheet 2

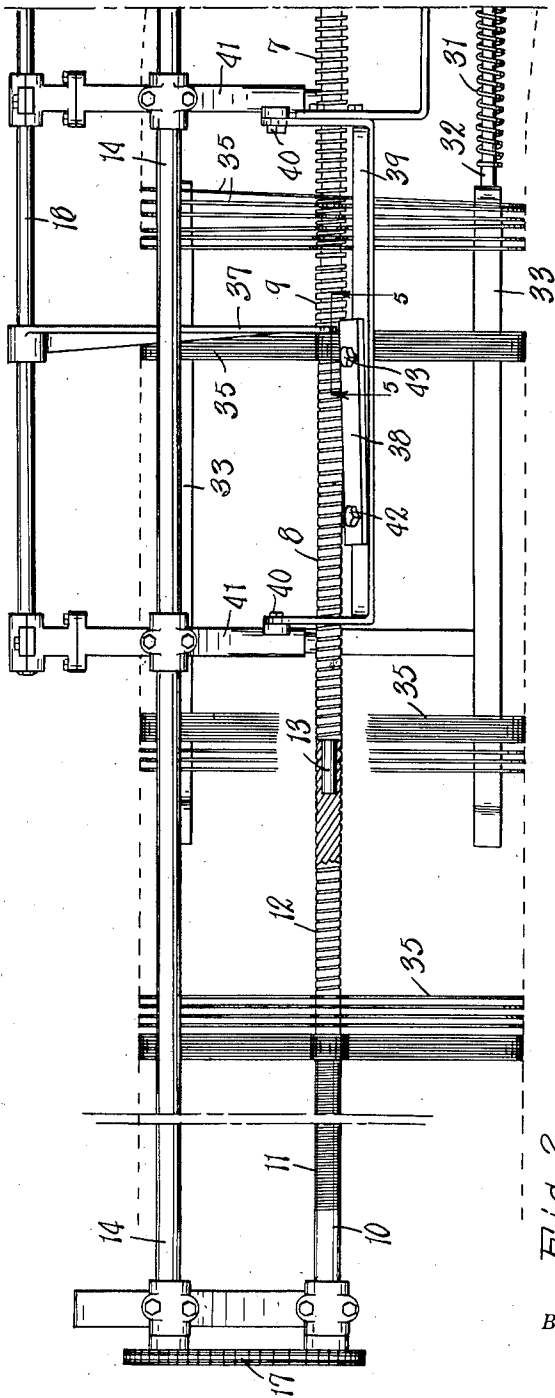


Fig. 2

BY

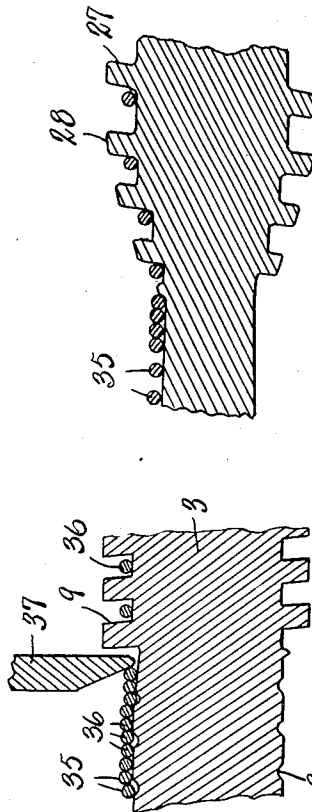


Fig. 5

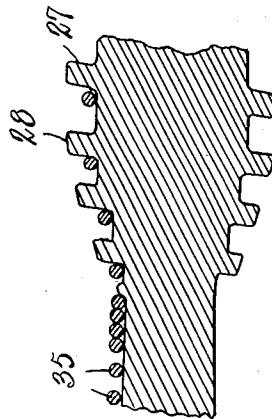


Fig. 6

INVENTORS
Stanley C. Simmons
Harry M. Simmons
BY *Chapell & Co.*
ATTORNEYS

Dec. 18, 1934.

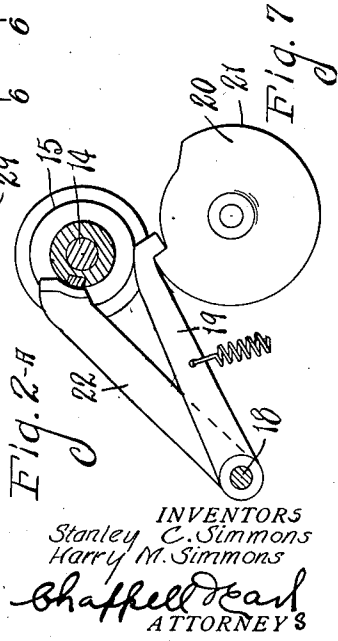
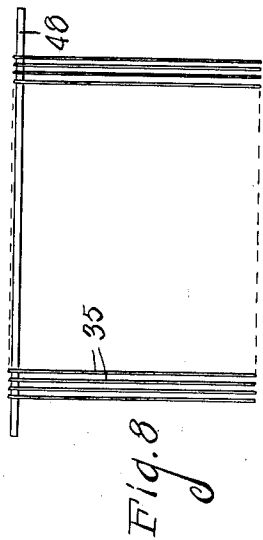
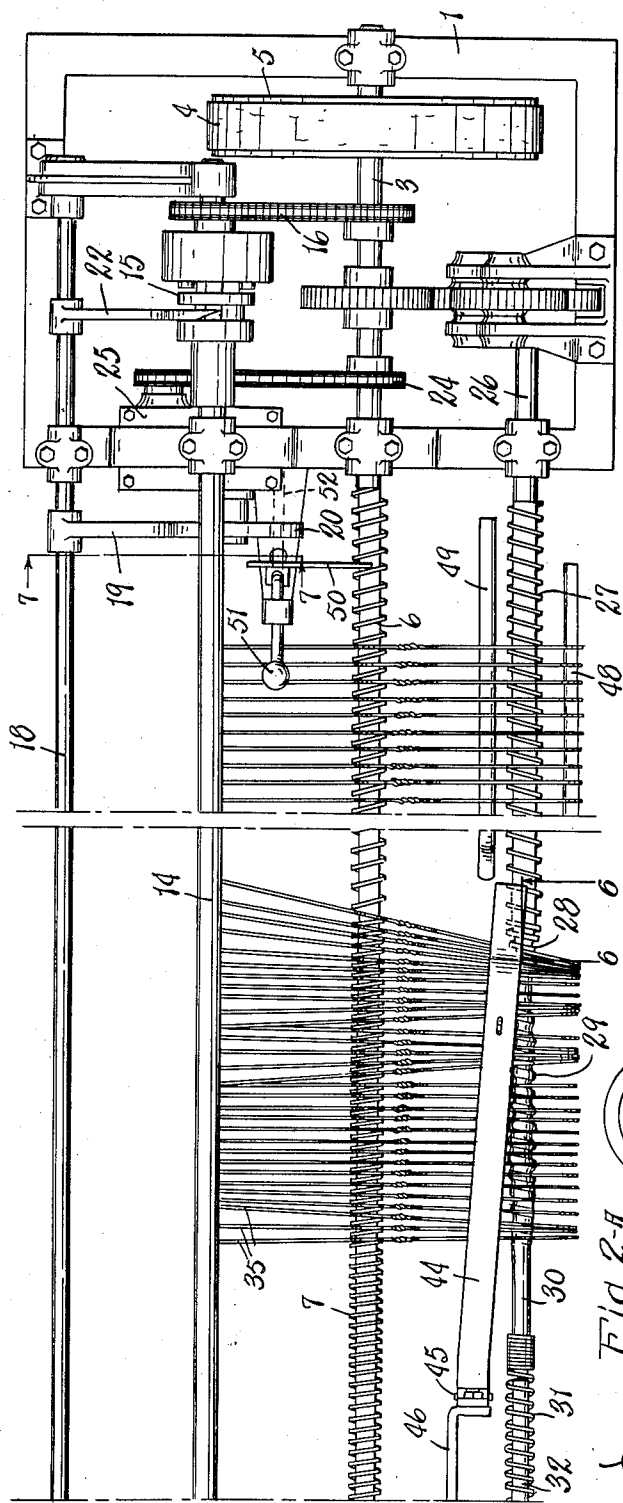
S. C. SIMMONS ET AL

1,984,659

CONVEYING AND GROUPING MACHINES

Filed Jan. 22, 1934

3 Sheets-Sheet 3



INVENTORS
Stanley C. Simmons
Harry M. Simmons
Chaffell Deal
ATTORNEYS

UNITED STATES PATENT OFFICE

1,984,659

CONVEYING AND GROUPING MACHINES

Stanley C. Simmons, Oaklawn, Ill., and Harry M. Simmons, Pittsburgh, Pa., assignors to Star-Service Hanger Company, Detroit, Mich.

Application January 22, 1934, Serial No. 707,634

26 Claims. (Cl. 198—34)

The main objects of this invention are:

First, to provide a conveyor for wire garment hangers and the like which is adapted to receive the garment hangers in bundles or unspaced relation and to space and group them preparatory to removal to an enameling or coating apparatus.

Second, to provide a machine or apparatus for this purpose which is mainly automatic in operation, such manual operations as are required being simple and requiring a minimum of effort.

Third, to provide a machine or apparatus for this purpose which is of large capacity.

Fourth, to provide a machine or apparatus embodying these advantages which is comparatively simple in structure.

Objects pertaining to details and economies of our invention will definitely appear from the description to follow. The invention is defined in the claims.

A machine embodying the features of our invention is clearly illustrated in the accompanying drawings, in which:

Fig. 1 is a front elevation of a machine embodying the features of our invention, parts being broken away for convenience in illustration and parts being shown mainly in conventional form.

Figs. 2 and 2A are complementary plan views, the work being shown in several positions, but it will be understood that the machine is not completely filled with work as in continuous use.

Fig. 3 is an enlarged fragmentary view in section on a line corresponding to line 3—3 of Fig. 1, one of the positions of the hangers in removing being indicated by dotted lines.

Fig. 4 is a fragmentary view in section on a line corresponding to line 4—4 of Fig. 1.

Fig. 5 is an enlarged detail section on line 5—5 of Fig. 2.

Fig. 6 is an enlarged detail section on line 6—6 of Fig. 2A.

Fig. 7 is an enlarged detail section on line 7—7 of Fig. 2A showing details of the clutch control and a stop control.

Fig. 8 is a conventionalized view illustrating a group of hangers as lifted from the machine by an operator as by means of a transfer or supporting rod for the coating apparatus.

In the embodiment of our invention illustrated the machine is of such length as to serve as a conveyor. It should be understood, however, that this is varied in practice according to the particular needs of the factory and that the machine is desirable when used merely for

grouping and spacing the hangers. We have not attempted in the accompanying drawings to illustrate the parts in relative proportion.

At one end of the machine is a power unit designated generally by the numeral 1 comprising a suitable frame and housing containing a motor 2 which is connected to the main drive shaft 3 by means of the belt 4 and the pulley 5. The main drive shaft has a section 6 provided with threads, in this embodiment two threads to an inch; a section 7 in advance of the section 6, having threads four to the inch; a section 8 in advance of the section 7 having threads four to the inch. Between the sections 8 and 7 is a short section 9 having threads four to the inch but substantially deeper than the threads of the section 8. The purpose of this will appear as the description proceeds.

In advance of the section 8 of the shaft 3 is a conveyor feed shaft 10 having a threaded section 11 with threads seven to the inch, and a section 12 with threads four to the inch. This feed shaft is aligned with the main shaft 3 but is driven independently thereof, the shafts having a journal connection 13. The shaft 10 is driven through the shaft 14 disposed in parallel relation to the shaft 3 and intermittently driven through the clutch 15. The driven member of the clutch 15 is connected to the shaft 3 by means of the sprocket chain 16 and suitable sprockets, see Fig. 2A. The shaft 14 is connected to the feed conveyor shaft 10 by means of the sprocket chain 17 and suitable sprockets.

At the rear of the machine and parallel with the shaft 14 is a rockshaft 18 controlled by the arm 19 coacting with the cam 20, see Figs. 2A and 7. The cam 20 has a lift portion 21 of approximately 270 degrees, this being a timing cam for controlling the rockshaft and through it the control arm 22 for the clutch 15 so that the shaft 14 is intermittently driven. The cam 20 is driven from the shaft 3 through the sprocket chain 24 and suitable gearing in the gear box 25, the gearing not being illustrated. The object of this connection is to intermittently drive the shaft 14 and through it the shaft 10 at suitable speeds relative to the shaft 3.

A shaft 26 is provided, disposed in parallel relation to but in a plane below the conveyor shaft 3. This shaft has a threaded portion 27 with threads two to the inch corresponding to the section or portion 6 of the shaft 3, and a tapered lift portion 28, with threads three to the inch, joining the portion 27 with a portion 29 having relatively shallow threads approximately one to

the inch. In advance of this portion 29 is an unthreaded portion 30 having fixed thereto a spiral pick-up spring 31, the turns of which are approximately four to an inch. This pick-up is supported by a rod 32 extending from the rear ends of the slides or steady bars 33. The threaded portions of these shafts are supported by bracket bearings 34, the shafts resting in these bearings so that the threads are exposed and permit the work to be carried along by the shafts and over or past the bearings.

The work, in this case the garment hangers 35, is of the widely used type of wire hangers provided with suspending hooks 36. In practical use of the machine such as the embodiment of our invention illustrated, the hangers are taken from the forming machine and hooked upon the threaded portion 11 of the feed conveyor shaft 10. The only care required is that the hooks should all face rearwardly. The hangers are engaged in bundles of such size as may be convenient for the operator to handle. The shaft 10 being intermittently driven as described feeds the hangers along substantially without separating; however, when they reach the portion 12 of this feed conveyor shaft the separation begins as indicated in Fig. 2, and they are carried along by this intermittently driven feed conveyor shaft and delivered upon the continuously driven shaft, the section 8 of which, as described, has threads corresponding to the threads of the section 12, namely four to an inch. This thread is preferably quite shallow and has just enough depth to insure that the hangers are advanced. The purpose of having the section 12 of greater pitch than section 11 of the feed shaft is to prevent an excessive pressure on the hangers that are bunched before or stopped by the stop 37 mounted on the rockshaft 18 to swing to and from stopping position. The movement of this shaft, as stated, is controlled by the cam 20, the stop swinging out of the way for predetermined periods to allow a predetermined number of hangers to pass. The speed of the shaft 3 in the embodiment illustrated is such that about fifty hangers will pass while the stop is in retracted position. The threads of the shaft sections 8 and 12 are shallow enough to permit the hangers being held back by the stop and to prevent their piling up or being thrown off the shaft by the pressure of the following hangers.

As the hangers are carried forward by the feed shaft, suspended entirely from their hooks, the arms of the hangers are brought into engagement with the steady bars 33 which stop any swinging or swaying movement, and the forward end of these bars guides the front ends of the hangers to the rotating pick-up spring 31 and tilts the hangers on their hooks as they are carried on to the shaft 26. As the hangers are carried forward to the stop and to prevent the hooks being lifted off the conveyor shaft 3 as they are retarded by the stop, they are engaged by a pivoted holder 38 which is carried by a bail-shaped frame 39 secured at 40 to the frame or supporting brackets 41. This holder 38, which might be termed a doctor bar, is adjustable on its bail-shaped support, its attaching means being indicated at 42 and 43. 42 may be a pivot and 43 a slot connection permitting the swinging adjustment of this holder member.

The section 30 of the shaft 26, as stated, is preferably without threads, while the section 29 has coarse shallow threads which, while acting to carry the hangers along without swaying move-

ment, permit straightening of the hangers, that is, permits them to come into a parallel relation as they are carried forward by the main conveyor shaft.

A holder bar 44 is pivoted at 45 on an arm 46 projecting from the support 39. This bar 44 rests on the hangers as they are carried forward by the conveyor shaft and then holds them steady as they are picked up by the tapered portion 28 of the shaft 26. This also enables the separate or individual picking up of the hangers by such portion of the shaft so that they are delivered thereby singly and in spaced relation to the delivery portion 27 of the shaft 26. The shaft 26 is driven slightly faster than the shaft 3, the train of gears designated generally by the numeral 47 connecting the shaft 26 to the shaft 3 being such as to accomplish this. The object is to compensate for the lag resulting from the retarding action described as the hangers are engaged by the portion 28 of the shaft 26.

When a group of hangers has accumulated at the take-off end of the machine, the operator passes a pick-up rod 48 through the front ends of the arms as indicated in Figs. 2A and 9 and positions the rod in the front bight of the hanger, and then lifts up thereon as indicated by dotted lines in Fig. 3. As the forward ends of the hangers are lifted upwardly, swinging the hooks on the conveyor shaft, the rear ends come into contact with the stripper bar 49, see Figs. 2A and 3, which disengages the hooks from the conveyor shaft as indicated in Fig. 3, permitting the operator to place the group of hangers, properly spaced on the bar, on a suitable conveyor or into a dipping or coating machine. The object of the spacing is to properly position the hangers so that they are out of contact and may be coated by dipping.

To prevent displacement of the hangers and jamming of the machine in the event the operator should fail to remove the grouped hangers at the take-off end, we provide an automatic control 50 which is positioned to be engaged by the first hanger of the group and to be actuated thereby. A manual control 51 is also provided. Both the automatic and manual controls 50 and 51 are connected by the control rod 52 to a control switch indicated at 53, see Fig. 1.

With the parts arranged as illustrated and described, the feed section of the conveyor may be of any length desired, and, it will be understood, will vary according to the particular installation. The balance of the machine, if desired, may be entirely standardized, and for economy in manufacture is preferably standardized.

In operation the operator serving the forming machines places the hangers upon the section 11 of the feed conveyor and preferably some attention is given to the section 12 thereof so that if it becomes overloaded a number of hangers may be removed and replaced on the section 11. It will be understood that the capacity of the machine is determined by the spacing mechanism and that it would be possible to overload the feed end of the machine. However, the feed conveyor shaft is driven with a step by step movement, the feed shaft being at rest while the spacing stop 37 is in actuated position as shown in Figs. 2 and 5, thereby preventing the delivery of hangers to the spacing conveyor shaft while they are being grouped in front of the stop. As soon as the stop is lifted to allow the hangers to pass the feed shaft starts.

The hangers are automatically carried along to take-off position and are properly spaced and supported in parallel position for removal, as described. To prevent the friction of the feed conveyor and the auxiliary spacing conveyor on the hangers displacing the hangers, the shafts are driven in opposite directions. In the embodiment illustrated the shaft 3 rotates in a clockwise direction and the shaft 26 in an anti-clockwise direction.

We have illustrated and described our improvements in an embodiment which we have found entirely practical. We have not attempted to illustrate or describe various modifications and adaptations which might be desirable as it is believed this disclosure will enable those skilled in the art to embody or adapt our improvements as may be desired.

The machine illustrated is adapted for hangers made of different gages of wire, in fact, for such range in gages as is found in commercial hangers at the present time.

Having thus described our invention what we claim as new and desire to secure by Letters Patent is:

1. In an apparatus of the class described, the combination of a main spacing shaft and an auxiliary spacing shaft disposed at the front of and in a plane below and parallel to the main shaft, a feed shaft constituting an extension for the main shaft and having a threaded receiving portion and a delivery portion with shallow threads of substantially greater pitch than the threads of its receiving portion, the main and auxiliary shafts having take-off portions with threads of the same pitch, the main shaft having a receiving portion at its front end with shallow threads and an intermediate portion joined to the receiving portion by a short section having relatively deep threads of a pitch intermediate the pitch of the threads of the receiving and intermediate portions, the threads of the intermediate portion being of less pitch than the threads of the take-off portion, the auxiliary shaft having an unthreaded front portion and an intermediate portion with shallow threads joined to the take-off portion by a tapered portion having threads of less pitch than the threads of the take-off portion, the unthreaded portion terminating in a coiled spring extension, said intermediate and front portions of said auxiliary shaft being disposed opposite the intermediate portion of the main shaft, an inclined supporting rod for and disposed within the spring extension of the auxiliary shaft, a work stop positioned to engage the work at the rear end of the receiving portion of the main shaft, means for intermittently driving said feed shaft, a control means for said feed shaft driving means and said stop whereby the stop is actuated to work engaging position during the periods of rest of the feed shaft, a work holder positioned to hold the work to the shaft when it is in position to be engaged by said stop, and a work hold-down member disposed to engage the work as it is translated from said intermediate portion of the auxiliary shaft to the take-off portion thereof.

2. In an apparatus of the class described, the combination of a main spacing shaft and an auxiliary spacing shaft disposed at the front of and in a plane below and parallel to the main shaft, a feed shaft constituting an extension for the main shaft and having a threaded receiving portion and a delivery portion with shallow

threads of substantially greater pitch than the threads of its receiving portion, the main and auxiliary shafts having take-off portions with threads of the same pitch, the main shaft having a receiving portion at its front end with shallow threads and an intermediate portion joined to the receiving portion by a short section having relatively deep threads of a pitch intermediate the pitch of the threads of the receiving and intermediate portions, the threads of the intermediate portion being of less pitch than the threads of the take-off portion, the auxiliary shaft having an unthreaded front portion and an intermediate portion with shallow threads joined to the take-off portion by a tapered portion having threads of less pitch than the threads of the take-off portion, the unthreaded portion terminating in a coiled spring extension, said intermediate and front portions of said auxiliary shaft being disposed opposite the intermediate portion of the main shaft, an inclined supporting rod for and disposed within the spring extension of the auxiliary shaft, and means for intermittently driving said feed shaft.

3. In an apparatus of the class described, the combination of a main spacing shaft and an auxiliary spacing shaft disposed at the front of and in a plane below and parallel to the main shaft, a feed shaft constituting an extension for the main shaft and having a threaded receiving portion and a delivery portion with shallow threads of substantially greater pitch than the threads of its receiving portion, the main and auxiliary shafts having take-off portions with threads of the same pitch, the main shaft having a receiving portion at its front end with shallow threads and an intermediate portion joined to the receiving portion by a short section having relatively deep threads of a pitch intermediate the pitch of the threads of the receiving and intermediate portions, the threads of the intermediate portion being of less pitch than the threads of the take-off portion, the auxiliary shaft having an unthreaded front portion and an intermediate portion with shallow threads joined to the take-off portion by a tapered portion having threads of less pitch than the threads of the take-off portion, the unthreaded portion terminating in a coiled spring extension, said intermediate and front portions of said auxiliary shaft being disposed opposite the intermediate portion of the main shaft, steady bars disposed on opposite sides of and in a plane below the receiving portion of the main shaft, the front steady bar carrying an inclined supporting rod for and disposed within the spring extension of the auxiliary shaft, and means for intermittently driving said feed shaft.

4. In an apparatus of the class described, the combination of a main spacing shaft and an auxiliary spacing shaft disposed at the front of and in a plane below and parallel to the main shaft, a feed shaft constituting an extension for the main shaft and having a threaded receiving portion and a delivery portion with shallow threads of substantially greater pitch than the threads of its receiving portion, the main and auxiliary shafts having take-off portions with threads of the same pitch, the main shaft having a receiving portion at its front end with shallow threads and an intermediate portion joined to the receiving portion by a short section having relatively deep threads of a pitch intermediate the pitch of the threads of the receiving and intermediate portions, the

threads of the intermediate portion being of less pitch than the threads of the take-off portion, the auxiliary shaft having a portion with shallow threads joined to the take-off portion by a tapered portion having threads of less pitch than the threads of the take-off portion, a work stop positioned to engage the work at the rear end of the receiving portion of the main shaft, means for intermittently driving said feed shaft, a control means for said feed shaft driving means and said stop whereby the stop is actuated to work engaging position during the periods of rest of the feed shaft, a work holder positioned to hold the work to the shaft when it is in position to be engaged by said stop, and a work hold-down member disposed to engage the work as it is translated from said intermediate portion of the auxiliary shaft to the take-off portion thereof.

5. In an apparatus of the class described the combination of a main spacing shaft and an auxiliary spacing shaft disposed at the front of and in a plane below and parallel to the main shaft, a feed shaft constituting an extension for the main shaft and having a threaded receiving portion and a delivery portion with shallow threads of substantially greater pitch than the threads of its receiving portion, the main and auxiliary shafts having take-off portions with threads of the same pitch, the main shaft having a receiving portion at its front end with shallow threads and an intermediate portion joined to the receiving portion by a short section having relatively deep threads of a pitch intermediate the pitch of the threads of the receiving and intermediate portions, the threads of the intermediate portion being of less pitch than the threads of the take-off portion, the auxiliary shaft having a portion with shallow threads joined to the take-off portion by a tapered portion having threads of less pitch than the threads of the take-off portion, and means for intermittently driving said feed shaft.

6. In an apparatus of the class described, the combination of a main spacing shaft and an auxiliary spacing shaft disposed at the front of and in a plane below and parallel to the main shaft, a feed shaft constituting an extension for the main shaft and having a threaded receiving portion and a delivery portion with shallow threads of substantially greater pitch than the threads of its receiving portion, the main and auxiliary shafts having take-off portions with threads of the same pitch, the main shaft having a receiving portion at its front end with shallow threads and an intermediate portion joined to the receiving portion by a short section having relatively deep threads of a pitch intermediate the pitch of the threads of the receiving and intermediate portions, the threads of the intermediate portion being of less pitch than the threads of the take-off portion, the auxiliary shaft having a portion with shallow threads joined to the take-off portion by a tapered portion having threads of less pitch than the threads of the take-off portion, a work stop positioned to engage the work at the rear end of the receiving portion of the main shaft, means for intermittently driving said feed shaft, and a work hold-down member disposed to engage the work as it is translated from said intermediate portion of the auxiliary shaft to the take-off portion thereof.

7. In an apparatus of the class described, the combination of a driven spacing shaft and a feed shaft constituting an extension for the

spacing shaft and having a threaded receiving portion and a delivery portion with shallow threads of substantially greater pitch than the threads of its receiving portion, the spacing shaft having a take-off portion at its rear end, a receiving portion at its front end with shallow threads and an intermediate portion joined to the receiving portion by a short section having relatively deep threads of a pitch intermediate the pitch of the threads of the receiving and intermediate portions, the threads of the intermediate portion being of less pitch than the threads of the take-off portion, a work stop positioned to engage the work at the rear end of the receiving portion of the spacing shaft, means for intermittently driving said feed shaft, a common control means for said feed shaft driving means and said stop whereby the stop is actuated to work engaging position during the periods of rest of the feed shaft, and a work holder positioned to hold the work to the shaft when it is in position to be engaged by said stop.

8. In an apparatus of the class described, the combination of a driven spacing shaft, the spacing shaft having a take-off portion at its rear end, a receiving portion at its front end with shallow threads and an intermediate portion joined to the receiving portion by a short section having relatively deep threads of a pitch intermediate the pitch of the threads of the receiving and intermediate portions, the threads of the intermediate portion being of less pitch than the threads of the take-off portion, and a work stop positioned to engage the work at the rear end of the receiving portion of the spacing shaft.

9. In an apparatus of the class described, the combination of a driven spacing shaft and a feed shaft constituting an extension for the spacing shaft and having a threaded receiving portion and a delivery portion with shallow threads of substantially greater pitch than the threads of its receiving portion, the spacing shaft having a take-off portion at its rear end, a receiving portion at its front end with shallow threads, a work stop positioned to engage the work at the rear end of the receiving portion of the spacing shaft, means for intermittently driving said feed shaft, a common control means for said feed shaft driving means and said stop whereby the stop is actuated to work engaging position during the periods of rest of the feed shaft, a work holder positioned to hold the work to the shaft when it is in position to be engaged by said stop, and a driving control means including a trip arm operatively associated with the spacing shaft to be actuated by work advanced to a predetermined point thereon.

10. In an apparatus of the class described, the combination of a driven spacing shaft and a feed shaft constituting an extension for the spacing shaft and having a threaded receiving portion and a delivery portion with shallow threads of substantially greater pitch than the threads of its receiving portion, the spacing shaft having a take-off portion at its rear end, a receiving portion at its front end with shallow threads, and means for intermittently driving said feed shaft.

11. In an apparatus of the class described, the combination of a driven spacing shaft having a take-off portion at its rear end, a receiving portion at its front end with shallow threads, a work stop positioned to engage the work at the rear end of the receiving portion of the

spacing shaft, a work holder positioned to hold the work to the shaft when it is in position to be engaged by said stop, and a driving control means including a trip arm operatively associated with the spacing shaft to be actuated by work advanced to a predetermined point thereon.

12. In an apparatus of the class described, the combination of a driven spacing shaft having a take-off portion at its rear end, a receiving portion at its front end with shallow threads, a work stop positioned to engage the work at the rear end of the receiving portion of the spacing shaft, and means acting to hold the work to said shaft when it is in position to be engaged by said stop.

13. In an apparatus of the class described, the combination of a main spacing shaft having succeeding threaded portions of increasing pitch, a feed shaft disposed in axial alinement with the main shaft and constituting an extension therefor, the feed shaft having succeeding portions thereof provided with threads of increasing pitch, the threads at the rear portion of the feed shaft and at the front portion of the main shaft being relatively shallow, an auxiliary shaft disposed at the side of and in a plane below the main shaft and having threaded portions of increasing pitch, means for intermittently driving the feed shaft, a work stop operatively associated with the main shaft at an intermediate point, the threads of said main shaft in advance of said work stop being relatively shallow, and control means for said feed shaft driving means and stop whereby the stop is actuated to work engaging position during periods of rest of the feed shaft.

14. In an apparatus of the class described, the combination of a main spacing shaft having succeeding threaded portions of increasing pitch, a feed shaft disposed in axial alinement with the main shaft and constituting an extension therefor, the feed shaft having succeeding portions thereof provided with threads of increasing pitch, the threads at the rear portion of the feed shaft and at the front portion of the main shaft being relatively shallow, an auxiliary shaft disposed at the side of and in a plane below the main shaft and having threaded portions of increasing pitch, and means for intermittently driving the feed shaft.

15. In an apparatus of the class described for spacing wire garment hangers and the like, the combination of a main spacing shaft having succeeding threaded portions of increasing pitch engaging the hooks of the garment hangers, the threads at the front portion of the main shaft being relatively shallow, an auxiliary shaft disposed at the side of and in a plane below the main shaft and having threaded portions of increasing pitch engaging the cross members of the garment hangers to tilt the latter, a work stop operatively associated with the main shaft at an intermediate point, the threads of said main shaft in advance of said work stop being relatively shallow, and means acting to hold the hooks to said main spacing shaft when they are in position to be engaged by said work stop.

16. In an apparatus of the class described for spacing wire garment hangers and the like, the combination of a main spacing shaft having succeeding threaded portions of increasing pitch engaging the hooks of the garment hangers, the threads at the front portion of the main

shaft being relatively shallow, an auxiliary shaft disposed at the side of and in a plane below the main shaft and having threaded portions of increasing pitch, and means acting to hold the hooks to said main spacing shaft when they are in position to be engaged by said work stop.

17. In an apparatus of the class described for spacing wire garment hangers and the like, the combination of a main spacing shaft having succeeding threaded portions of increasing pitch engaging the hooks of the garment hangers, the threads at the front portion of the main shaft being relatively shallow, an auxiliary shaft disposed at the side of and in a plane below the main shaft and having threaded portions of increasing pitch, means acting to hold the hooks to said main spacing shaft when they are in position to be engaged by said work stop and means for driving the main and auxiliary shafts in opposite directions, the threads of one shaft being right hand threads and those of the other being left hand threads.

18. In an apparatus of the class described, the combination of a main spacing shaft having succeeding threaded portions of increasing pitch, a feed shaft disposed in axial alinement with the main shaft and constituting an extension therefor, the feed shaft having succeeding portions thereof provided with threads of increasing pitch, the threads at the rear portion of the feed shaft and at the front portion of the main shaft being relatively shallow, means for intermittently driving the feed shaft, a work stop operatively associated with the main shaft at an intermediate point, the threads of said main shaft in advance of said work stop being relatively shallow, and control means for said feed shaft driving means and stop whereby the stop is actuated to work engaging position during periods of rest of the feed shaft.

19. In an apparatus of the class described, the combination of a main spacing shaft threaded to advance and space wire garment hangers having their hooks engaged with such shaft, an auxiliary shaft disposed at the side of the main shaft to support one end of the hangers and threaded to advance and space hangers resting thereon, and means for driving said shafts in opposite directions, the threads of one shaft being right-hand threads and those of the other being left-hand threads.

20. In an apparatus of the class described, the combination of a main spacing shaft threaded to advance and space wire garment hangers having their hooks engaged with such shaft, an auxiliary shaft disposed at the side of the main shaft to support one end of the hangers and threaded to advance and space hangers resting thereon, and means for driving said shafts.

21. In an apparatus of the class described, the combination of a spacing shaft threaded to advance and space wire garment hangers having their hooks engaged therewith, and a driving control means for said shaft including a trip arm operatively associated with the main shaft to be engaged by work advanced to a predetermined point.

22. In an apparatus of the class described, the combination of a driven shaft having succeeding portions of increasing pitch to advance and space a plurality of garment hangers suspended therefrom by their hooks, a second shaft disposed parallel to said driven shaft and having threads to advance and space the ends of gar-

ment hangers resting thereon and bring them into parallel relation while suspended from the main shaft, and a stripper bar arranged on the inside of the auxiliary shaft to facilitate the
5 disengagement of the hooks from the main shaft as the hangers are lifted from their forward ends with a tilting movement.

23. In an apparatus of the class described, the combination of a driven shaft having suc-
10 ceeding portions of increasing pitch to advance and space a plurality of garment hangers suspended therefrom by their hooks, and a second shaft disposed parallel to said driven shaft and having threads to advance and space the ends
15 of garment hangers resting thereon and bring them into parallel relation while suspended from the main shaft.

24. An apparatus of the class described comprising shafts threaded to advance and space
20 wire garment hangers supported thereby with the hangers in parallel relation and supported so as to permit the insertion of a rod through corresponding ends of a plurality of spaced
25 alined hangers, and means associated with the

shafts to guide the hangers during the disengaging movement thereof from the shafts.

25. An apparatus of the class described comprising vertically and horizontally offset shafts threaded to advance and space triangular wire
5 garment hangers having suspension hooks supported thereby with the hangers in parallel relation, said shafts being arranged to support said hangers so as to permit the insertion of a rod through corresponding angular ends of a plu-
10 rality of spaced alined hangers, and means acting to operate said shafts in unison.

26. An apparatus of the class described comprising means for advancing triangular wire
15 garment hangers having suspension hooks and spacing and alining them in parallel relation, and positioned so as to permit the insertion of a rod through corresponding angular ends of a plurality of the hangers, said means including a
20 hook engaging screw and a cross member engaging screw arranged relative to each other to support the hangers in tilted position, and means
acting to rotate said screws in unison.

STANLEY C. SIMMONS.

HARRY M. SIMMONS. 25