Aug. 20, 1935. A. E. DRISSNER 2,011,712

STOCK REEL FOR AUTOMATIC MULTIPLE SPINDLE SCREW MACHINES

Filed June 23, 1934 3 Sheets-Sheet 1

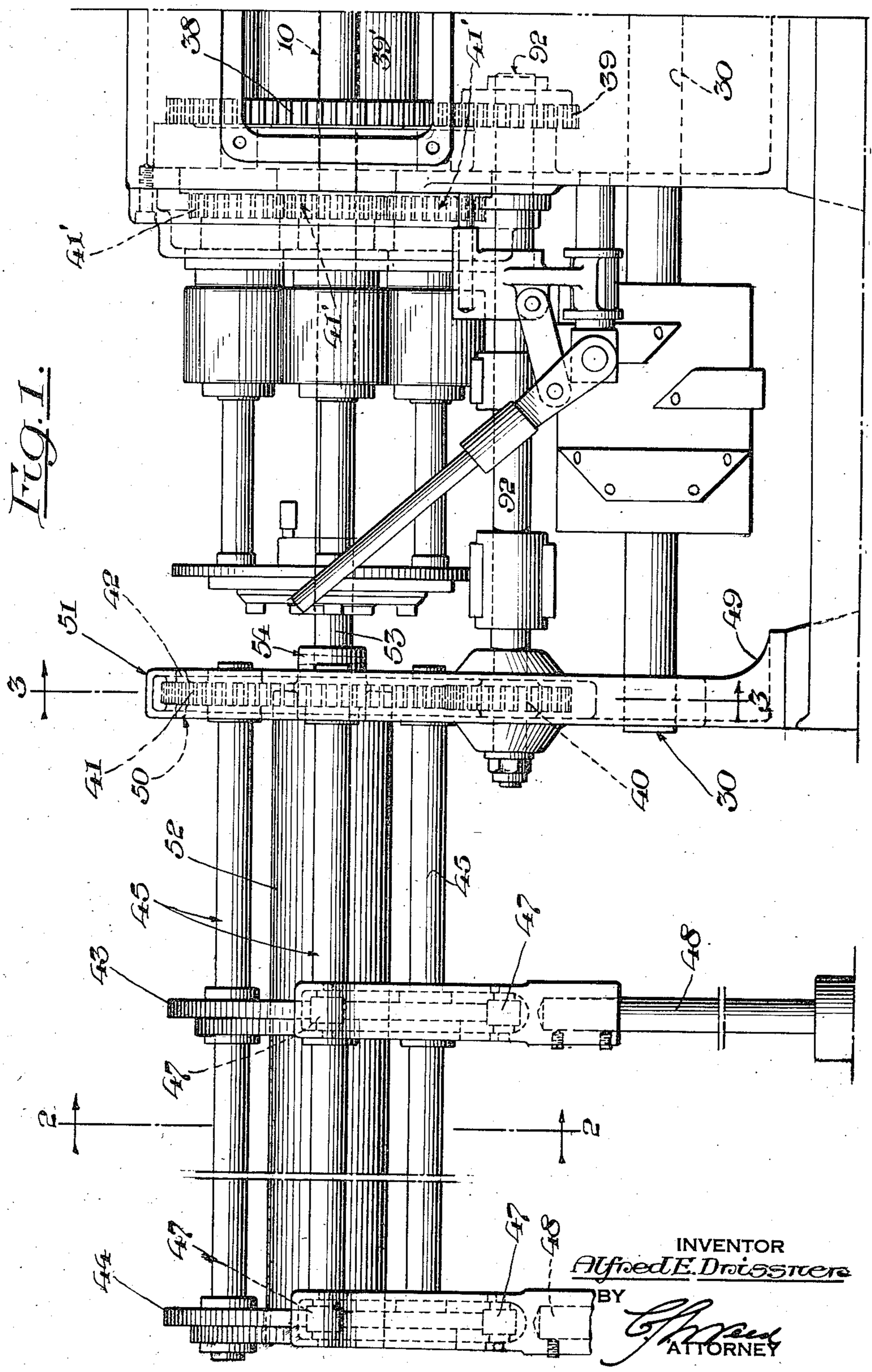

FIG. 1.

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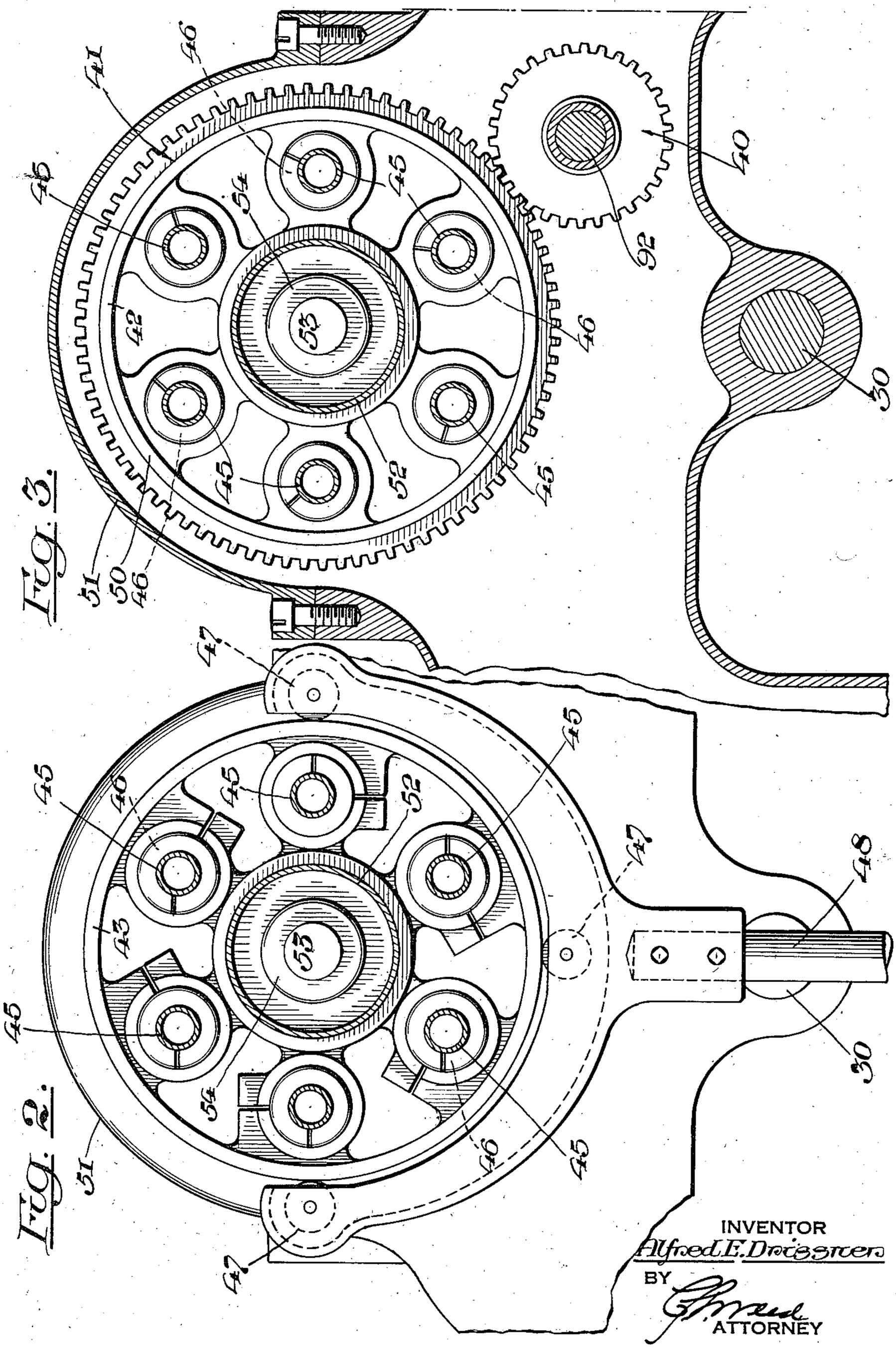

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Filed June 23, 1934 3 Sheets-Sheet 3

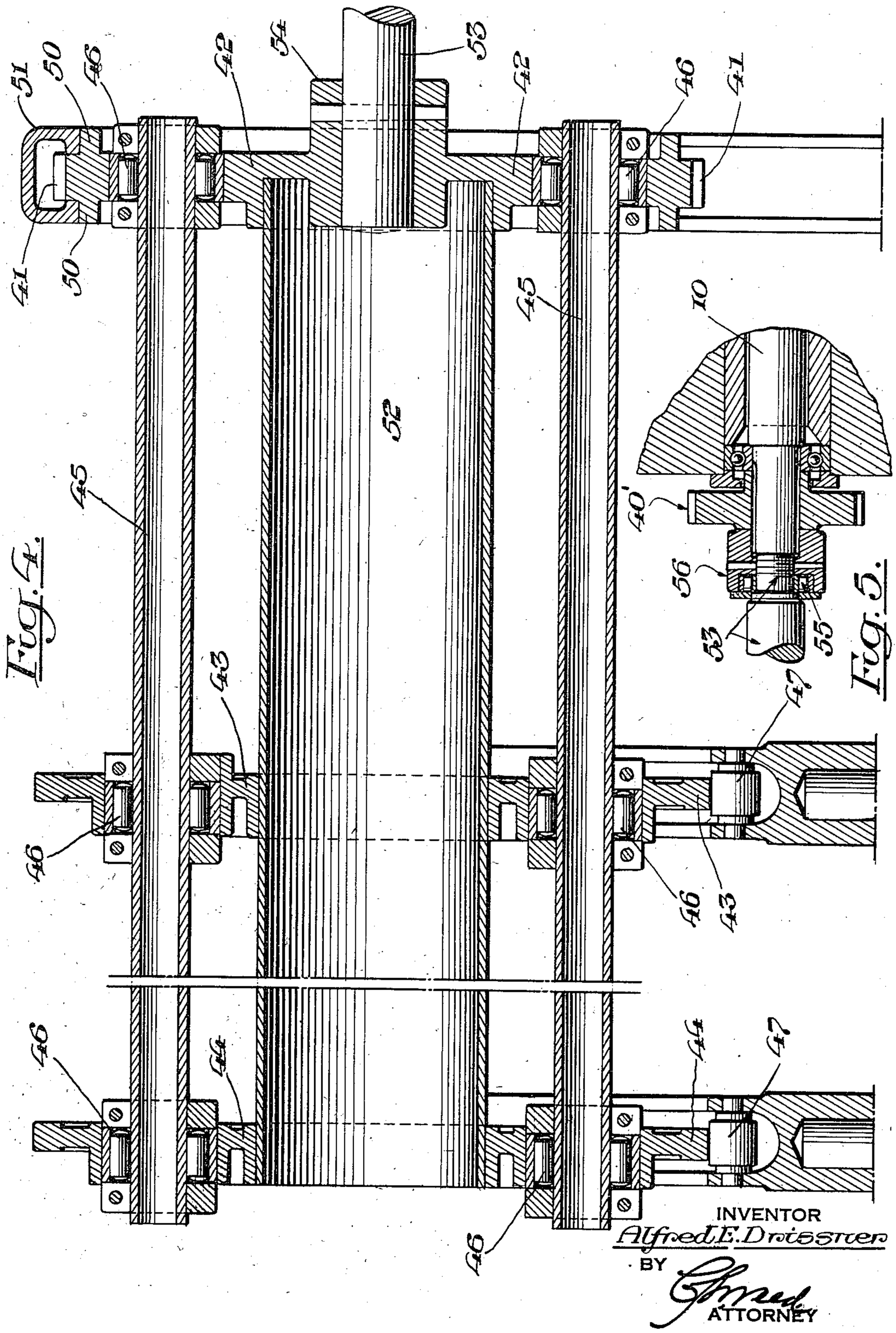

Fig. 4.

Fig. 5.

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2,011,712

STOCK REEL FOR AUTOMATIC MULTIPLE SPINDLE SCREW MACHINES

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Application June 23, 1934, Serial No. 732,059

17 Claims. (Cl. 29—37)

This invention relates to stock reel mechanism for automatic multiple spindle screw machines, the object of the invention being to provide an improved reel mechanism which will eliminate strains and torque on the work spindle carrier or cylinder whereby the alignment and accuracy of the work spindle carrier will not be affected.

Heretofore, in machines of this kind, it has been the practice to connect the stock reel with the work spindle carrier so that the two will be indexed in unison and as the stock rods of these machines fed to the work spindle carrier project rearwardly thereof to the extent of ten to twenty feet and rotate with the work spindles of the carrier, the whip of these rods is considerable. Consequently, when they are indexed with the carrier and the reel, they have a tendency to affect the accuracy and aligment of the work spindle carrier in its bearings.

The object of the present invention is to provide an improved reel mechanism which is indexed with the work spindle carrier but is not rigidly connected thereto, whereby the disadvantages hereinbefore set forth are avoided and at the same time utilizes a rod or shaft already present in the machine for indexing the reel, the present improvement being applicable to the machine shown and described in the contemporaneously pending application of C. W. Simpson and A. E. Drissner, Serial Number 632,490, filed September 10th, 1932, and in which there is shown at 92 (see Figs. 1 and 20 to 23), a rod or shaft together with a similar rod 91 for supporting the operating slides at the rear of the machine and the present improvement utilizes this shaft 92 for the purpose of transmitting motion from the work spindle carrier gear 38 of that machine to this improved reel mechanism, this gear 38 being the gear by means of which the work spindle carrier is indexed from the cam shaft 30 in that machine.

Thus, this improved reel mechanism is operated in a very simple manner from the work spindle carrier without the necessity of rigidly connecting it with that carrier and by means of a rod or shaft already present in the machine and providing a very simple and economical reel operating means without adding another shaft to the machine. This is accomplished by providing the shaft 92 with a gear in mesh with the gear 38 of the work spindle carrier and at the opposite end with a gear for operating the reel.

The present improvement thus permits the reel to be indexed in unison with the work spindle carrier without rigidly connecting it therewith as heretofore and eliminating the transmission of strains from the carrier and stock rods carried thereby to the work spindle carrier and prolonging the life of the bearings supporting that work spindle carrier.

In the drawings accompanying and forming a part of this specification, Fig. 1 illustrates a side view of this improved reel in position at the rear end of an automatic multiple spindle screw machine such as that shown and described in the application hereinbefore referred to.

Fig. 2 is a cross sectional view taken on the line 2—2 of Fig. 1.

Fig. 3 is a cross sectional view taken on the line 3—3 of Fig. 1.

Fig. 4 is a longitudinal sectional view of the reel shown in Fig. 1, and

Fig. 5 is a detail view illustrating the manner of connecting the center shaft of the reel with the center driving shaft of the multiple spindle screw machine whereby this center driving shaft can run at any speed while the reel shaft is stationary.

Similar characters of reference indicate corresponding parts in the several views.

Before explaining in detail the present improvement and mode of operation thereof, I desire to have it understood that the invention is not limited to the details of construction and arrangement of parts illustrated in the accompanying drawings since the invention is capable of other embodiments, and that the phraseology which I employ is for the purpose of description and not of limitation.

The gear 38 hereinbefore referred to and by means of which the work spindle carrier and the series of rotating work spindles are indexed from the cam shaft meshes with a gear 39 secured to the end of a rod 92 which, as hereinbefore stated, is one of the rods present in the machine referred to for supporting the slide mechanism of that machine. This rod is still utilized for supporting that slide mechanism but, in the present instance, is mounted to rotate.

On the opposite end of this rod is a gear 40 in mesh with a large gear 41 on the end of the stock reel, from which it follows that each time the work spindle carrier of the machine is indexed, the reel will likewise be indexed.

The reel comprises a series of disks 42, 43 and 44 supporting a series of stock rod tubes 45 for the reception of the stock rods which pass to and are fed through the work spindles of the work spindle carrier, the front ends of which are successively operated upon by the end working tools carried by the main tool slide and by the cross and top

tools carried by suitable cross and top slides, as set forth in said application hereinbefore referred to and as each completed piece of product is cut off when finished by the tools, the stock rods are fed forward and because of the great length of these stock rods varying from ten to twenty feet, as hereinbefore stated, it is necessary that a reel mechanism be provided for supporting them in alignment with the work spindle carriers of the machine. Otherwise, the stock rods would bend downward and flex and also whip to such an extent as to make it difficult, if not impossible, to properly feed them through the spindles of the work spindle carrier.

The stock rods carried by the reel are, as stated, indexed with the work spindle carrier and are also rotated within the reel by the work spindles of the machine which are rotated by suitable gear mechanism comprising a gear 41' on each spindle, all of which gears are in mesh with a centrally located gear 40' rotated by the main driving shaft 10 of the machine, this driving shaft projecting from one end of the machine to the other through the main tool slide and the work spindle carrier 39'.

The stock rod tubes 45 are mounted in the disks by suitable anti-friction roller bearings 46, thereby facilitating free rotation of the tubes 45 and the stock rods therewith and eliminating noise.

The intermediate and rear end disks are also supported on roller bearings 47 to facilitate the indexing of the reel and these roller bearings are carried by suitable stanchions or supports 48 resting upon the floor while the front end disk of the reel is provided with a depending bracket mounted and secured to the bed of the machine as at 49. This bracket also acts to support one end of the main cam shaft 30 of the machine.

The front end reel disk 42 has a pair of lateral flanges 50 supported in the reel bracket 51 for rotation or indexing movement and the gear 41 is formed as a part of or secured on the disk 42 midway of these flanges.

The several disks 42, 43 and 44 are secured to a drum or tube 52 whereby the disks and the drum or tube 52, together with the stock rod tubes 45 form a unit.

Projecting from the front disk 42 is a center shaft 53, this being secured to a hub 54 of the disk 42. The opposite end of this shaft 53 is supported by the rear end of the work spindle or main driving shaft 10 by means of a roller bearing 55 so that the main driving shaft of the machine can be rotated at any speed while the shaft 53 of the stock reel is stationary.

Heretofore in National Acme machines, this shaft 53 was bolted to the rear end of the work spindle carrier so as to index therewith and by means thereof the reel was indexed but, in the present instance, this shaft 53, as before stated, is not bolted to the rear end of the work spindle 10 but, as stated, is supported at its forward end by the main driving shaft by the roller bearings 55 and for this purpose a suitable chambered member or hub 56 is secured to the rear end of the main driving shaft 10 and carries the roller bearings 55 for supporting the end of the shaft 53. This construction leaves the entire rear end of the work spindle carrier free so that any desired size or number of work spindles may be mounted therein and, as before stated, permits this main driving shaft to be run at any speed, the shaft 53 now acting simply as a support for the reel disk 42.

From the foregoing it will be seen that instead of indexing the stock rod reel with the work spindle carrier centrally of the stock reel, it is now peripherally indexed directly from the same gear by means of which the work spindle carrier is indexed by utilizing the indexing gear 38 of the work spindle carrier and the rod 92 and experience has demonstrated that this peripheral indexing of the stock reel does not interfere with the accuracy and alignment of the work spindle carrier in its bearings. In other words, heretofore, by indexing the reel by means of a centrally located shaft bolted to the rear end of the work spindle carrier, the stock reel being located way beyond the end of the carrier, it had a tendency because of the weight of the stock rods to affect the accuracy and alignment of the work spindle carrier in its bearings whereas the present improvement eliminates strains and torque on the work spindle carrier.

Because of the heavy mass of metal comprising the work spindle carrier and its rotating spindles, one of the most difficult problems with which the manufacturers of such machines had to contend was the wear and distortion of the bearings supporting the work spindle carrier, the assignee of the present applicant having experimented for many years and spend considerable sums of money in an endeavor to provide bearings that would overcome this disadvantage and any improvement that will eliminate strains and torque on the work spindle carrier; prolong the life of the bearings and insure accuracy and alignment of the work spindle carrier in its bearings, is of the utmost importance and it has been found in practice that the present improved reel mechanism very materially assists in these respects.

It is to be understood that by describing in detail herein any particular form, structure or arrangement, it is not intended to limit the invention beyond the terms of the several claims or the requirements of the prior art.

Having thus explained the nature of my said invention and described a way of constructing and using the same, although without attempting to set forth all of the forms in which it may be made or all of the modes of its use, I claim:

1. Reel mechanism for automatic multiple spindle screw machines having a rotatable work spindle carrier provided with a main driving shaft extending axially therethrough and an indexing gear and comprising a reel for supporting stock rods fed to the work spindle carrier from the rear end thereof and located in the rear of said carrier and having an axially located shaft in alignment with the driving shaft of the work spindle carrier, and means for indexing the reel from the work spindle carrier and comprising a shaft extending rearwardly only from the work spindle carrier for supporting auxiliary mechanism between said reel and work spindle carrier, a gear on said shaft in mesh with the work spindle carrier indexing gear, and gearing between said shaft and reel for indexing the reel with the work spindle carrier.

2. Reel mechanism for automatic multiple spindle screw machines having a work spindle carrier and a gear for indexing it and also having operating slides at the rear of said carrier and rods for supporting said slides extending rearwardly only from the work spindle carrier, and means for indexing the reel with the carrier and comprising a gear carried by one of said rods and in mesh with the carrier gear, and gearing between said rod and the reel whereby the rod is rotated from the work spindle carrier to rotate the reel.

3. In an automatic multiple spindle screw machine having an indexible work spindle carrier and a main driving shaft, the combination of a reel indexible with the carrier and means for indexing the reel from the carrier, said reel having a centrally located shaft and means for supporting one end of that shaft from the main driving shaft to permit the driving shaft to be rotated independently of the reel shaft.

4. In an automatic multiple spindle screw machine having an indexible work spindle carrier and a main driving shaft, the combination of a reel indexible with the carrier and means for indexing the reel from the carrier at the periphery of the reel, said reel having a centrally located shaft and means for supporting one end of that shaft from the main driving shaft to permit the driving shaft to be rotated independently of the reel shaft.

5. In an automatic multiple spindle screw machine having an indexible work spindle carrier and a main driving shaft, the combination of a stock rod supporting reel and means for indexing it simultaneously with the work spindle carrier, said reel having a shaft secured thereto, one of said shafts supporting the other to permit rotation of one independently of the other.

6. In an automatic multiple spindle screw machine having an indexible work spindle carrier and a main driving shaft, the combination of a stock reel, means for peripherally indexing the stock reel with and by the indexible work spindle carrier, a shaft secured to the stock reel, said shaft and the main driving shaft one supporting the other to permit rotation of the main driving shaft independently of the stock reel shaft.

7. In an automatic multiple spindle screw machine having an indexible work spindle carrier and a main driving shaft, the combination of a stock reel, means for peripherally indexing the stock reel with and by the indexible work spindle carrier, a shaft secured to the stock reel, said shaft and the main driving shaft one supporting the other to permit the rotation of the main driving shaft independently of the stock reel shaft, said reel indexing means comprising a gear carried by the stock reel, a gear in mesh therewith, a shaft carrying said last gear, and means for rotating said shaft.

8. In an automatic multiple spindle screw machine having an indexible work spindle carrier and a main driving shaft, the combination of a stock reel, means for peripherally indexing the stock reel with and by the indexible work spindle carrier, a shaft secured to the stock reel, said shaft and the main driving shaft, one supporting the other to permit the rotation of the main driving shaft independently of the stock reel shaft, said reel indexing means comprising a gear carried by the stock reel, a gear in mesh therewith, a shaft carrying said last gear, and means for rotating said shaft, said means comprising a gear on said shaft and a gear on the indexible work spindle carrier.

9. Reel mechanism for automatic multiple spindle screw machines having a work spindle carrier and means for indexing it and comprising a reel consisting of a plurality of disks, a plurality of stock rod tubes supported by said disks, anti-friction bearings for supporting said tubes for rotation independently of the disks, a gear carried by one of said disks, and means for indexing said gear and thereby the reel simultaneously with the indexing of the work spindle carrier and comprising a slide supporting rod extending rearwardly only from the work carrier and having a gear at one end meshing with the disk gear of the reel and a gear at its opposite end in mesh with a gear carried by the work spindle carrier.

10. Reel mechanism for automatic multiple spindle screw machines having a work spindle carrier and means for indexing it and comprising a reel consisting of a plurality of disks, a plurality of stock rod tubes supported by said disks, anti-friction bearings for supporting said tubes for rotation independently of the disks, a gear carried by one of said disks, and means for indexing said gear and thereby the reel simultaneously with the indexing of the work spindle carrier and comprising a gear in mesh with the reel gear, a shaft carrying said last gear and extending rearwardly only from the work spindle carrier, and means for rotating said shaft.

11. Reel mechanism for automatic multiple spindle screw machines having a work spindle carrier and means for indexing it and comprising a reel consisting of a plurality of disks, a plurality of stock rod tubes supported by said disks, anti-friction bearings for supporting said tubes for rotation independently of the disks, a gear carried by one of said disks, and means for indexing said gear and thereby the reel simultaneously with the indexing of the work spindle carrier and comprising a gear in mesh with the reel gear, a shaft carrying said last gear and extending rearwardly only from the work spindle carrier, and means for rotating said shaft and comprising a gear carried by said shaft and a gear in mesh therewith and carried by the work spindle carrier.

12. Reel mechanism for automatic multiple spindle screw machines having a work spindle carrier and means for indexing it and comprising a reel consisting of a plurality of disks, a plurality of stock rod tubes supported by said disks, anti-friction bearings for supporting said tubes for rotation independently of the disks, a gear carried by one of said disks, and means for indexing said gear and thereby the reel simultaneously with the indexing of the work spindle carrier and comprising a gear in mesh with the reel gear, a shaft carrying said last gear and extending rearwardly only from the work spindle carrier, means for rotating said shaft, and anti-friction bearings supporting one or more of the reel disks.

13. Reel mechanism for automatic multiple spindle screw machines having a work spindle carrier and means for indexing it and comprising a reel consisting of a plurality of disks, a plurality of stock rod tubes supported by said disks, anti-friction bearings for supporting said tubes for rotation independently of the disks, a gear carried by one of said disks, and means for supporting said gear and thereby the reel simultaneously with the indexing of the work spindle carrier and comprising a gear in mesh with the reel gear, a shaft carrying said last gear and extending rearwardly only from the work spindle carrier, means for rotating said shaft and comprising a gear carried by said shaft, a gear in mesh therewith and carried by the work spindle carrier, and anti-friction bearings supporting one or more of the reel disks.

14. In an automatic multiple spindle screw machine having an indexible work spindle carrier, an indexible gear for indexing the carrier, and a slide supporting rod and extending rearwardly only from the work spindle carrier, the combination of a stock reel and means for in-

dexing the reel and comprising a pair of gears carried by the slide supporting rod, one in mesh with the work spindle carrier gear, and a gear carried by the stock reel and in mesh with the other gear of said rod.

15. In an automatic multiple spindle screw machine having an indexible work spindle carrier, an indexible gear for indexing the carrier and a slide supporting rod and extending rearwardly only from the work spindle carrier, the combination of a stock reel and means for indexing the reel and comprising a pair of gears carried by the slide supporting rod, one in mesh with the work spindle carrier gear, and a gear carried by the stock reel and in mesh with the other gear of said rod, said machine having a main driving shaft and a shaft secured to the stock reel, said two shafts having connection whereby one may rotate independently of the other.

16. A stock rod supporting reel for use with automatic multiple spindle screw machines and comprising a plurality of spaced disks, bearings carried by said disks, stock rod tubes supported by said bearings for rotation independently of the reel, bearings for supporting certain of said disks to facilitate the indexing of the reel, means carrying said last bearings and supporting the reel, a ring gear carried at one end of said reel and located around said tubes, means for supporting said gear and thereby the end of the reel, and means engaging said gear for rotating said reel and including a rod rotated by the work spindle carrier and extending rearwardly only from said work spindle carrier.

17. In an automatic multiple spindle screw machine having an indexible work spindle carrier provided with a gear and a main driving shaft, the combination of a reel indexible with the carrier, said reel having a centrally located shaft and means for supporting one end of that shaft from the main driving shaft to permit the driving shaft to be rotated independently of the reel shaft, and means for indexing the reel from the carrier comprising a shaft extending rearwardly only from the work spindle carrier and having a gear in mesh with the work spindle carrier gear and gearing between said shaft and the reel.

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