J. R. PERRINE.

FEED GEARING.

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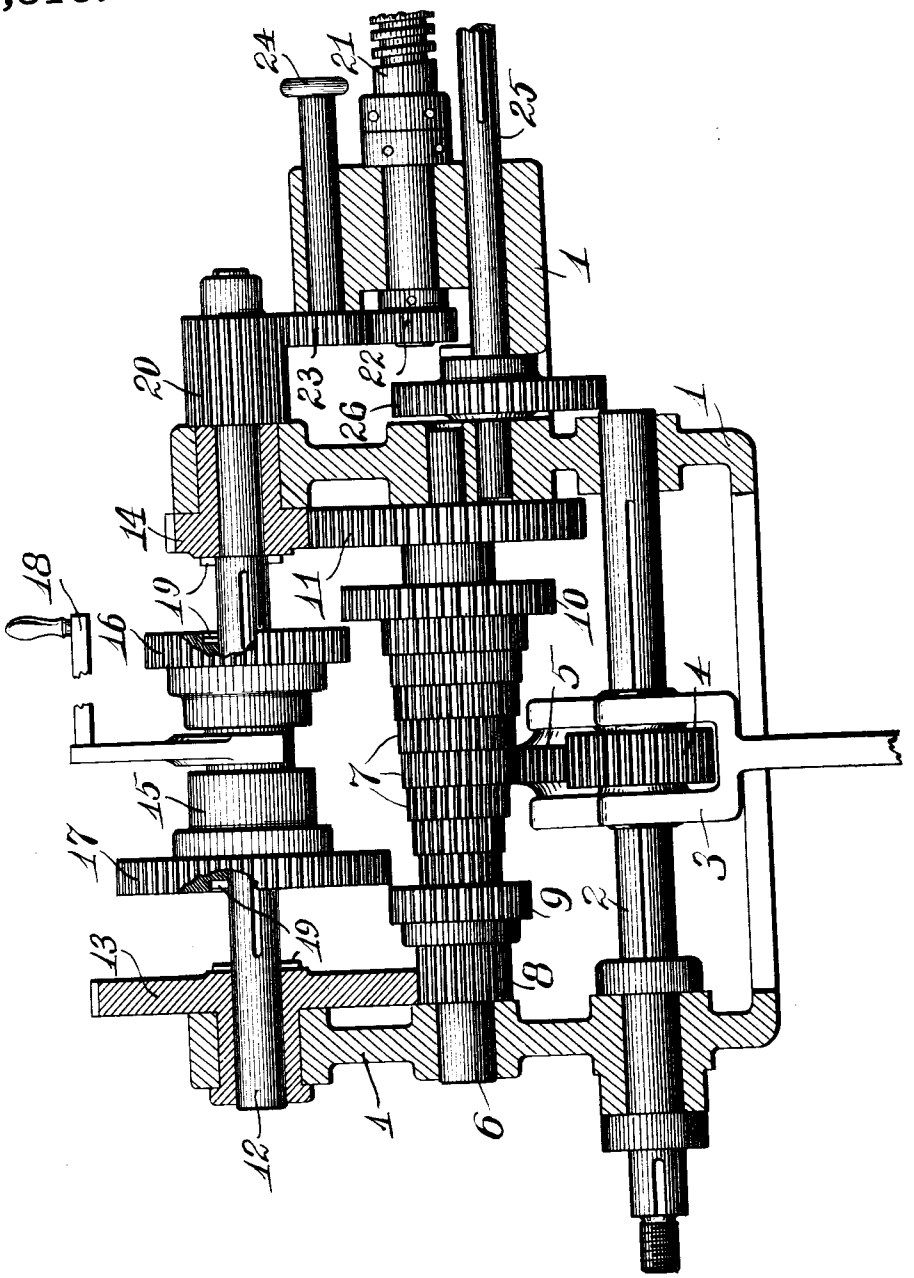
1,029,313.



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UNITED STATES PATENT OFFICE.

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FEED-GEARING.

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To all whom it may concern:

Be it known that I, JOHN R. PERRINE, a citizen of the United States, residing at Cincinnati, Hamilton county, Ohio, have invented certain new and useful Improvements in Feed-Gearing, of which the following is a specification.

This invention pertains to feed gearing such as is employed on engine lathes for securing various rates of carriage-advance in feeding and in screw-cutting, and the invention relates to improvements designed to facilitate the convenient getting of a satisfactory number of speed changes for the lead-screw and the feed-rod.

The invention will be readily understood from the following description taken in connection with the accompanying drawing which is a vertical longitudinal section, somewhat diagrammatic, of feed gearing exemplifying my present invention.

In the drawing:—1, indicates fixed parts to furnish bearings for the shafts of the mechanism: 2, a splined shaft to which rotation is to be imparted in any convenient manner, as, for instance, through the medium of the change gearing of an engine lathe of which the present feed gearing may form a portion of the equipment: 3, a tumbler, of usual type, arranged to slide on this shaft: 4, a pinion splined on shaft 2 and carried by the tumbler: 5, an intermediate pinion carried by the tumbler and engaging pinion 4, the splined shaft, tumbler, and tumbler-pinions presenting no special peculiarities: 6, a first countershaft disposed parallel with splined shaft 2: 7, a series of diversely sized gears fast on shaft 6 and preferably so arranged as to constitute a cone of gears which can be selectively engaged by tumbler-pinion 5 after the manner of ordinary cone and tumbler gearing: 8, 9, 10 and 11 additional diversely sized gears fast on shaft 6: 12, a second countershaft mounted parallel with the first countershaft 6, this second countershaft being splined: 13, a gear loose on the second countershaft and engaging gear 8: 14, a gear loose on the second countershaft and engaging gear 11: 15, a spool splined on second countershaft 12 and carrying a pair of diversely sized gears: 16, one of the gears carried by this spool and of a size to mesh with gear 10: 17, the other gear carried by the spool and of a size adapting it to mesh with gear 9, the total length of the spool-structure with its two gears being such that it may occupy an idle position between gears 9 and 10, as shown: 18, a handled shifter by means of which the spool-structure may be slid upon the splined shaft: 19, clutch-teeth at the hubs of gears 13, 14, 16 and 17: 20, a long pinion fast on second countershaft 12: 21, the lead-screw: 22, a narrow pinion fast on the lead-screw near long pinion 20: 23, a sliding pinion constantly in mesh with long pinion 20 and adapted to be slid into and out of mesh with pinion 22: 24, a handle connected with sliding pinion 23 and typifying means by which that pinion can be slid along on pinion 20: 25, the feed-rod: and 26, a gear fast on the feed-rod, and of such location and size that sliding pinion 23 may be made to mesh with it, the distance between gear 26 and pinion 22 being such that sliding pinion 23 may be adjusted to an idle position out of gear with either of them.

Splined shaft 2 being in motion it is manifest that, by properly adjusting the tumbler, various rates of speed may be transmitted to first countershaft 6. Loose gears 13 and 14 are in rotation whenever the first countershaft is turning, and these gears turn at different rates of speed, and at rates of speed dependent on the speed of the first countershaft 6. With the parts in the position indicated in the drawing no motion will be transmitted to second countershaft 12 owing to the fact that gears 13 and 14 are loose on the shaft, and gears 16 and 17 are disengaged from gears 9 and 10. If, now, the spool-structure be slid to the left till gear 17 meshes with gear 9, a certain rate of speed will be given to the second countershaft, and if the spool-structure be slid still farther so that it becomes clutched to gear 13 then the second countershaft will be driven at a still lower speed, and if the spool-structure be adjusted to bring gear 16 into mesh with gear 10 the countershaft will be driven at a higher rate of speed, and if the spool-structure be shifted to the right to clutch it to gear 14 then the second countershaft will be driven at a still higher rate of speed. It is thus seen that, aside from the variations in speed which may be given to the first countershaft 6 by means of the tumbler adjustment, four selective rates of speed may be given to second countershaft 12 by

means of the adjustment of the spool-structure. It is therefore seen that a great variety of speeds become available for long pinion 20 from which motion is to be imparted to the lead-screw or the feed-rod. With the parts in the position shown rotation is imparted to the lead-screw at a rate of speed dependent on the selected speed for long pinion 20. By sliding pinion 23 to the left a proper distance it continues to rotate but ceases to impart motion to the lead-screw, under which conditions both the lead-screw and the feed-rod will be at rest. If, however, pinion 23 be adjusted still farther to the left, into mesh with gear 26, rotation will be imparted to the feed-rod, and it is manifest that motion cannot be transmitted from the long pinion to the lead-screw and the feed-rod simultaneously.

I claim:—

Feed gearing comprising, a first countershaft, means for imparting selective speeds of rotation to said shaft, four diversely sized gear fast on said first countershaft, a second countershaft, a pair of diversely sized gears loose on said second countershaft and engaging the outer ones of the gears on the first countershaft, a spool-structure splined on the second countershaft, gears carried by the spool-structure and adapted to engage with the inner gears on the first countershaft, clutches at the hubs of the loose gears on the second countershaft and at the hubs of the gears carried by this spool-structure, a long pinion fast on the second countershaft, a driven shaft, a narrow gear fast on said driven shaft, a second driven shaft, a narrow gear fast on the said second driven shaft and at some distance from the gear on the first driven shaft, a slidable narrow gear constantly engaging the long pinion and adapted to slide along the same so as to be in mesh with either the gear on the first or the gear on the second driven shaft or be in disengaged position between those two gears, and a handle mechanism for sliding said slidable gear, combined substantially as set forth.

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