

Jan. 16, 1940.

A. E. DRISSNER

2,187,682

INDEPENDENT CROSS SLIDE MECHANISM

Filed Sept. 14, 1937

3 Sheets-Sheet 1

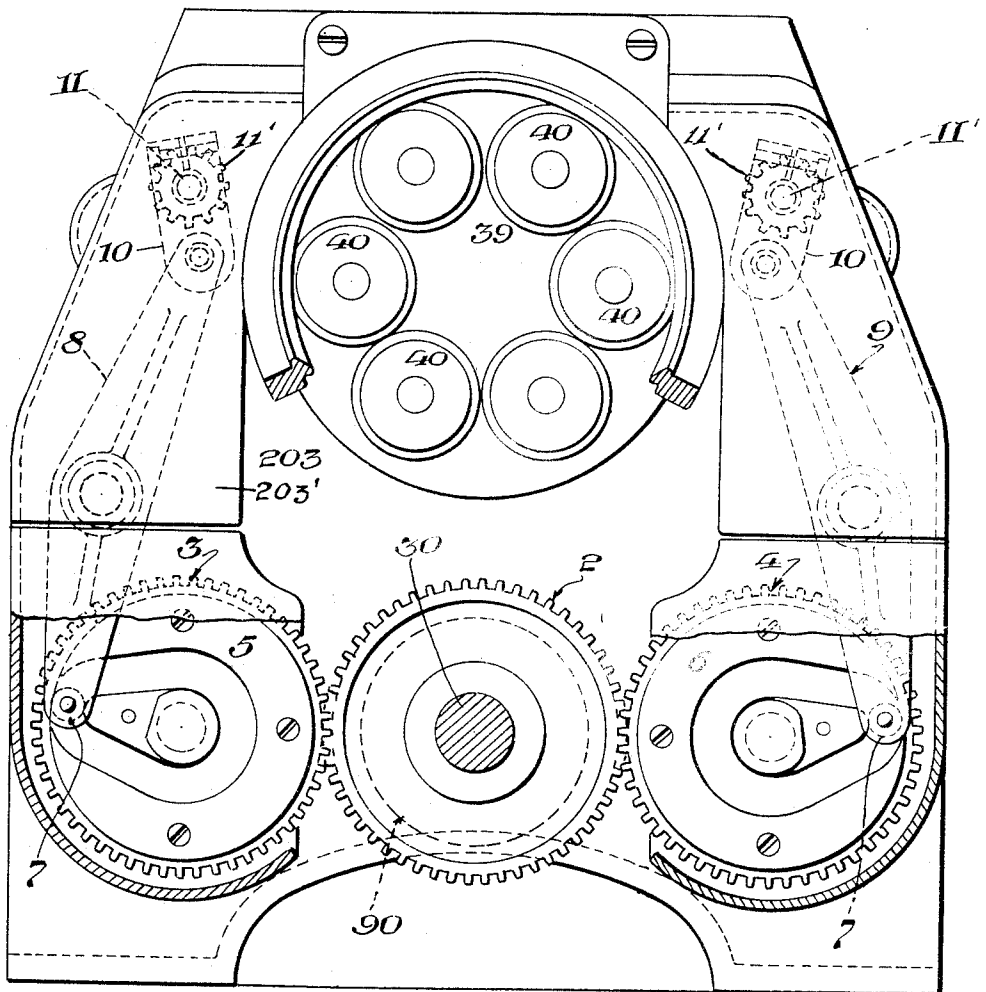


Fig. 1.

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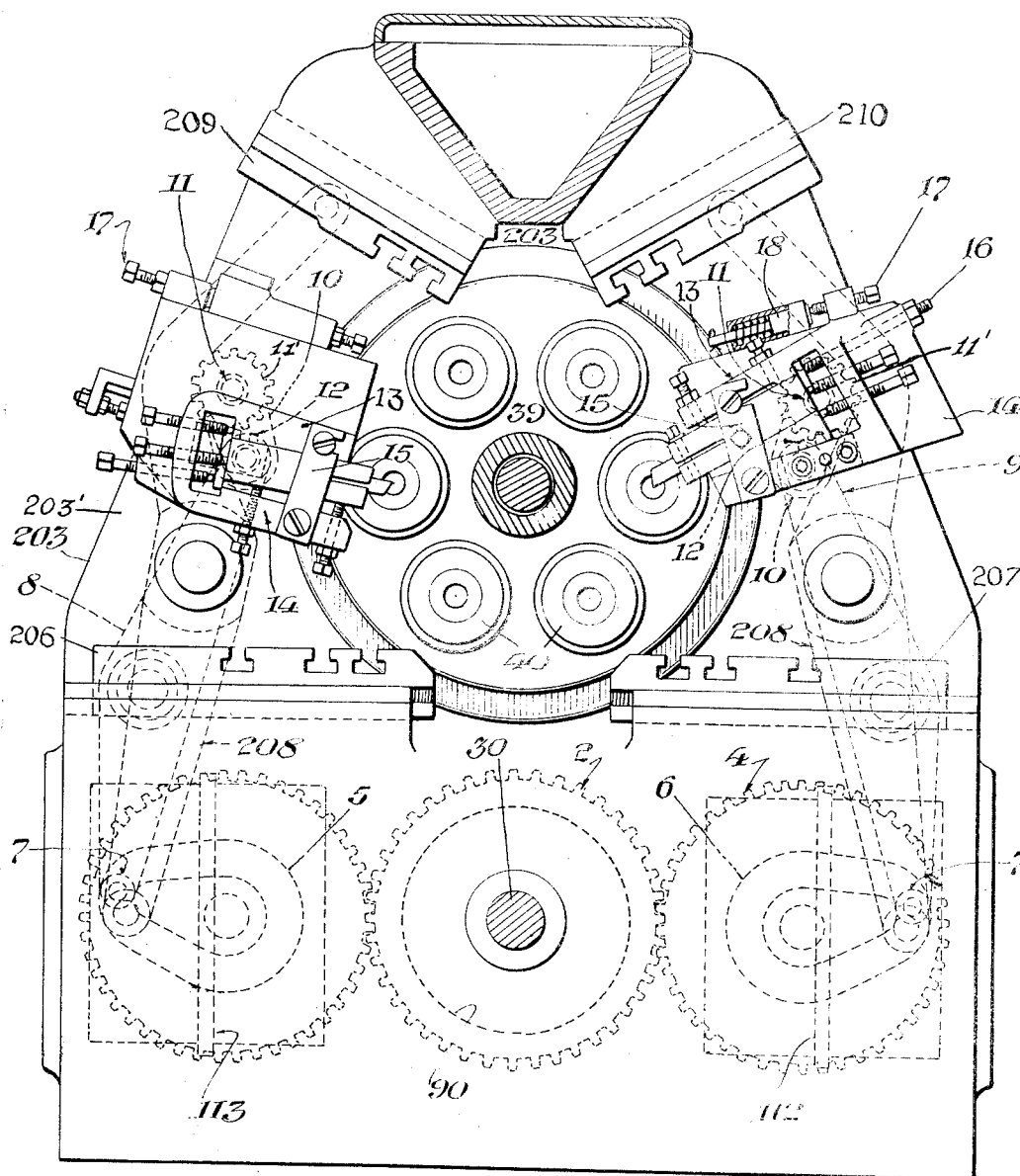
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Fig. 2.



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Fig. 3.

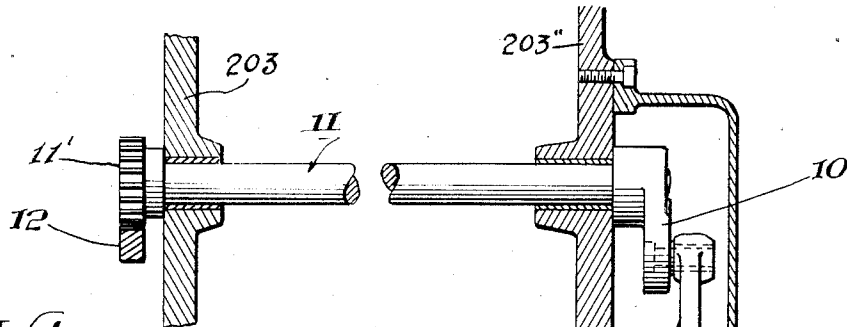
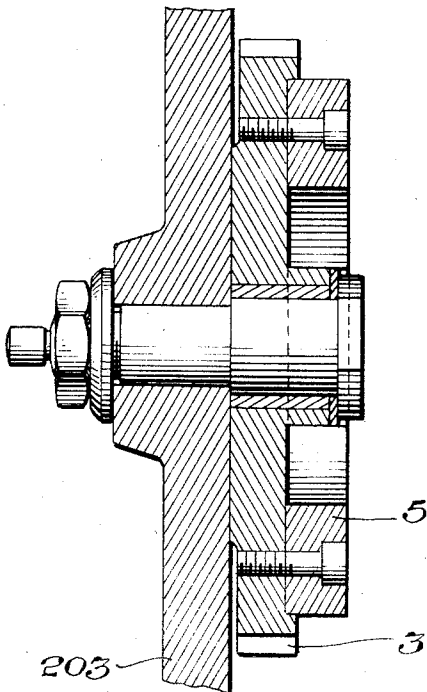
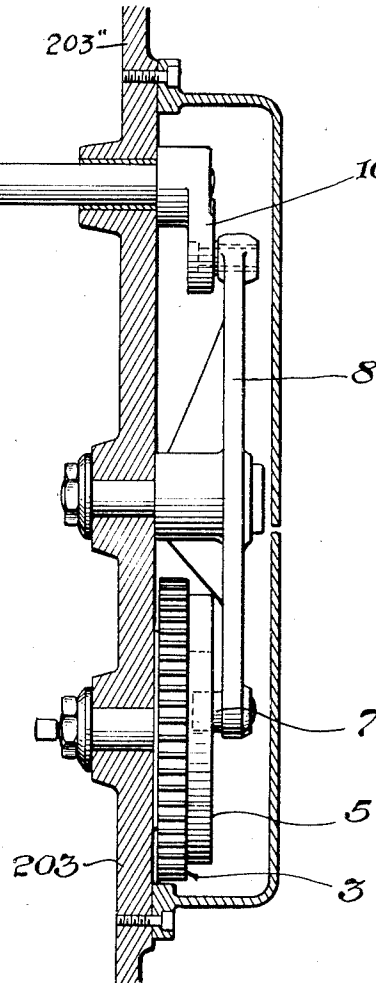


Fig. 4.



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UNITED STATES PATENT OFFICE

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INDEPENDENT CROSS SLIDE MECHANISM

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Application September 14, 1937, Serial No. 163,728

17 Claims. (Cl. 29—37)

This invention relates to forming or cross slide mechanism for automatic metal working machines of the multiple spindle type such as six spindle machines, the object of the invention being to provide an improved side forming or cross slide mechanism operated independently of the usual side and top cross slides whereby each spindle may have its own independently operated forming or cross slide so that the exact depth of forming, cutting off and other operations may be performed by the tools carried by these slides thereby accomplishing greater production, prolonging the life of the tools and obtaining increased accuracy.

Heretofore, it has been the practice to provide multiple spindle machines with side forming or cross slides for operation upon the work of the two lower spindles and top forming or cross slides for operation upon the work of the two upper spindles and, in a six spindle machine, to provide for operation upon the two intermediate spindles commonly designated as the 2nd and 5th position of the spindles, double deck tool holders or slides whereby two of the tool holders would co-operate with the two lower spindles commonly designated as the 1st and 6th position spindles and the other two would co-operate with the two intermediate spindles designated, as stated, as the 2nd and 5th position spindles.

However, as both double deck tool holders at each side of the machine were operated by the same means, it followed that the travel and retraction of the tool holders at each side was the same since the tools of both double deck slides moved together at the same speed. Consequently, certain disadvantages and inaccuracies resulted and the production of the work lessened.

In the prior patent of Simpson and Drissner, No. 2,033,490, of March 10, 1936, instead of providing double deck side tool holders, side tool holders for the intermediate or 2nd and 5th position spindles were provided carried by levers which operated the top cross slides but here, again, the side slides and top slides were operated by the same means and the same disadvantages were present.

To eliminate these disadvantages and provide a multiple spindle machine of the six spindle type with an independent cross slide for each spindle whereby its tool can have its own independent travel and thus have the advantage of exact depth of forming, cutting off or any other operation performed by the side slide tool and thereby increase the production of the machine and insure

greater accuracy, is the object of the present improvement.

The present invention, being an improvement upon that shown and described in the patent hereinbefore referred to, only so much of that machine is illustrated as is deemed necessary to an understanding of the present construction. Therefore, the spindle carrier 39 carrying the six rotary work spindles 40 is shown mounted in the upright housing 203 and the levers for operating the two top cross slides 209 and 210 are illustrated at 208 in Fig. 2, these levers being actuated by cam drums 112 and 113. The two lower cross slides 206 and 207 for the two lower spindles are similar to those shown in said patent and an improvement thereon disclosed in my contemporaneously pending application, Serial Number 162,846, filed September 8, 1937, and this cross slide mechanism for the two lower spindles is also operated by the cam drums 112 and 113, the formation of the cams on these drums controlling, of course, independently the travel of the side slides and top slides hereinbefore referred to.

To increase the production of the machine and the accuracy of the work as well as prolong the life of the tools in the modern high speed machines, it has become essential not merely to provide side forming tools that will cooperate with the intermediate spindles designated as the 2nd and 5th position spindles, but to operate these cross slides and their tools entirely independently of the lower side slides and top side slides and this has necessitated not only additional mechanism but such location of the additional parts as not to interfere with the operation of other parts and compactness of the machine. Therefore, the gist of the present improvement is the provision of an independently operated and controlled forming or cross tool slide for each of the six spindles which will not interfere with the work of any other side tool, each having its own independent operating means and, therefore, travel, whereby one can travel a greater or less distance than the other tool.

In the drawings accompanying and forming a part of this specification, Fig. 1 is a transverse view of so much of a six spindle multiple spindle machine as is deemed necessary to illustrate the operating means for this improved cross slide mechanism.

Fig. 2 is a somewhat similar view illustrating the positions of the improved cross slide mechanism.

Fig. 3 is a longitudinal sectional view of a part

of the spindle carrier housings and illustrates the operating means for the improved intermediate cross slide mechanism, and

Fig. 4 is a sectional view of a part of the operating means shown in Fig. 3.

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 details of construction and arrangement of parts illustrated in the accompanying drawings since the invention is capable of other embodiments, and that the phraseology employed is for the purpose of description and not of limitation.

In the machine illustrated, the work spindle housing 203 having a front wall 203' and rear wall 203 carries the indexible work spindle carrier 39 shown having six rotary work spindles 40, the carrier being indexed by suitable means, the bottom cross slides 206, 207 and top slides 209, 210 cooperating respectively with the two lower spindles and the two top spindles in the usual way, and reference is made to said patent for the various other units which cooperate with the indexible work spindle carrier to make a practical and operative machine.

In the machine shown, there is the usual cam drum shaft 30 for operating the cam drums of the machine and on this cam drum shaft is the usual stock feed cam drum 90 located in the rear of the spindle carrier housing and, in the present instance, the improved mechanism is operated from this stock feed cam drum by means of a gear 2 fastened thereto. This gear is in mesh with a pair of gears 3 and 4 mounted on studs carried by a suitable portion of the framework.

Secured to the face of each of these gears 3 and 4 are interchangeable cam disks 5 and 6 cooperating with rollers 7 carried by the lower ends of a pair of levers 8 and 9 suitably pivotally supported by the framework. The upper end of each lever is connected with an arm 10 mounted on the end of a shaft 11 having a gear 11' pinned at its opposite end, this shaft being suitably supported by the carrier housing.

Each of these gears is in contact with a rack 12 fastened to the side slide 13, which slide is thus shifted backward and forward on a base or bracket 14 fastened to the front of the spindle carrier housing by a key and screws to give the side slide rigid support.

A suitable clamping bracket 15 is provided to hold the tool in proper position and an adjusting screw 16 is in position to adjust the tool holders endwise.

Carried by the tool slide at 17 is a stud and adjusting screw fastened to the slide to contact with a spring plunger 18 which eliminates all end play in the slide due to the driving gear and its operating means and also insuring a fixed stop for the travel of the slide to hold the tool accurately for the proper diameter of the work when the slides are used for forming.

Thus, from the foregoing, it will be seen that the machine has an independently cam operated slide for each spindle.

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. A multiple spindle machine having a work spindle carrier, top tool slides for the upper spindles and lower side tool slides for the lower spindles, each independently operated, and cross slide mechanism for the intermediate spindles operated independently of the other tool slides.

2. A multiple spindle machine having a work spindle carrier, top tool slides for the upper spindles and side tool slides for the lower spindles, each independently operated, cross slide mechanism for the intermediate spindles operated independently of the other tool slides and located at the front of the spindle carrier, and means located at the rear of the spindle carrier for operating said slides.

3. A multiple spindle machine having a work spindle carrier, top tool slides for the upper spindles and side tool slides for the lower spindles, each independently operated, cross slide mechanism for the intermediate spindles operated independently of the other tool slides and located at the front of the spindle carrier, and cam operated means located at the rear of the spindle carrier for operating said slides.

4. A multiple spindle machine having a work spindle carrier, top tool slides for the upper spindles and side tool slides for the lower spindles, each independently operated, cross slide mechanism for the intermediate spindles operated independently of the other tool slides and located at the front of the spindle carrier, and interchangeable cam operated means located at the rear of the spindle carrier for operating said slides.

5. A multiple spindle machine having a work spindle carrier, top tool slides for the upper spindles and side tool slides for the lower spindles, each independently operated, and cross slide mechanism for the intermediate spindles operated independently of the other tool slides and comprising cam slides located in front of the spindle carrier, a gear carried by a cam drum in the rear of the work spindle carrier, gears meshing therewith, cams carried by said gears, levers operated by said cams, and gear and rack mechanism for operating said slides.

6. A metal working machine having an indexible spindle carrier carrying five or more rotary work spindles, a cam shaft, a cam drum thereon and located in the rear of said spindle carrier, a pair of cross slides located in front of the spindle carrier in position to cooperate with the intermediate spindles of said carrier, and means operated by said cam drum for operating said slides.

7. A metal working machine having an indexible spindle carrier carrying five or more rotary work spindles, a cam shaft, a cam drum thereon and located in the rear of said spindle carrier, a pair of cross slides located in front of the spindle carrier in position to cooperate with the intermediate spindles of said carrier, and means operated by said cam drum for operating said slides and comprising a gear on the cam drum, a pair of gears cooperating therewith, cams carried by said last gears, levers cooperating with said cams, and gear and rack mechanism for operating said slides.

8. In a metal working machine, a housing, an indexible spindle carrier carried by said housing and provided with a series of five or more rotary work spindles, a cam shaft, a cam drum

thereon located in the rear of said spindle carriers, cross slides supported by said housing in position to cooperate with the intermediate spindles of the spindle carrier, and means operated by said cam drum for operating said slide.

9. In a metal working machine, a housing, an indexible spindle carrier carried by said housing and provided with a series of five or more rotary work spindles, a cam shaft, a cam drum thereon located in the rear of said spindle carrier, cross slides supported by said housing in position to cooperate with the intermediate spindles of the spindle carrier, and means operated by said cam drum for operating said slide and comprising a gear secured to the drum, a gear in mesh therewith, a cam carried by said last gear, a lever cooperating with said cam, and means operated by said lever for shifting the slide.

10. In a metal working machine, a housing, an indexible spindle carrier carried by said housing and provided with a series of five or more rotary work spindles, a cam shaft, a cam drum thereon located in the rear of said spindle carrier, cross slides supported by said housing in position to cooperate with the intermediate spindles of the spindle carrier, and means operated by said cam drum for operating said slide and comprising a gear secured to the drum, a gear in mesh therewith, an interchangeable cam carried by said last gear, a lever cooperating with said cam, and means operated by said lever for shifting the slide.

11. In a metal working machine, a housing, an indexible spindle carrier carried by said housing and provided with a series of five or more rotary work spindles, a cam shaft, a cam drum thereon located in the rear of said spindle carrier, cross slides supported by said housing in position to cooperate with the intermediate spindles of the spindle carrier, and means operated by said cam drum for operating said slide and comprising a gear secured to the drum, a gear in mesh therewith, a cam carried by said last gear, a lever cooperating with said cam, and means operated by said lever for shifting the slide and comprising a rack and gear mechanism.

12. In a metal working machine having an indexible spindle carrier provided with rotary work spindles and having side cross slides cooperating with the lower spindles of the set, top cross slides cooperating with the top spindles of the set, side cross slides located to cooperate with

the intermediate spindles, and means for operating said slides independently of the other slides of the machine.

13. In a metal working machine having an indexible spindle carrier having rotary spindles and having a top slide and a lower side slide cooperating respectively with the top and bottom spindles, a side cross slide located to cooperate with the intermediate spindles of the set, and means for operating said slide independently of the other top and cross slides.

14. In a metal working machine having an indexible spindle carrier having rotary spindles and having a top slide and a lower side slide cooperating respectively with the top and bottom spindles, a side cross slide located in front of said carrier to cooperate with the intermediate spindles of the set, and means for operating said slide independently of the other top and cross slides, said means located rearwardly of the spindle carrier.

15. A multiple spindle machine having a work spindle carrier, top tool slide mechanism for the upper spindle, lower side tool mechanism for the lower spindle, each independently operated, and an intermediate cross slide mechanism for an intermediate spindle operated independently of the other tool slides whereby all of the cross slides are operated independently of each other.

16. A multiple spindle machine having a work spindle carrier, top tool slide mechanism for the upper spindles and supported inclined to the axis of the carrier, lower tool slide mechanism for the lower spindles and supported for horizontal movement, each independently operated, and an intermediate cross slide mechanism for the intermediate spindles supported inclined to the axis of the carrier, and means for operating said intermediate cross slide mechanism independently of the other tool slides.

17. A multiple spindle machine having a work spindle carrier, top tool slide mechanism for the upper spindles, lever mechanism for operating said top tool slide mechanism, lower side tool mechanism for the lower spindles, means for operating same whereby each of said slide mechanisms operates independently, intermediate cross slide mechanism for the intermediate spindles, and lever mechanism for operating said intermediate cross slide mechanism independently of the other tool slide mechanisms.

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