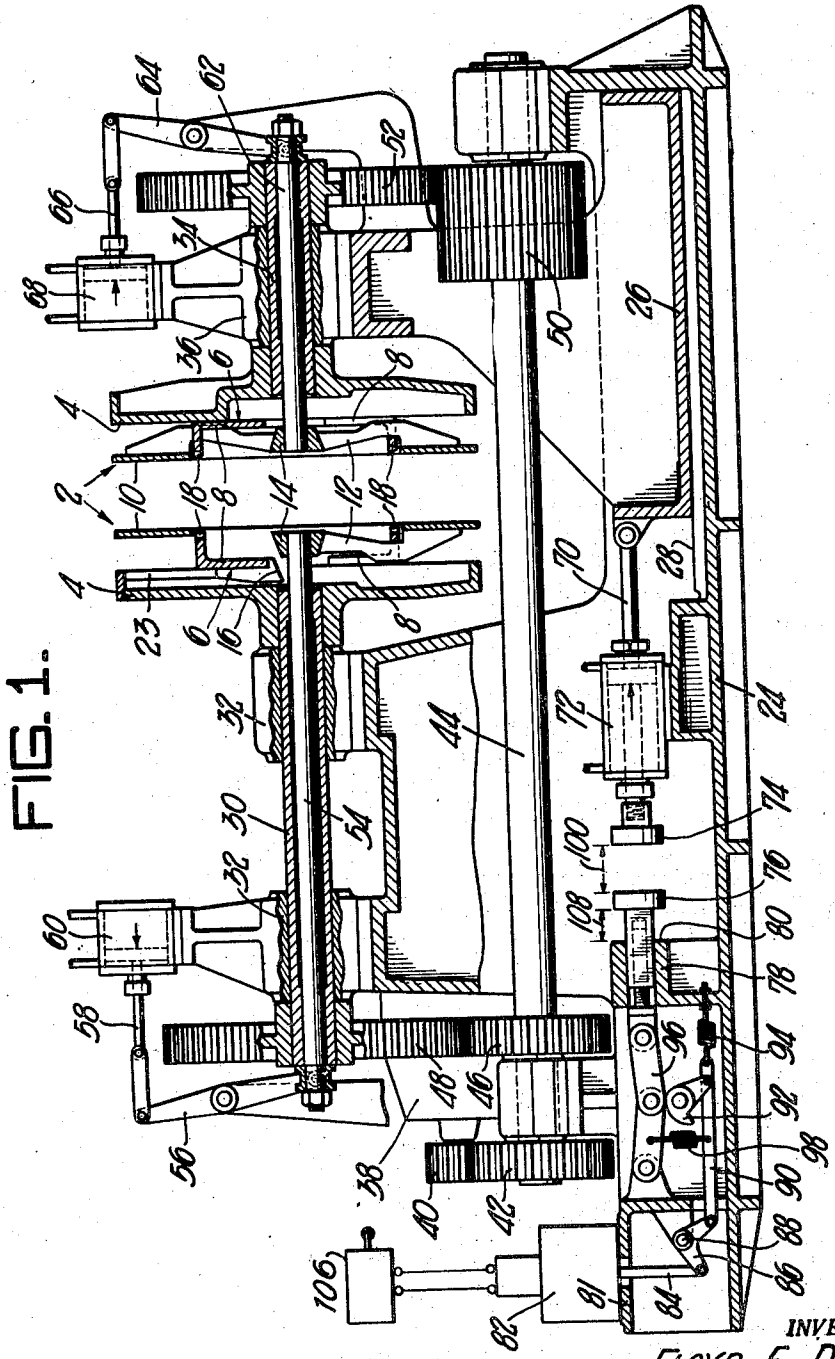
May 20, 1947. F. E. DAVIS 2,420,936

FLYING COILER

Filed Dec. 6, 1944 4 Sheets-Sheet 1

FIG. 1.



INVENTOR:
FLOYD E. DAVIS.
BY: John E. Jackson
HIS ATTORNEY.

May 20, 1947. F. E. DAVIS 2,420,936

FLYING COILER

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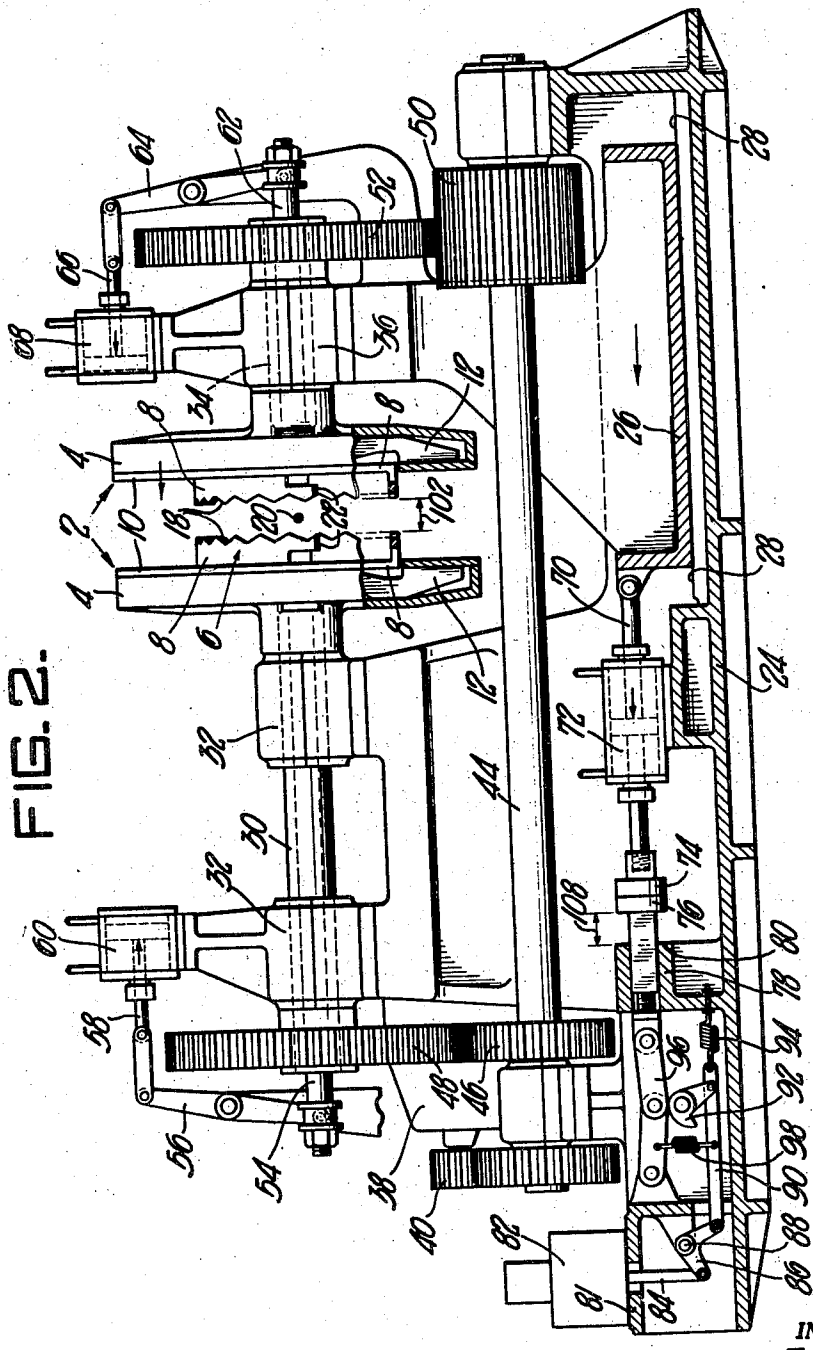


FIG. 2.

INVENTOR:
FLOYD E. DAVIS,
BY: John E. Jackson
HIS ATTORNEY.

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FLYING COILER

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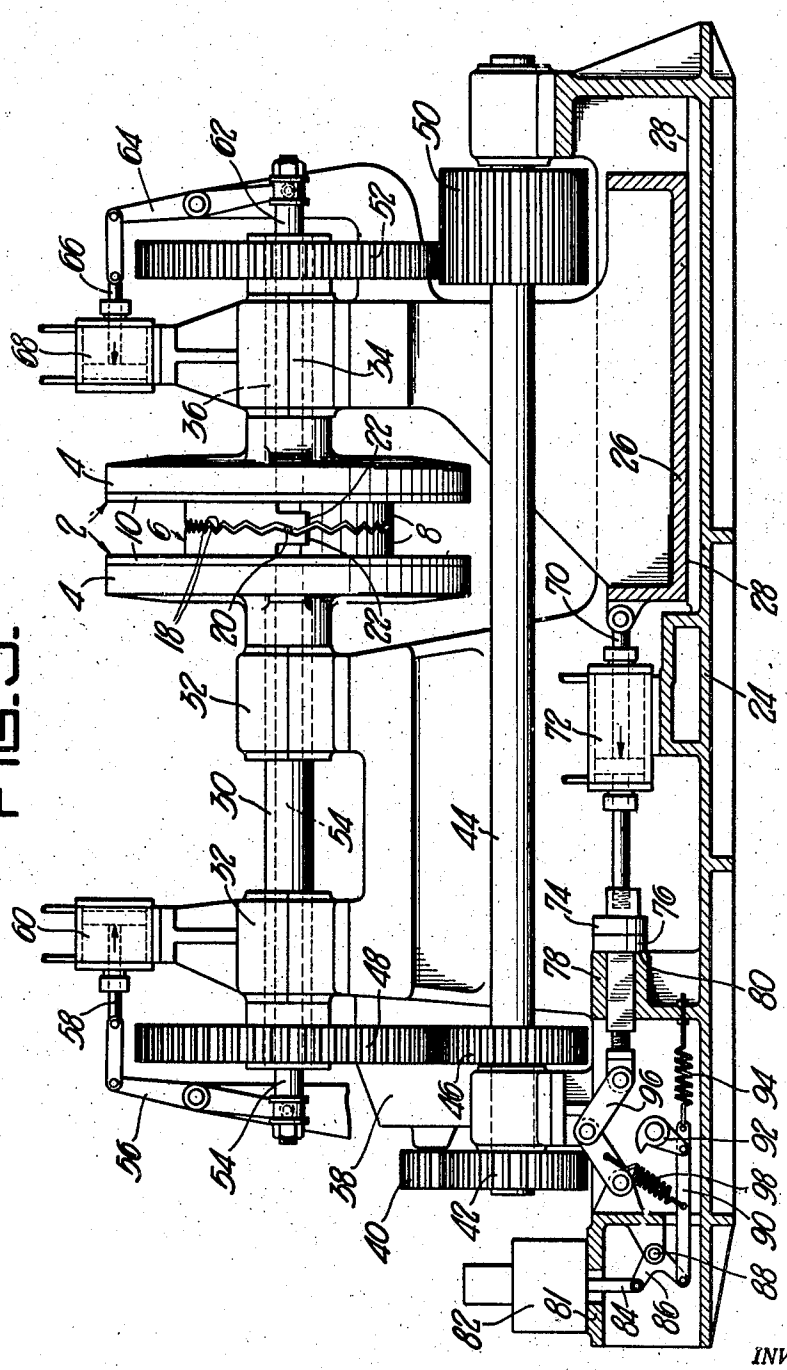


FIG. 3.

INVENTOR:
FLOYD E. DAVIS.
BY: John E. Jackson
HIS ATTORNEY.

May 20, 1947. F. E. DAVIS 2,420,936

FLYING COILER

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FIG. 4.

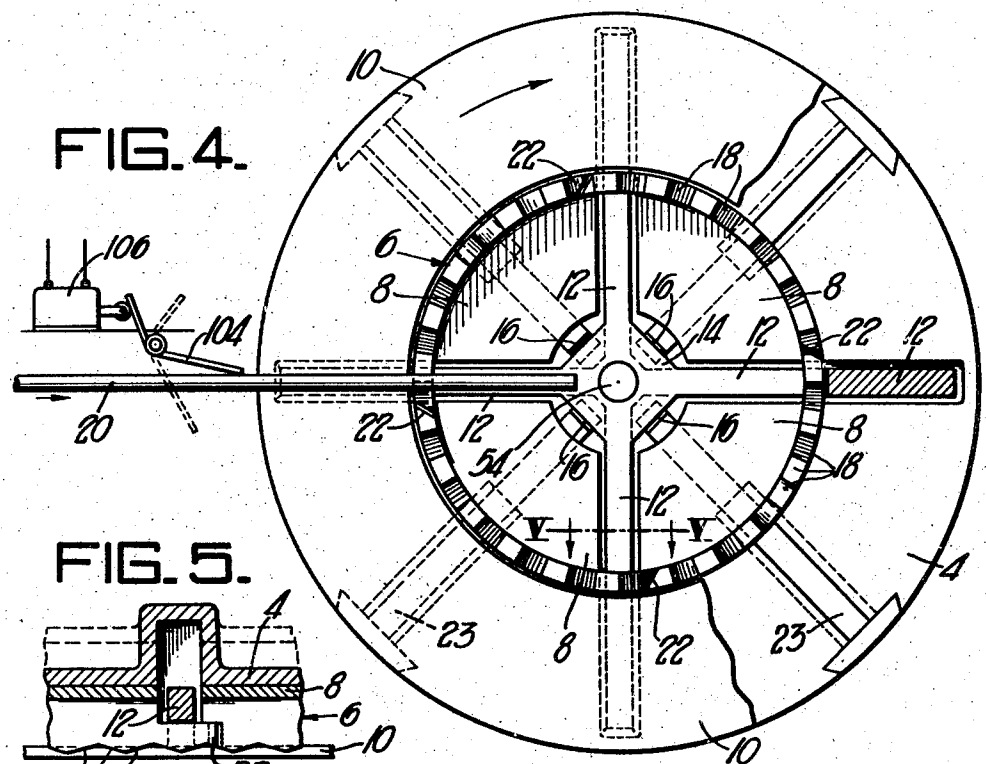


FIG. 5.

FIG. 6.

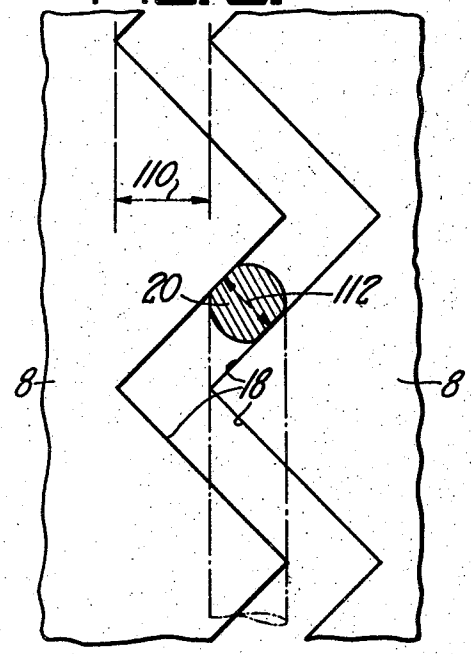
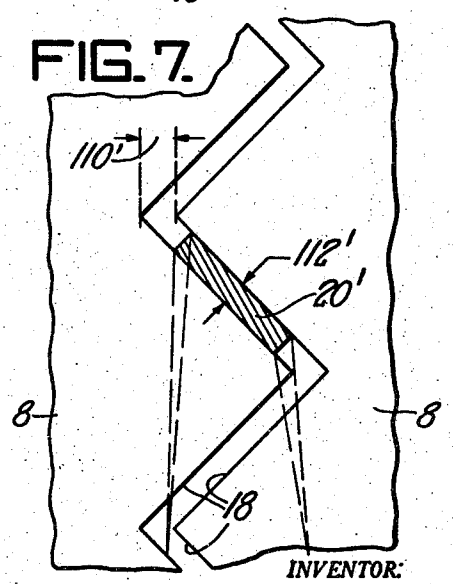


FIG. 7.



INVENTOR:
FLOYD E. DAVIS,
BY: John E. Jackson
HIS ATTORNEY.

Patented May 20, 1947

2,420,936

UNITED STATES PATENT OFFICE

2,420,936

FLYING COILER

Floyd E. Davis, Gary, Ind.

Application December 6, 1944, Serial No. 566,929

25 Claims. (Cl. 242—81)

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This invention relates to flying coilers for rods and the like. In the manufacture of rods, bars and other similar products it is often necessary to form them into coils. In many instances the coils are formed as the rod leaves the rolling mill or the hot bed, while traveling at a relatively high rate of speed. At present two types of coilers are in general use. For catching the bar on the fly, there is a spike type coiler which is operated with a stationary face plate opposite a rotating spiked face plate. This type of coiler is defective in that there is an excessive breakage of spikes and the bars are damaged by being rubbed against the stationary face plate. The other type of coiler in general use is the collapsible drum type which must be stopped and hand fed for each coil. These stops cause delays and interfere with steady production.

It is an object of this invention to provide a coiler which has positive means for catching and holding the leading end of a rod on the fly and which will not damage the surface thereof.

Another object is to provide a coiler which will wrap the material uniformly about its drum.

A further object is to provide a coiler which will maintain the shape of the coil upon discharge therefrom.

These and other objects will be more apparent after referring to the attached drawings, in which:

Fig. 1 is a cross-sectional elevation of the coiler in discharge position, the head end of the reel being shown on a line through the keyed-connection of the drum;

Fig. 2 is an elevation partly in cross-section, showing the coiler in catching position;

Fig. 3 is a view similar to Fig. 2, but showing the coiler in gripping position;

Fig. 4 is an end view of the reel, partly in cross-section, showing a rod in position to be gripped;

Fig. 5 is a section taken on the line V—V of Fig. 4;

Figs. 6 and 7 are views showing the position of the serrations as they grip the material to be coiled.

Referring more particularly to the drawings, the reference numeral 2 indicates the reel of a coiler. The reel is composed of two identical halves which face each other and rotate together. Each half includes a face plate 4, a collapsible drum 6 having a plurality of segments 8, and a stripper plate 10. The spider 12 of the stripper plate is mounted on a tapered hub 14 which cooperates with corresponding tapers 16 on the drum segments 8. The jaws of the drum segments have zigzag gripping teeth or serrations 18 on the outer edges thereof for gripping the rod 20 therebetween and preventing it from working down between the jaws as it is coiled around the drum. The shape of the serrations 18 may be varied to grip a bar or other shape of material as shown in Fig. 7. The drum segments 8 overlap each other at 22 as shown in Fig. 5, to prevent the material from catching and wedging therebetween and are keyed to the face plates by dovetailed keys 23.

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The head end of the reel is mounted on the stationary bed 24 and the tail end on carriage 26 which slides on the ways 28 on bed 24. If desired, the head end of the reel may be similarly mounted on a movable carriage so that either or both drums may be moved toward and away from the other. The face plate 4 of the head end of the coiler is attached to a hollow spindle shaft 30 which is mounted for rotation in bearings 32. The face plate 4 of the tail end is attached to a hollow spindle shaft 34 which is mounted for rotation in bearing 36. The two halves of the reel are synchronously driven by means of a motor 38 through motor pinion 40 in mesh with a gear 42 mounted on drive shaft 44 which is mounted for rotation on the stationary bed 24. Mounted on drive shaft 44 is a pinion 46 which drives the spindle shaft 30 by means of a gear 48 mounted thereon. On the tail end of shaft 44 is mounted a pinion 50 which drives the spindle shaft 34 by means of a gear 52 mounted thereon. The pinion 50 has a wide face so that it will be in mesh with the gear 52 regardless of the position of carriage 26. Extending through hollow shaft 30 and supporting the stripper plate 10 of the head end is a shaft 54 which is moved in relation to the face plate 4 by means of a lever 56 connected to the piston rod 58 which is actuated by means of pressure applied to the cylinder 60. In like manner the stripper plate 10 of the tail end is moved by means of shaft 62 mounted within shaft 34 and which is attached to lever 64 connected to the piston rod 66 which is actuated by means of pressure applied to cylinder 68.

Connected to the carriage 26 is a piston rod 70 which is actuated by pressure applied to the cylinder 72. On the head end of the piston rod 70 is mounted an adjustment nut 74. A second adjustment nut 76 in axial alignment with nut 74 is mounted for sliding movement in bearing 78, the face of which acts as a stop 80 for the adjustment nut 76. Mounted on a bracket 81 is a solenoid 82 having a rod 84 connected to a bell crank lever 86 pivotally mounted at 88 on bracket

81. The other arm of the bell crank lever is connected to a link 90 which rotates a cam 92. Spring 94 is connected to the free end of the link 90. Connected to the adjustment nut 76 is one end of a toggle 96, the other end being connected to the bracket 81. A spring 98 has one end connected to the toggle 96 and the other connected to lever 90.

The operation of the device is as follows:

With the coiler in the position shown in Fig. 1, the motor 38 is started, thus causing the two face plates 4 to rotate in synchronism. Pressure is then admitted to the outer ends of cylinders 60 and 68, thus drawing the stripper plates 10 back against the face plates 4 as shown in Fig. 2. Pressure is admitted to the tail end of cylinder 72 which moves the carriage 26 a distance of stroke 100 where the nut 76 acts as a stop for nut 74 to establish the gap 102 between the gripping teeth 18. (See Fig. 2.) This sets the coiler in the catching position. By adjusting the position of nut 76 the width of gap 102 may be varied. As the material to be coiled approaches the coiler, it strikes a flag 104 and actuates it to make contact with the contactor 106, thus closing the circuit to the solenoid causing it to rotate the bell crank lever 86 clockwise. This pulls the lever 90 to the left to rotate the cam 92 causing it to break the toggle 96 as shown in Fig. 3. With pressure still applied to the tail end of cylinder 72 the breaking of the toggle causes the carriage 26 to be moved over the additional stroke 108 (See Figs. 1 and 2) to establish the gap 110 (Fig. 6), thus gripping the leading end of the rod between the serrations 18. It will be understood that sufficient time elapses between the striking of the flag 104 by the rod and the movement of the carriage 26 to permit the rod to enter between the serrations 18. The gap 110 and its related gap 112 are adjustable by nut 74 to limit the deformation of the material being coiled and to enable material of different thicknesses or widths to be gripped.

The modified members in Figure 7 are indicated by the reference numerals 20', 110' and 112'.

When the coil is completed, the contact 106 is opened, thus opening the solenoid circuit. The motor 38 is stopped and pressure admitted to the head end of cylinder 72 to force the carriage 26 to the right, thus spreading the face plates 4. With release of the pressure on nut 76, the springs 94 and 98 return the toggle 96 to the position shown in Fig. 1. Pressure is admitted to the inner ends of cylinders 60 and 68 to push the stripper plates out into the position shown in Fig. 1. As the stripper plates are pushed out, the tapered hubs 14 of the spider 12 move away from the corresponding tapers 16 on the drum segments 8, thus providing clearance for the drum segments to collapse so that the coil is easily stripped from the drum. The stripper plates grip the coil while it is being stripped from the drums and support it momentarily after clearance as wide as the coil is provided between the drums. The coil then drops straight down without losing its shape. Since the inner convolutions of the coil all have the same diameter, the coil is easily fitted to an uncoiler for subsequent processing.

While one embodiment of the invention has been shown and described, it will be apparent to one skilled in the art that other adaptations and modifications may be made without departing from the scope of the attached claims.

I claim:

1. A flying coiler for rods and the like comprising opposed rotatable drums, means for rotating the drums in synchronism, means for moving at least one of said drums toward and away from the other, serrations on the edge of each drum for preventing the rod from working down between the drums, and means for limiting the movement of the drums together to establish a gap between the edges of the drums for receiving the leading end of said rod when the drums are moved together.

2. A flying coiler for rods and the like comprising opposed collapsible drums, means for rotating the drums in synchronism, means for moving at least one of said drums toward and away from the other, serrations on the edge of each drum for preventing the rod from working down between the drums, and means for limiting the movement of the drums together to establish a gap between the edges of the drums for receiving the leading end of said rod when the drums are moved together.

3. A flying coiler for rods and the like comprising opposed rotatable drums, means for rotating the drums in synchronism, means for moving at least one of said drums toward and away from the other, serrations on the edge of each drum for preventing the rod from working down between the drums, means for limiting the movement of the drums together to establish a gap between the edges of the drums for receiving the leading end of said rod when the drums are moved together, and means for stripping the coil from the drums.

4. A flying coiler for rods and the like comprising opposed collapsible drums, a face plate adjacent each of said drums, means for rotating the drums and face plates in synchronism, means for moving at least one of said drums toward and away from the other, serrations on the edge of each drum for preventing the rod from working down between the drums, means for limiting the movement of the drums together to establish a gap between the edges of the drums for receiving the leading end of said rod when the drums are moved together, and means for stripping the coil from the collapsed drums.

5. A flying coiler for rods and the like comprising opposed collapsible drums, means for rotating the drums in synchronism, means for moving at least one of said drums toward and away from the other, serrations on the edge of each drum for preventing the rod from working down between the drums, means for limiting the movement of the drums together to establish a gap between the edges of the drums for receiving the leading end of said rod when the drums are moved together, means for stripping the coil from the collapsed drum, and means actuated by the leading end of said rod for operating said second named means to move said drums together to grip the leading end of said rod therebetween.

6. A flying coiler for rods and the like comprising opposed collapsible drums, means for rotating the drums in synchronism, means for moving at least one of said drums toward and away from the other, serrations on the edge of each drum for preventing the rod from working down between the drums, means for limiting the movement of the drums together to establish a gap between the edges of the drums for receiving the leading end of said rod when the drums are moved together, and means actuated by the leading end of said rod for operating said second named means to move said drums together to grip the leading end of said rod therebetween.

7. A flying coiler for rods and the like com-

prising opposed rotatable drums, means for rotating the drums in synchronism, means for moving at least one of said drums toward and away from the other, serrations on the edge of each drum for preventing the rod from working down between the drums, means for limiting the movement of the drums together to establish a gap between the edges of the drums for receiving the leading end of said rod when the drums are moved together, and means for varying the width of said gap.

8. A flying coiler for rods and the like comprising opposed collapsible drums, means for rotating the drums in synchronism, means for moving at least one of said drums toward and away from the other, serrations on the edge of each drum for preventing the rod from working down between the drums, means for limiting the movement of the drums together to establish a gap between the edges of the drums for receiving the leading end of said rod when the drums are moved together, and means for varying the width of said gap.

9. A flying coiler for rods and the like comprising opposed rotatable drums, means for rotating the drums in synchronism, means for moving at least one of said drums toward and away from the other, serrations on the edge of each drum for preventing the rod from working down between the drums, means for limiting the movement of the drums together to establish a gap between the edges of the drums for receiving the leading end of said rod when the drums are moved together, means for varying the width of said gap, and means for stripping the coil from the drums.

10. A flying coiler for rods and the like comprising opposed collapsible drums, means for rotating the drums in synchronism, means for moving at least one of said drums toward and away from the other, serrations on the edge of each drum for preventing the rod from working down between the drums, means for limiting the movement of the drums together to establish a gap between the edges of the drums for receiving the leading end of said rod when the drums are moved together, means for varying the width of said gap, and means for stripping the coil from the collapsed drums.

11. A flying coiler for rods and the like comprising opposed collapsible drums, means for rotating the drums in synchronism, means for moving at least one of said drums toward and away from the other, serrations on the edge of each drum for preventing the rod from working down between the drums, means for limiting the movement of the drums together to establish a gap between the edges of the drums for receiving the leading end of said rod when the drums are moved together, means for varying the width of said gap, means for stripping the coil from the collapsed drum, and means actuated by the leading end of said rod for operating said second named means to move said drums together to grip the leading end of said rod therebetween.

12. A flying coiler for rods and the like comprising a bed, a collapsible drum rotatably mounted on said bed, a carriage mounted on said bed, a collapsible drum rotatably carried on said carriage, means for rotating said drums in synchronism, means for moving said carriage on said bed, serrations on the edge of each drum for preventing the rod from working down between the drums, and means for limiting the movement of the drums together to establish a gap between the edges of the drums for receiving the leading end of said rod when the drums are moved together.

13. A flying coiler for rods and the like comprising a bed, a collapsible drum rotatably mounted on said bed, a carriage mounted on said bed, a collapsible drum rotatably carried on said carriage, means for rotating said drums in synchronism, means for moving said carriage on said bed, serrations on the edge of each drum for preventing the rod from working down between the drums, means for limiting the movement of the drums together to establish a gap between the edges of the drums for receiving the leading end of said rod when the drums are moved together, and means actuated by the leading end of said rod for operating said moving means to move said drums to grip the leading end of said rod therebetween.

14. A flying coiler for rods and the like comprising a bed, a collapsible drum rotatably mounted on said bed, a carriage mounted on said bed, a collapsible drum rotatably carried on said carriage, means for rotating said drums in synchronism, means for moving said carriage on said bed, serrations on the edge of each drum for preventing the rod from working down between the drums, means for limiting the movement of the drums together to establish a gap between the edges of the drums for receiving the leading end of said rod when the drums are moved together, means actuated by the leading end of said rod for operating said moving means to move said drums to grip the leading end of said rod therebetween, a stripper plate surrounding each of said drums, and means for moving said plates toward each other to strip the coil from the drums after they have been separated and their rotation stopped.

15. A flying coiler for rods and the like comprising a bed, a collapsible drum rotatably mounted on said bed, a carriage mounted on said bed, a collapsible drum rotatably carried on said carriage, means for rotating said drums in synchronism, means for moving said carriage on said bed, serrations on the edge of each drum for preventing the rod from working down between the drums, means for limiting the movement of the drums together to establish a gap between the edges of the drums for receiving the leading end of said rod when the drums are moved together, means actuated by the leading end of said rod for operating said moving means to move said drums to grip the leading end of said rod therebetween, a stripper plate surrounding each of said drums, and means for moving said plates toward each other to strip the coil from the drums after they have been separated and their rotation stopped, said last named means including means for permitting the collapse of said drums.

16. A flying coiler for rods and the like comprising a bed, a collapsible drum rotatably mounted on said bed, a carriage mounted on said bed, a collapsible drum rotatably carried on said carriage, means for rotating said drums in synchronism, means for moving said carriage on said bed, serrations on the edge of each drum for preventing the rod from working down between the drums, means for limiting the movement of the drums together to establish a gap between the edges of the drums for receiving the leading end of said rod when the drums are moved together, means actuated by the leading end of said rod for operating said moving means to move said drums to grip the leading end of

said rod therebetween, and means for stripping the coil from the collapsed drums.

17. A flying coiler for rods and the like comprising a bed, a collapsible drum rotatably mounted on said bed, a carriage mounted on said bed, a collapsible drum rotatably carried on said carriage, means for rotating said drums in synchronism, means for moving said carriage on said bed, serrations on the edge of each drum for preventing the rod from working down between the drums, means for limiting the movement of the drums together to establish a gap between the edges of the drums for receiving the leading end of said rod when the drums are moved together, means for varying the width of said gap, means actuated by the leading end of said rod for operating said moving means to move said drums to grip the leading end of said rod therebetween, a stripper plate surrounding each of said drums, and means for moving said plates toward each other to strip the coil from the drums after they have been separated and their rotation stopped.

18. A flying coiler for rods and the like comprising a bed, a collapsible drum rotatably mounted on said bed, a carriage mounted on said bed, a collapsible drum rotatably carried on said carriage, means for rotating said drums in synchronism, means for moving said carriage on said bed, serrations on the edge of each drum for preventing the rod from working down between the drums, means for limiting the movement of the drums together to establish a gap between the edges of the drums for receiving the leading end of said rod when the drums are moved together, means for varying the width of said gap, means actuated by the leading end of said rod for operating said moving means to move said drums to grip the leading end of said rod therebetween, a stripper plate surrounding each of said drums, and means for moving said plates toward each other to strip the coil from the drums after they have been separated and their rotation stopped, said last named means including means for permitting the collapse of said drums.

19. A flying coiler for rods and the like comprising opposed rotatable drums, means for rotating said drums in synchronism prior to gripping the rod therebetween, means for moving at least one of said drums toward and away from the other, and means for limiting the movement of the drums together to establish a gap between the edges of the drums slightly less than the thickness of the rod to be gripped therebetween.

20. A flying coiler for rods and the like comprising opposed rotatable drums, means for moving at least one of said drums toward and away from the other, means for limiting the movement of the drums together to establish a gap between the edges of the drums slightly less than the thickness of the rod to be gripped therebetween, and means actuated by the leading end of said rod for operating said first named means to move said drums together to grip the leading end of said rod therebetween.

21. A flying coiler for rods and the like comprising a bed, a collapsible drum rotatably mounted on said bed, a collapsible drum rotatably carried on said carriage, means for rotating said drums in synchronism, means for moving said carriage on said bed, and means for limiting the movement of the carriage toward the first named drum to establish a gap between the edges of the drums slightly less than the thickness of the rod to be gripped therebetween.

22. A flying coiler for rods and the like comprising a bed, a collapsible drum rotatably mounted on said bed, a carriage mounted on said bed, a collapsible drum rotatably carried on said carriage, means for rotating said drums in synchronism, means for moving said carriage on said bed, means for limiting the movement of the carriage toward the first named drum to establish a gap between the edges of the drums slightly less than the thickness of the rod to be gripped therebetween, and means actuated by the leading end of said rod for operating said moving means to move said drums to grip the leading end of said rod therebetween.

23. A flying coiler for rods and the like comprising a bed, a collapsible drum rotatably mounted on said bed, a carriage mounted on said bed, a collapsible drum rotatably carried on said carriage, means for rotating said drums in synchronism, means for moving said carriage on said bed, means for limiting the movement of the carriage toward the first named drum to establish a gap between the edges of the drums slightly less than the thickness of the rod to be gripped therebetween, means actuated by the leading end of said rod for operating said moving means to move said drums to grip the leading end of said rod therebetween, a stripper plate surrounding each of said drums, and means for moving said plates toward each other to strip the coil from the drums after they have been separated and their rotation stopped.

24. A flying coiler for rods and the like comprising opposed rotatable drums, means for rotating said drums in synchronism, means for moving at least one of said drums toward and away from the other, means for limiting the movement of the drums together to establish a gap between the edges of the drums slightly less than the thickness of the rod to be gripped therebetween, and means for preventing the gripped rod from working down between the drums.

25. A flying coiler for rods and the like comprising opposed rotatable drums, means for rotating said drums in synchronism, means for moving at least one of said drums toward and away from the other, and serrations on the edge of each drum, said serrations being arranged and shaped so as to bridge to a predetermined depth thus providing a predetermined clearance between the edges of said drums when the drums are in their closed position.

FLOYD E. DAVIS.

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