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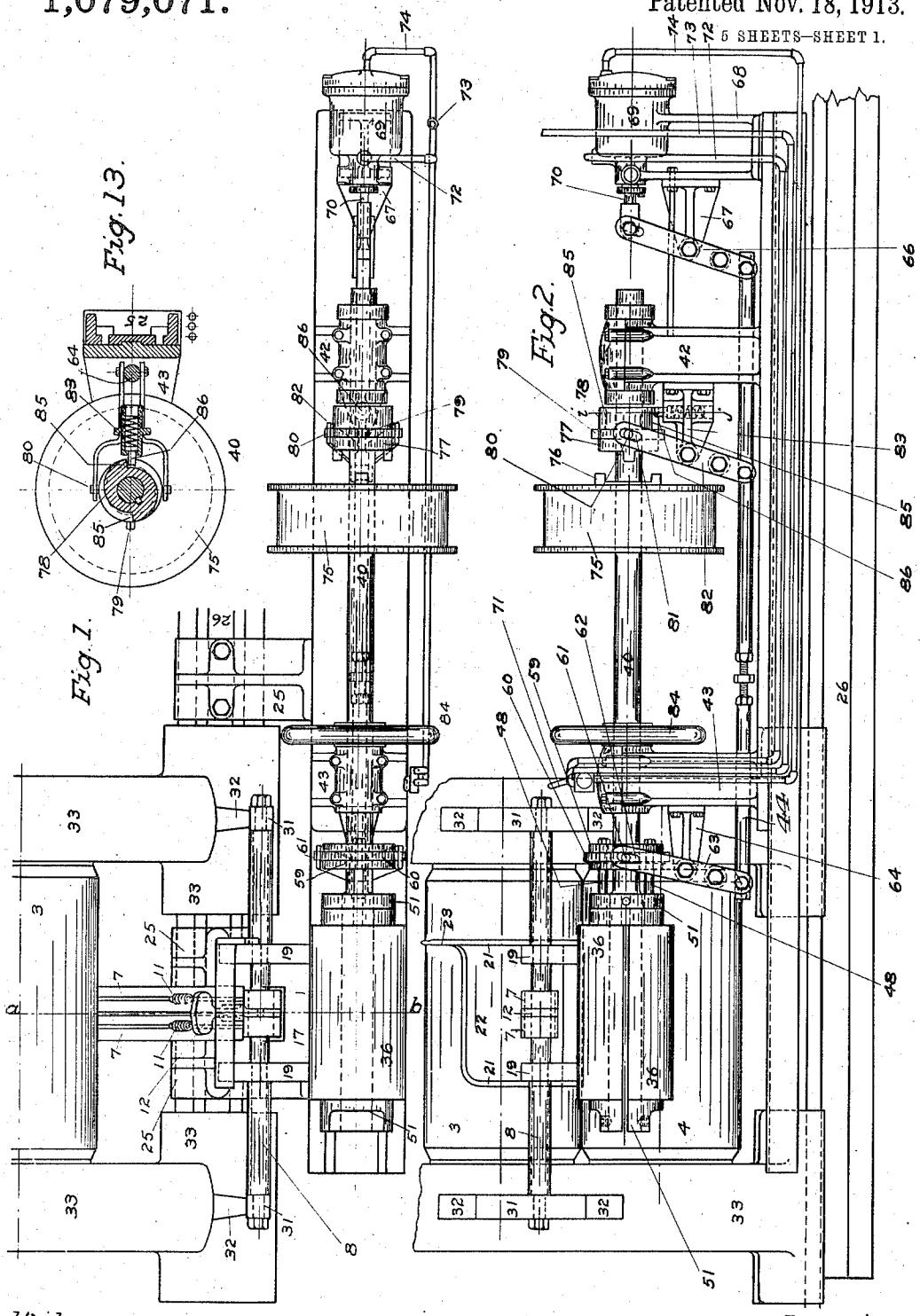
MACHINE FOR COILING METAL STRIPS.

APPLICATION FILED AUG. 22, 1912.

1,079,071.

Patented Nov. 18, 1913.

5 SHEETS—SHEET 1.



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MACHINE FOR COILING METAL STRIPS.

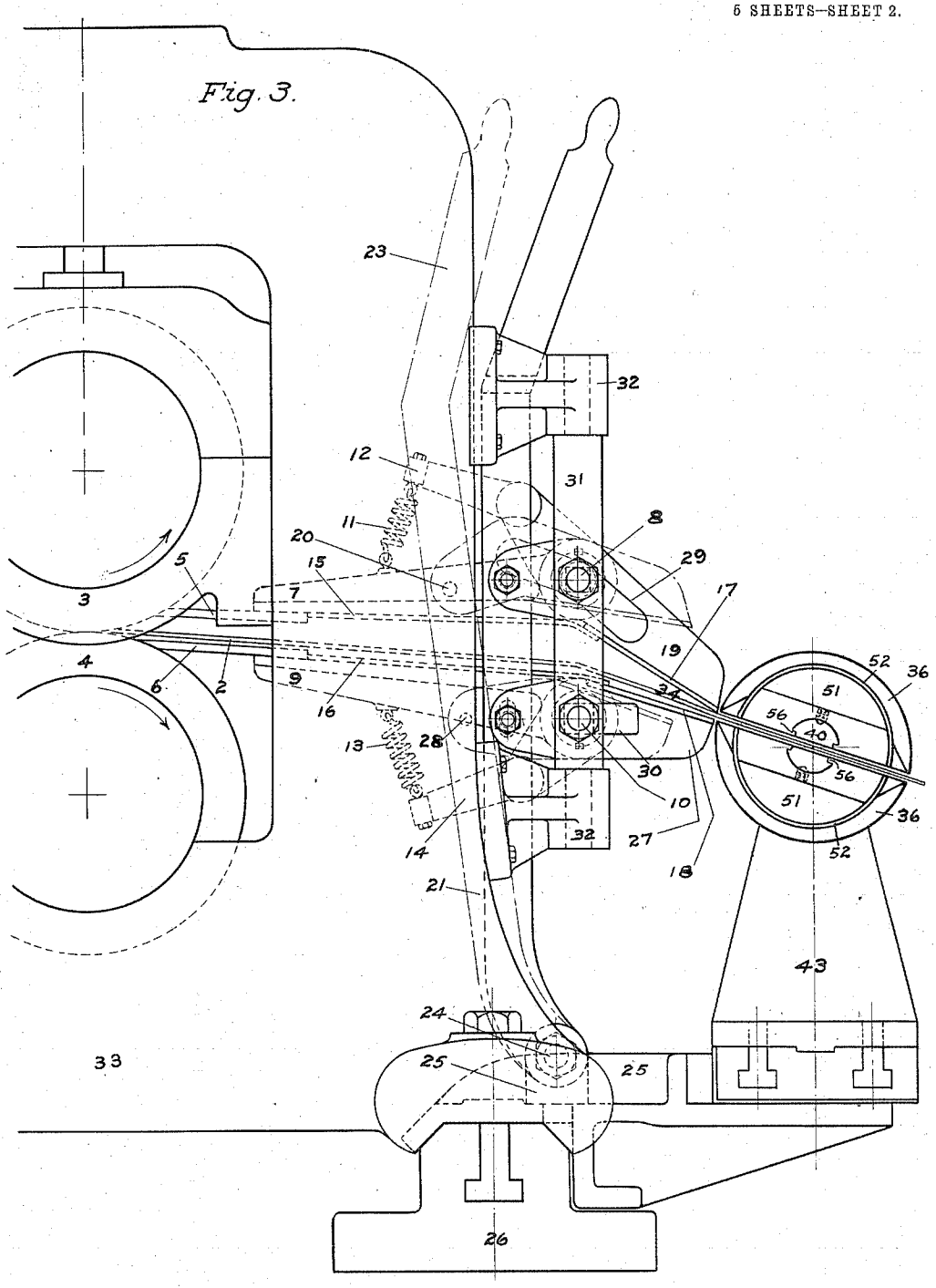
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5 SHEETS—SHEET 2.

Fig. 3.



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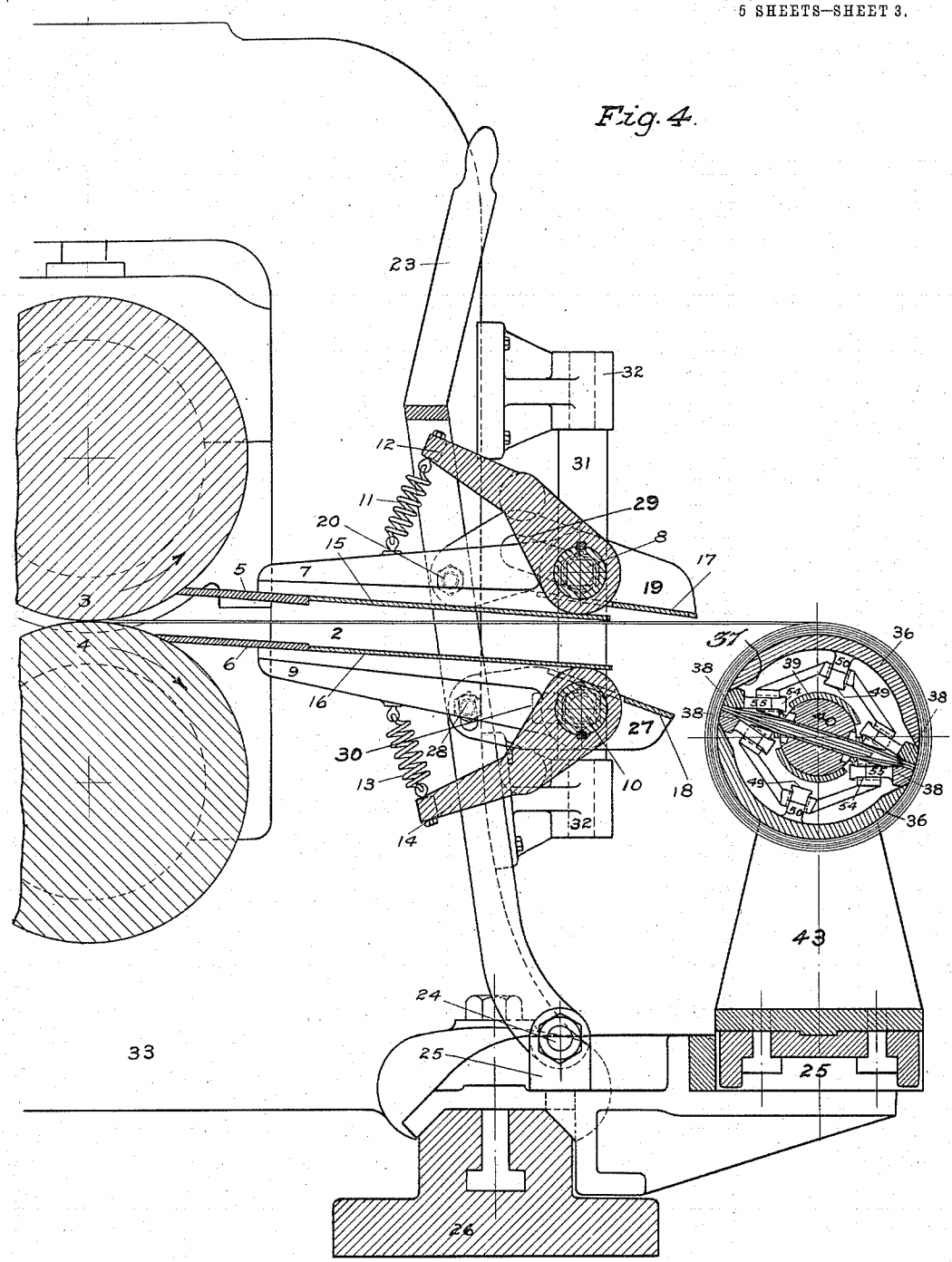
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Fig. 4.



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5 SHEETS—SHEET 4.

Fig. 12.

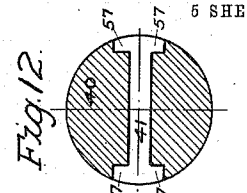


Fig. 7.

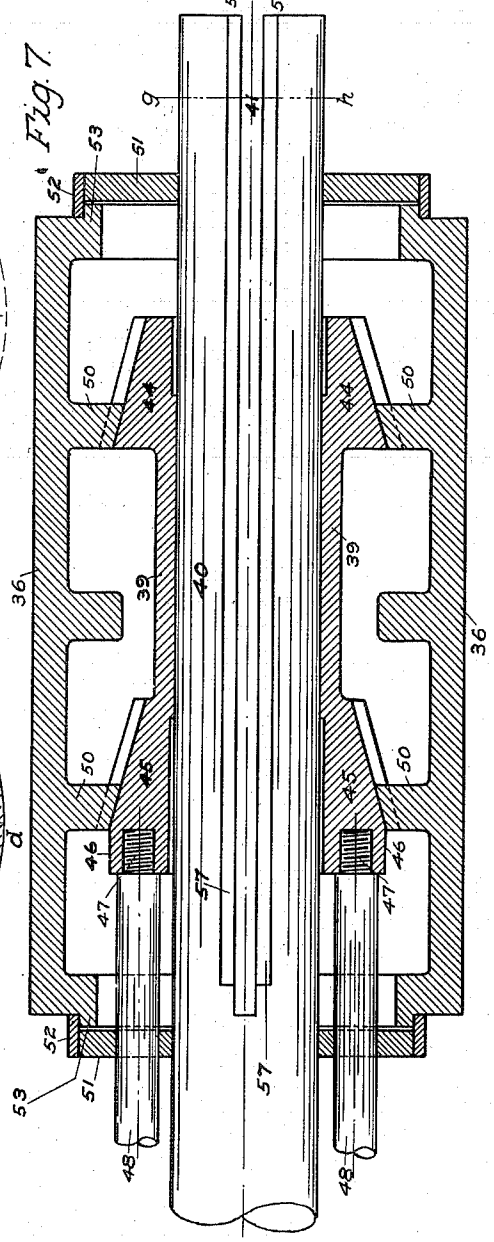


Fig. 6.

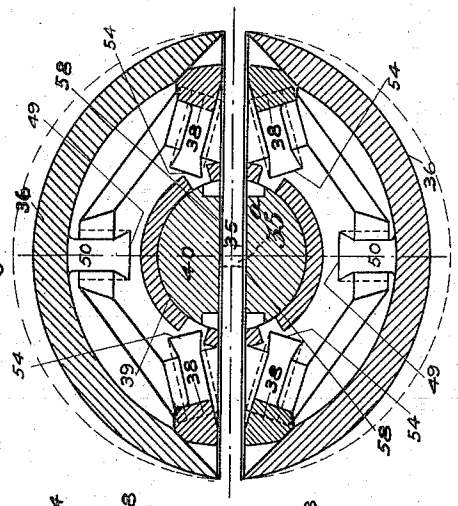
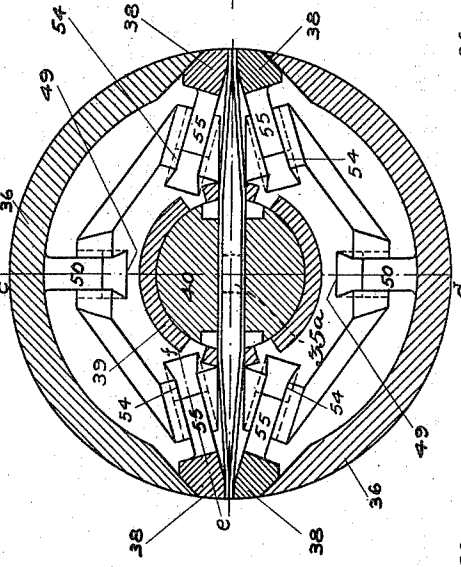


Fig. 5.



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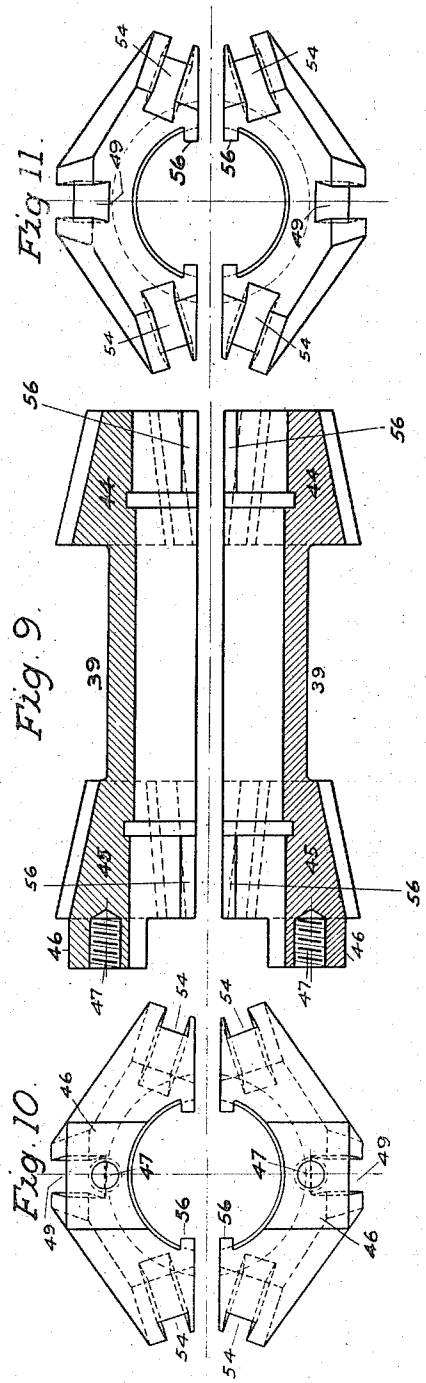
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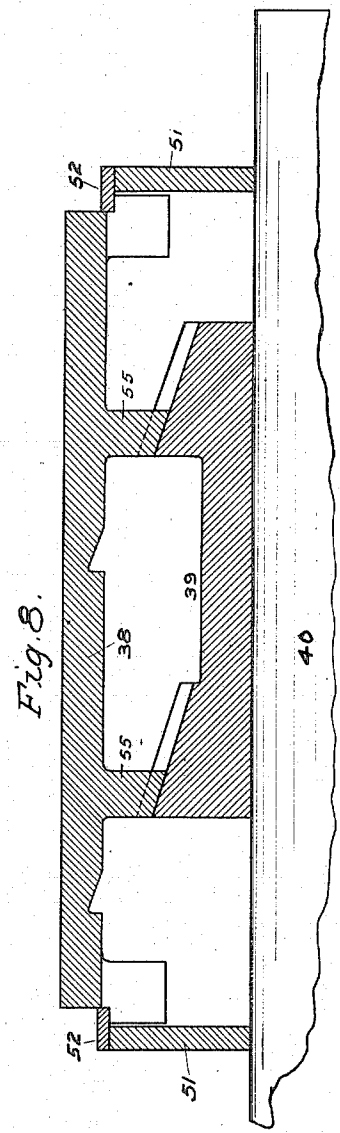
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1,079,071.

Patented Nov. 18, 1913

5 SHEETS—SHEET 5.





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MACHINE FOR COILING METAL STRIPS.

1,079,071. Specification of Letters Patent. Patented Nov. 18, 1913.

Application filed August 22, 1912. Serial No. 716,452.

To all whom it may concern:

Be it known that I, DAVID L. SUMMEY, a citizen of the United States, residing at Waterbury, in the county of New Haven and State of Connecticut, have invented a new and useful Improvement in Machines for Coiling Metal Strips; and I do hereby declare the following, when taken in connection with the accompanying drawings and the characters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this application, and represent, in—

Figure 1 a plan view of a machine for coiling metal strips, constructed in accordance with my invention. Fig. 2 a view thereof in side elevation, with the housings of the strip-rolling mill partly broken away. Fig. 3 a view of the machine in end elevation looking at its outer end, with its coiling-drum expanded, and a strip entered into its strip-receiving space, and with its strip-delivery arms and plates shown in their strip-delivery positions by full lines, and in their coil-clearance positions by broken lines. Fig. 4 a view in vertical transverse section on the line *a—b* of Fig. 1, showing the strip being wound upon the drum, with the strip-delivery arms and plates in their coil-clearance positions. Fig. 5 a view in vertical transverse section of the expansible coiling-drum with its members in their expanded positions, at which time its closure-members fill in the spaces between the ends of its body-members. Fig. 6 a corresponding view showing the drum as contracted, with its passway open to receive the end of the strip to be coiled. Fig. 7 a view of the drum in longitudinal section on the line *c—d* of Fig. 5. Fig. 8 a broken view of the drum in longitudinal section on the line *e—f* of Fig. 5 and showing one of the closure-members and the sleeve by which the same, as well as the other movable members of the drum, are operated. Fig. 9 a detached view in vertical longitudinal section of the two-part operating-sleeve. Fig. 10 a view in elevation of the inner end thereof. Fig. 11 a corresponding view of the outer end thereof. Fig. 12 a detached view in transverse section of the shaft or spindle on the line *g—h* of Fig. 7. Fig. 13 a broken view in transverse section on the line *i—j* of Fig. 2.

My invention relates to an improved strip-coiling machine, the object being to produce a compact, effective, convenient and durable device having a large capacity for work and constructed with particular reference to safety of operation, whereby danger to the operator is wholly eliminated and the capacity of the strip-rolling mill is increased.

With these ends in view, my invention consists in a machine for coiling metal strips, having certain details of construction and combinations of parts as will be hereinafter described and pointed out in the claims.

In the machine chosen for the illustration of my invention, the metal strip 2 to be coiled, is stripped from the rolls 3, 4, of an ordinary strip-rolling mill by means of an upper and a lower pair of stripping fingers 5 and 6, the outer ends of which are beveled to conform to the peripheries of the said rolls 3 and 4 with which they are maintained in constant engagement, as will be described later on. The fingers 5 of the upper pair of stripping-fingers are fastened to the lower faces of the outer ends of two horizontally arranged guide-plate carrying-arms 7 having a slight rocking movement upon a horizontal shaft 8 upon which they are mounted, while the fingers 6 of the lower pair of stripping-fingers are fastened to the upper faces of the outer ends of two corresponding horizontally arranged guide-plate carrying-arms 9 having a slight rocking movement upon a horizontal shaft 10 located directly below the shaft 8 aforesaid. The said stripping fingers 5 are maintained in constant engagement with the stripping-roll 3 and automatically adjusted to any changes in the position thereof, by means of two springs 11 fastened at their lower ends to the upper edges of the respective arms 7 and having their upper ends respectively secured to arms 12 fixed upon the shaft 8. The said stripping-fingers 6 are maintained in constant engagement with the periphery of the roll 4 by means of two springs 13 respectively fastened to the arms 9 aforesaid and to fixed arms 14 corresponding to the arms 12, and mounted upon the shaft 10. Under this construction, the two springs 11 and the two springs 13 exert a constant effort to maintain the stripping-fingers 5 and 6 in engagement with the peripheries of the respective rolls 3 and 4.

A flat horizontal plate 15 fastened to the

lower faces of the upper arms 7, forms an upper guide for the strip 2, while a corresponding plate 16 fastened to the upper faces of the two arms 9 forms a lower guide for the strip 2 as it emerges from the strip-rolling mill. The said plates 15 and 16 deliver the end of the strip to corresponding upper and lower strip-delivery plates 17 and 18. The upper plate 17 is fastened to the lower faces of a pair of longitudinally movable and rocking strip-delivery plate-carrying arms 19 having their inner ends pivotally connected by studs 20 to vertically arranged levers 21 connected by a cross-arm 22 terminating in a common handle 23. The two levers 21 are connected at their lower ends by a shaft 24 mounted in a bracket 25 secured to a supporting rail 26 of the mill. Similarly the lower plate 18 is fastened to the upper faces of two longitudinally movable strip-delivery plate-carrying arms 27 having their inner ends connected by studs 28 to the respective levers 21 aforesaid. The said plate-carrying arms 19 are formed with longitudinal slots 29 through which the shaft 8 aforesaid passes, whereby the said arms 19 are supported when being horizontally moved back and forth into their strip-delivery and coil-clearance positions by the handle 23. The said plate-carrying arms 27 are formed with slots 30 through which the shaft 10 aforesaid passes, whereby the said arms 27 are supported in being moved back and forth into their strip-delivery and strip-clearance positions by the said handle 23.

By inclining the slots 29 as shown in Fig. 4, the upper arms 19 are rocked as well as moved longitudinally by the handle 23, while the horizontal arrangement of the slots 30 of the lower arms 27 confines them to horizontal movement back and forth by the said handle 23. The horizontal shafts 8 and 10 before mentioned, are mounted one above the other in vertical frame-pieces 31 the ends of which are mounted in brackets 32 bolted to the housing 33. Under the construction described, the upper arms 19 and the lower arms 27 are simultaneously moved longitudinally into their strip-delivery and coil-clearance positions in which they are respectively shown by full lines in Figs. 3 and 4, by the operation of the handle 23. It will be observed by comparing these two figures, that in their strip-delivery positions, the upper arms 19 have their outer ends depressed so as to produce the narrow delivery-space 34 between the upper and lower guide-plates 17 and 18 required for the accurate delivery of the end of the strip to a coiling-drum which, as herein shown, has a passway 35, and is of the expansible type. I do not, however, limit myself to the use of an expansible drum, although I prefer to employ an expansible drum since its capacity for contraction facilitates the removal of the coil.

The expansible coiling-drum shown and described herein comprises two corresponding radially movable, nearly semi-cylindrical body-members 36 the edges of which are separated, when the drum is contracted as shown in Fig. 6, by a diametric passway 35 produced by the construction and organization of the several movable members of the drum, for the reception into the very body thereof, of the end of the strip preparatory to the coiling operation. The said passway 35 forms within the drum a strip-end-receiving space extending clear through the drum for which it provides two strip-end receiving entrances. If desired, however, the said passway may be blocked between its ends, as indicated by broken lines 35^a in Figs. 5 and 6, without interfering with the operation of the machine. The inner faces of the edges of the said body-members 36 are beveled as at 37 to provide clearance for the beveled outer edges of two pairs of movable closure-members 38 the primary office of which is to close the ends of the passway 35, and so insure a continuous cylindrical surface for the drum at the time it discharges its strip-coiling function. In other words, the coiling surface of the drum is made up of the convex surfaces of its semi-cylindrical body-members 36 and the narrow convex outer surfaces of its closure-members 38 which may also have strip-gripping functions as will be described later on. By means of the closure-members 38, I am enabled to construct the coiling-drum so as to have a relatively wide passway or interior strip-end receiving space or slot, a wide entrance way or space or slot for the reception of the strip-end being very desirable in automatically fed strip-coiling machines designed to be run at a very high rate of speed to keep pace with a rapidly operated strip-rolling mill. One pair of the said closure-members 38 is located at one entrance of the said passway 35, and the other pair at the other entrance thereof. In their retracted positions as shown in Fig. 6, the said closure-members 38 leave both entrances of the passway 35 wide open, while in their projected positions as shown in Fig. 5, the said closure-members 38 close the entrances of the passway, and by taking positions between the edges of the said body-members 36, complete the circle of the drum and so insure a continuous surface or periphery for the winding of the coil, which, being under high tension when being coiled, partakes of the exact superficial form of the drum, so that unless the drum presents a smooth, continuous cylindrical surface, the metal strip coiled will be disfigured throughout its length and rendered unfit for use.

For the positive operation in both direc-

tions of the body-members 36 and closure-members 38 of the expansible coiling-drum, I employ a non-rotatable sleeve 39 composed of two corresponding halves, and mounted upon the outer end of an intermittently rotated spindle or shaft 40 which is formed with a slot 41 open along its edges, and at its outer end as shown in Figs. 5, 7 and 12, and constitutes a portion of the passway 35 through the drum. The said shaft 40 is journaled in pedestal bearings 42 and 43 secured to the bracket 25 aforesaid. The said sleeve 39 is formed at its respective ends with circumferential heads 44, 45, the latter including a collar 36 having threaded openings 47 for the reception of two operating-rods 48, 48, by means of which the sleeve is reciprocated upon the shaft 40. The said outer and inner heads 44 and 45 are formed at opposite points in their peripheries with inclined, dovetail slots 49 receiving inclined dovetail lugs 50 cast integral with, and extending radially inward from, the inner surfaces of the body-members 36 which are thus connected with the sleeve 39 so as to be positively moved radially inward and outward thereby as the sleeve is reciprocated upon the shaft or spindle 40. The said body-members 36 of the drum are held against longitudinal movement and limited to radial movement under the endwise thrust and pull of the sleeve 39, by means of collars 51 fastened upon the shaft 40 and formed with inwardly projecting flanges 52 co-acting with annular shoulders 53 at the ends of the said body-members 36 as clearly shown in Figs. 7 and 8.

For the positive movement of the closure-members 38 into their retracted or entrance-opening, and their projected or entrance-closing positions, the said heads 44, 45 of the sleeve 39, are formed with inclined dovetail slots 54 for the reception of inclined dovetail lugs 55 formed integral with the said members 38 and positively operating the same in both directions in the same manner that the lugs 50 operate the said body-members 36 in both directions, the closure-members 38 being also held against endwise displacement under the endwise thrust and pull of the sleeve 39, by means of the collars 51 aforesaid.

To prevent the sleeve 39 from rotating upon the shaft 40, its corresponding halves are formed at their ends with longitudinal coupling-lugs 56 (Figs. 9 and 10) entering longitudinal grooves 57 formed in the shaft 40 as shown in Figs. 5, 6, 7 and 12.

Under the construction just above described, the sliding sleeve 39 operates to positively move the body-members 36 and the closure-members 38 in both directions, the parts being timed so that the body-members will be moved to the extreme limit of their outward excursions before the closure-members are moved to the limit of their outward excursions, the sleeve being entirely relied upon for moving the body and closure-members of the drum into their expanded positions. However, by constructing the parts so that the closure-members do not reach the limit of their outward movement until after the body-members have reached the limit of their outward movement, the beveled edges of the body-members form points of purchase for crowding the closure-members inward upon the strip so as to grip and clamp the same.

I do not limit myself to constructing the closure-members so as to actually clamp the end of the strip which may not be necessary for the reason that if the drum has made a turn the end of the strip secures, as I might say, a bight upon the drum and does not need to be held; but I prefer especially when the passway is blocked midway of its length, to construct the closure-members so that as a matter of additional security in holding the strip, they will be crowded inward upon the same so as to grip it just as they are moving into their final outward positions in which they discharge their primary functions of bridging the spaces between the edges of the body-members so as to provide a perfectly continuous cylindrical coiling surface for the drum when it is fully expanded and at the time of the coiling operation.

For the purpose of providing a smooth path for the strip-end 2 through the passway, double-entrance or interior space 35, the same is lined, as it were, by means of two flexible metal plates 58, shown in Figs. 5 and 6, these plates being secured to the opposite faces of the slot 41 in the shaft 40 and projecting radially beyond the edges of the said slot 41 to the entrances of the passway 35, whereby the projecting portions of the plates are left free to be flexed by the movement toward each other of the closure-members 38 as shown in Fig. 5. On the other hand, when the drum is contracted and the passway 35 opened, the projecting portions of the plates 58 return of their own resiliency to their normal positions, as shown in Fig. 6.

As already described, the sleeve 39 is provided for its reciprocation with two rods 48 the outer ends of which are connected with a sliding collar 59, (Figs. 1 and 2) mounted upon the shaft 40, and formed with the usual circumferential groove containing a ring 60 furnished at opposite points on its periphery with studs 61 entering slots 62 in the upper ends of the respective arms of a yoke-lever 63 pivotally hung in a bracket 64 bolted to the pedestal-bearing 43, the lower end of the said yoke-lever 63 being

connected with the outer end of a horizontal adjustable connecting-rod 44 the inner end of which is connected with the lower end of a yoke-lever 66 hung in a bracket 67 bolted to the pedestal 68 of a power cylinder 69, the piston-rod 70 of which is connected with the upper end of the said yoke-lever 66.

The piston (not shown) in the cylinder 69 is controlled by means of an ordinary two-way valve 71 mounted upon the pedestal-bearing 43 aforesaid in convenient position for manipulation in conjunction with the manipulation of the handle 23 of the levers 21, the said valve 71 being connected with the cylinder in the ordinary way by means of an inlet pipe 72, air-supply pipe 73, and an inlet pipe 74, whereby by the manipulation of the valve 71 the cylinder 69 is brought into play for expanding or contracting the coiling-drum.

For rotating the shaft 40, and hence the coiling-drum, I employ a continuously rotated belt-driven pulley 75 loosely mounted upon the shaft 40 and formed upon its inner face with one member 76 of an ordinary jaw-clutch the complementary member 77 of which is formed upon a collar 78 mounted to slide upon the shaft 40 and formed in the usual manner with an annular groove (not shown) for the reception of a ring 79 having oppo-oppositely projecting studs 80 entering slots 81 in the upper ends of the respective arms of a yoke-lever 82 suspended in a bracket 83 bolted to the side of the pedestal-bearing 42, the lower end of the lever 82 being pivotally connected to the connecting-rod 44, whereby when the said rod moves in the direction required for expanding the coiling-drum, the collar 78 is moved for the co-action of the clutch-members 77 and 76, thus coupling the pulley 75 with the shaft 40, which is then rotated to coil the strip.

The parts just described are timed in their operation so that the starting of the shaft 40 in rotation is substantially simultaneous with the expansion of the coiling-drum and the closing of the passway 35 thereof. Conversely the reverse operation of the two-way valve 71 brings the cylinder 59 into play for simultaneously contracting the coiling-drum and opening its said passway 35 and stopping the shaft 40.

In order to provide for the accurate registration of one entrance or the other of the passway 35 of the coiling-drum with the narrow delivery-space 34 formed by the plates 17 and 18 of the guiding and delivering means, as shown in Fig. 3, I provide the said shaft 40 with a hand-wheel 84, and the collar 78 (Figs. 2 and 13) with two oppositely arranged stop-notches 85 either one of which is arranged to co-act with a spring-actuated bolt 86 mounted in the bracket 83. The said notches 85 are arranged with reference to the passway 35, so that as soon as the shaft 40 has been manually turned in either direction by the hand-wheel 84 sufficiently to bring either entrance of the passway 35 into registration with the said delivery space 34 of the guiding and delivering means, the bolt 86 will enter one or the other of the two stop-notches 85 and stop the coiling drum in right position for the reception of the end of the strip to be coiled. The described registration of the passway 35 with the delivery-space 34 is manually effected preparatory to the coiling of each strip, but automatically thrown off just before the drum is started in rotation, since the sliding movement of the collar 78 as it moves forward to clutch the pulley 75 carries the said collar out of engagement with the bolt 86.

Having described my improved machine for coiling strips, I will briefly set forth the operation thereof. Let it be assumed, in the first place, that the hand-wheel 84 has been manually turned to register either entrance of the passway 35 of the coiling-drum with the delivery-space 34, the said drum being at this time contracted as shown in Fig. 6 with its passway 35 open at both entrances and locked against rotation by the bolt 86. At the same time the handle 23 will be thrown into the position in which it is shown by full lines in Fig. 3, whereby the strip-delivery plate-carrying arms 19 of the strip-delivery means are advanced into their strip-delivery positions, as shown in Fig. 3, which represents the extreme ends of the said arms nearly in contact with the coiling-drum, and the strip-delivery space 34 contracted and in line with the passway 35 of the drum. With the machine thus adjusted, the end of a strip of metal is introduced into the strip-rolling mill, and as it emerges from between the rolls 3 and 4 thereof, the stripping-fingers 5 and 6 strip it from contact with the roll with which it is engaged as the case may be, and direct it between the guiding plates 15 and 16 by means of which it is guided and delivered between the delivering plates 17 and 18 which together form the contracted delivery-space 34 from which the end of the strip enters the passway 35 of the coiling-drum. The operator now operates the two-way valve 71 which immediately brings the power-cylinder 69 into play for moving the rod 44, and hence the operating sleeve 39 as required for expanding the coiling-drum by positively moving the body-members 36 to the limit of their outward movement and for closing the entrances of the passway 35 by projecting the closure-members 38 between the edges of the body-members 36 and thus completing the circle of the drum and providing a continuous surface for the strip to be coiled upon. The closure-members are timed so as not to finish their movement until after the body-members

are in their fully expanded positions, whereby the beveled edges of the said body-members become points of purchase for the closure-members in being crowded upon the strip in case a clamping action is deemed desirable. The same movement of the rod 44 starts the shaft 40, and hence the coiling-drum, in rotation. With his other hand, the operator throws the handle 23 back into its coil-clearance position in which it is shown by broken lines in Fig. 3, and by full lines in Fig. 4, whereby the strip-delivery plate-carrying arms 19 and 27 are retired into their coil-clearance positions as shown in Fig. 3 by broken lines, and in Fig. 4 by full lines. As the two arms 19 move outward away from the coiling-drum into their coil-clearance positions, they undergo a lifting movement at their outer ends so as to permit the strip 2 to rise, as it were, from the center of the coiling-drum to the periphery thereof. The machine having been started as described, the coiling-drum is allowed to rotate until the full length of the strip has been wound upon it, after which the operator reverses the valve 71, which brings the cylinder 69 into play for moving the operating-sleeve 30 as required for positively contracting the coiling-drum whereby the body-members 38 are made to let go their hold upon the coil for the easy removal thereof and whereby the closure-members are retracted for opening the entrances into the passway 35, or slot or interior space, or whatever it may be called. The operator now slips the coil of metal off the outer end of the contracted coiling-drum and re-sets the same by means of the hand-wheel 84. The operation above described is repeated, and so on.

It will be noted that the operator is not called upon to touch the metal strip from the time its end is introduced into the rolls of the strip-rolling mill until the strip has been coiled upon the drum and the machine and drum brought to a stop, the end of the strip being automatically guided and delivered to the coiling-drum and entered into the passway or slot or interior strip-end receiving space thereof.

By locating the means for guiding and delivering the end of the strip at one side of the drum and between the same and the rolls of the strip-rolling mill, the drum is at all times left accessible for observation, as well as for attention and repair, and the removal of the coiled strip from it greatly facilitated over machines in which the strip is guided in being coiled by guiding devices surrounding and inclosing the drum. The specific means employed for guiding and delivering the strip may be widely varied within the purview of my invention as long as they are located between the rolls of the mill and the coiling-drum with which they make but one point of contact as distinguished from encircling the drum in whole or in part. In case the interior space of the drum takes the form of a passway whether the same is left open from end to end or blocked, as suggested, it may be arranged diametrically, or it may, if preferred, traverse the drum at one side of the center thereof.

I claim:—

1. In a machine for coiling metal strips, the combination with the rolls of a strip-rolling mill, of an expansible coiling-drum having a continuous, cylindrical coiling-surface and an interior strip-receiving space, means for guiding the end of the strip from the said rolls into the said space, means for separating and retiring the said guiding means to permit the strip to be piled in layers upon the drum, and a fluid-operated power-cylinder for positively expanding and contracting the drum.

2. In a machine for coiling metal strips, the combination with the rolls of a strip-rolling mill, of an expansible coiling-drum having a continuous, cylindrical coiling-surface and an interior strip-receiving space, means for guiding the end of the strip from the said rolls into the said space, means for separating and retiring the said guiding means to permit the strip to be coiled in layers upon the drum, means for expanding and contracting the drum, and independent power means for rotating the drum.

3. In a machine for coiling metal strips, the combination with the rolls of a strip-rolling mill, of an expansible coiling-drum having an interior strip-receiving space, means for guiding the end of the metal strip from the said rolls and entering it into the said space, a power cylinder connected with the drum for expanding and contracting the same, and means independent of the said power cylinder for rotating the drum.

4. In a strip-coiling machine, the combination with the rolls of a strip-rolling mill, of an expansible drum comprising body-members and closure-members constructed and organized so that when the drum is contracted, an interior strip-receiving space will be formed in it for the reception of the end of the strip and so that when the drum is expanded the said space will be closed, and the said members will form a continuous cylindrical coiling-surface, and means interposed between the said rolls and drum for guiding the strip and automatically inserting its end into the said space in the drum when the same is contracted.

5. In a machine for coiling metal strips, the combination with the rolls of a strip-rolling mill, of an expansible coiling-drum having a continuous cylindrical coiling-surface and an interior strip-receiving space, means for guiding the end of the strip from

the said rolls into the said space, a fluid-operated power-cylinder, lever-connection between the said cylinder and the drum for the positive expansion and contraction thereof, and independent means for rotating the drum.

6. In a machine for coiling metal strips, the combination with an expansible coiling-drum having body-members and closure-members constructed and organized to provide a continuous, cylindrical coiling-surface and to produce a strip-receiving space within the drum when the same is contracted, of means for guiding the strip from the said rolls into the said space, a power-cylinder, lever-connection between the same and the said body- and closure-members of the drum for the automatic operation thereof in contracting and expanding the drum, and independent means for rotating the drum.

7. In a strip-coiling machine, the combination with an expansible coiling-drum comprising body-members and closure-members constructed and arranged to form a strip-receiving space within the said drum, of a shaft for the said drum, a sliding sleeve mounted upon the said shaft and connected with the said body and closure-members for the positive operation thereof in both directions, a fluid-operated power-cylinder and lever connection between the said cylinder and sleeve for the operation of the latter.

8. In a machine for coiling metal strips, the combination with an expansible coiling-drum comprising body-members and closure-members constructed and arranged to form a continuous, cylindrical coiling-surface when the drum is expanded and a strip-receiving passway extending through the drum when the same is contracted; of means for guiding the strip from the said rolls and entering it into the said passway at either end thereof, means for positively expanding the drum and closing the said passway after the strip has been entered thereinto, and for contracting the drum preparatory to the removal of the coil, and manually operable means for separating and retiring the said guiding means to permit the coil to be piled in layers upon the continuous expanded surface of the drum.

9. A strip-coiling machine having an expansible coiling-drum parts of which are constructed and organized to form a strip-receiving passway having two entrances for the reception of the end of the strip, the said entrances being closed when the drum is expanded, for the production of a continuous coiling surface, in combination with guiding means for automatically leading the end of the strip to the drum and entering it into one entrance or the other of its passways, and manually-operated means for retiring the guiding means into a clearance position in which they permit the metal to be piled upon the expanded drum.

10. In a strip-coiling machine, the combination with a drum having body and closure members constructed and organized to form a passway through the drum when the same is contracted, and to form a continuous coiling surface when the drum is expanded, of a revolving shaft for the drum, a sliding sleeve mounted upon the said shaft and connected with the said members for their positive movement in both directions, a power cylinder, and lever connection between the said cylinder and the said sleeve for the operation of the latter.

11. In a strip-coiling machine, the combination with a drum having radially movable body-members, and closure-members located within the said body-members and shaped to extend into the spaces between the edges thereof to form a continuous coiling surface for the drum when the same is expanded, and the said members being constructed and organized to form, when the drum is contracted, a strip-receiving space; of a shaft located in the center of the drum, a sliding sleeve mounted upon the said shaft, and dovetail connection between the sleeve and the said members for their positive operation in both directions thereby.

12. An expansible coiling-drum for use in a machine for coiling metal strips, the said drum consisting of body-members and closure-members organized as two units separated by a strip-receiving passway extending radially through the drum and open when the said members are in their contracted positions, and closed, when the said members are in their expanded positions, to form a continuous coiling-surface.

13. In a machine for coiling metal strips, the combination with the rolls of a strip-rolling mill, of an expansible coiling-drum having a continuous, cylindrical coiling-surface and an interior strip-receiving space, of means located between the said rolls and the periphery of the drum for guiding the strip from the rolls into the said space, means for separating and retiring the said guiding means to permit the strip to be piled in layers upon the surface of the drum, means for positively contracting and expanding the drum, and independent means for rotating the drum.

14. In a strip-coiling machine, the combination with the rolls of a strip-rolling mill, of an expansible coiling-drum having a continuous, cylindrical coiling-surface and an interior strip-receiving space having two entrances which are closed when the drum is expanded and open when the drum is contracted, means located between the said rolls and the said space for entering the strip into an entrance thereof, and means for re-

turing the said guiding means to permit the strip to be wound in layers upon the coiling-surface of the drum.

15. In a strip-coiling machine, the combination with the rolls of a strip-rolling mill, of an expansible coiling-drum having a continuous, cylindrical coiling-surface and an interior strip-receiving space, of power connections for expanding and contracting the said drum to close and open the said space, means independent of the said connections for rotating the drum, means for guiding the strip from the said rolls into the said space, and a lever connected with the said guiding means for moving them into their strip-delivery and coil-clearance positions, respectively.

In testimony whereof, I have signed this specification in the presence of two subscribing witnesses.

DAVID LONG SUMMEY.

Witnesses:
A. H. FEELIG,
L. M. COTTER.