(No Model.) 2 Sheets—Sheet 1.

W. H. H. SISUM.

TWISTING OR WINDING MACHINE.

No. 488,227. Patented Dec. 20, 1892.

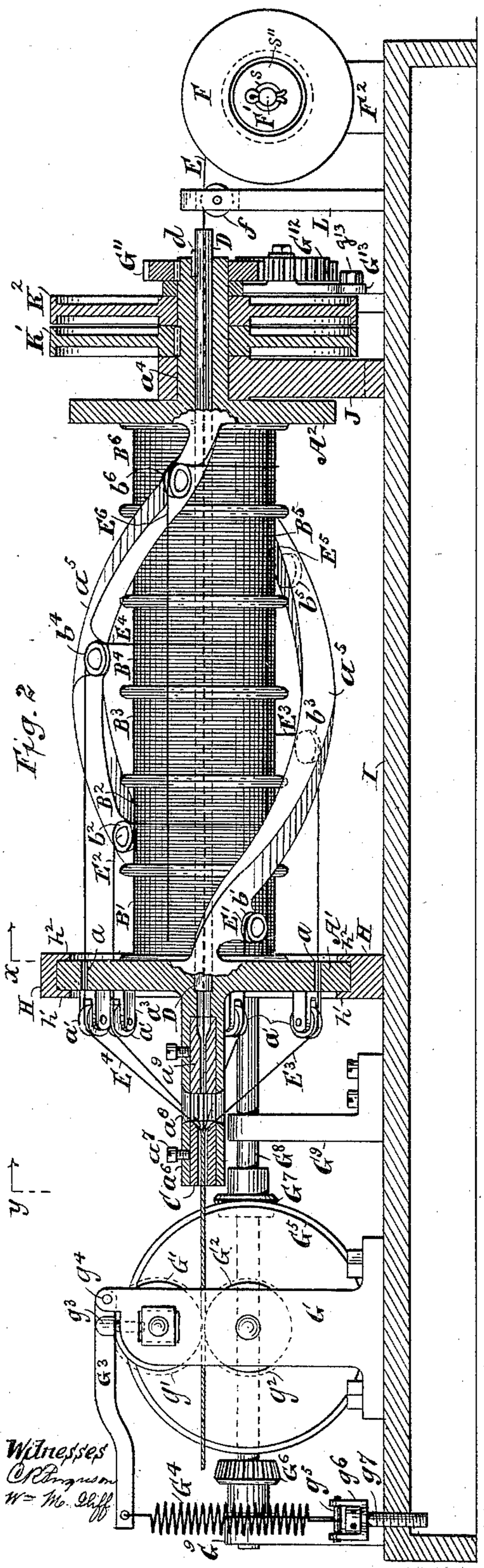

Fig. 2

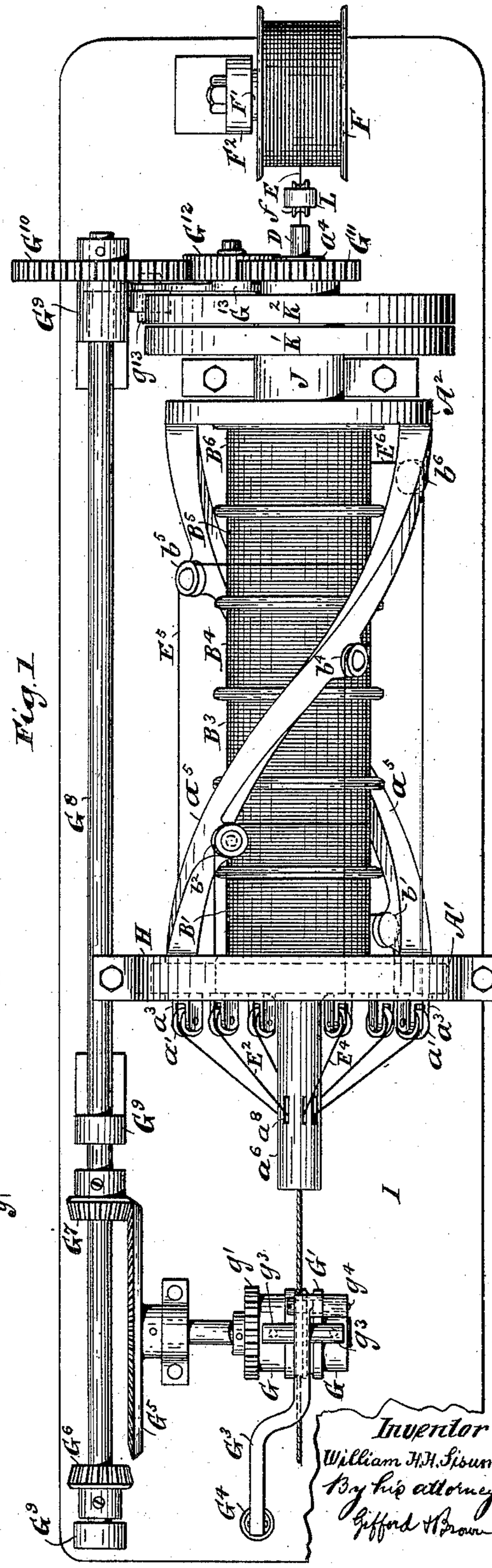

Fig. 1

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(No Model.) 2 Sheets—Sheet 2.

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Fig 3

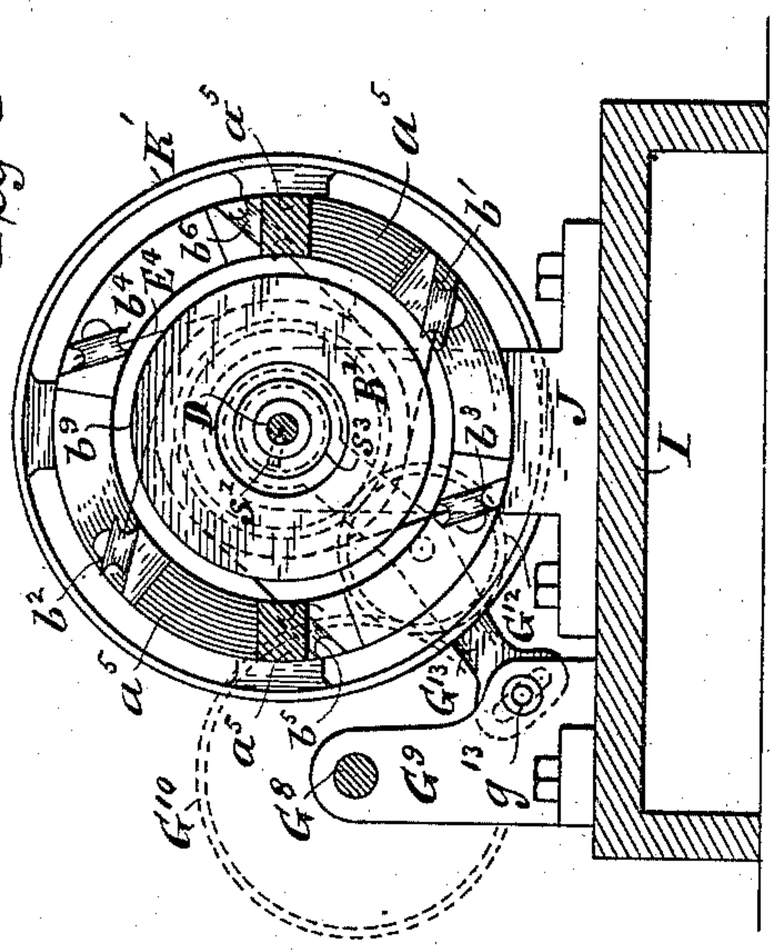


Fig. 4

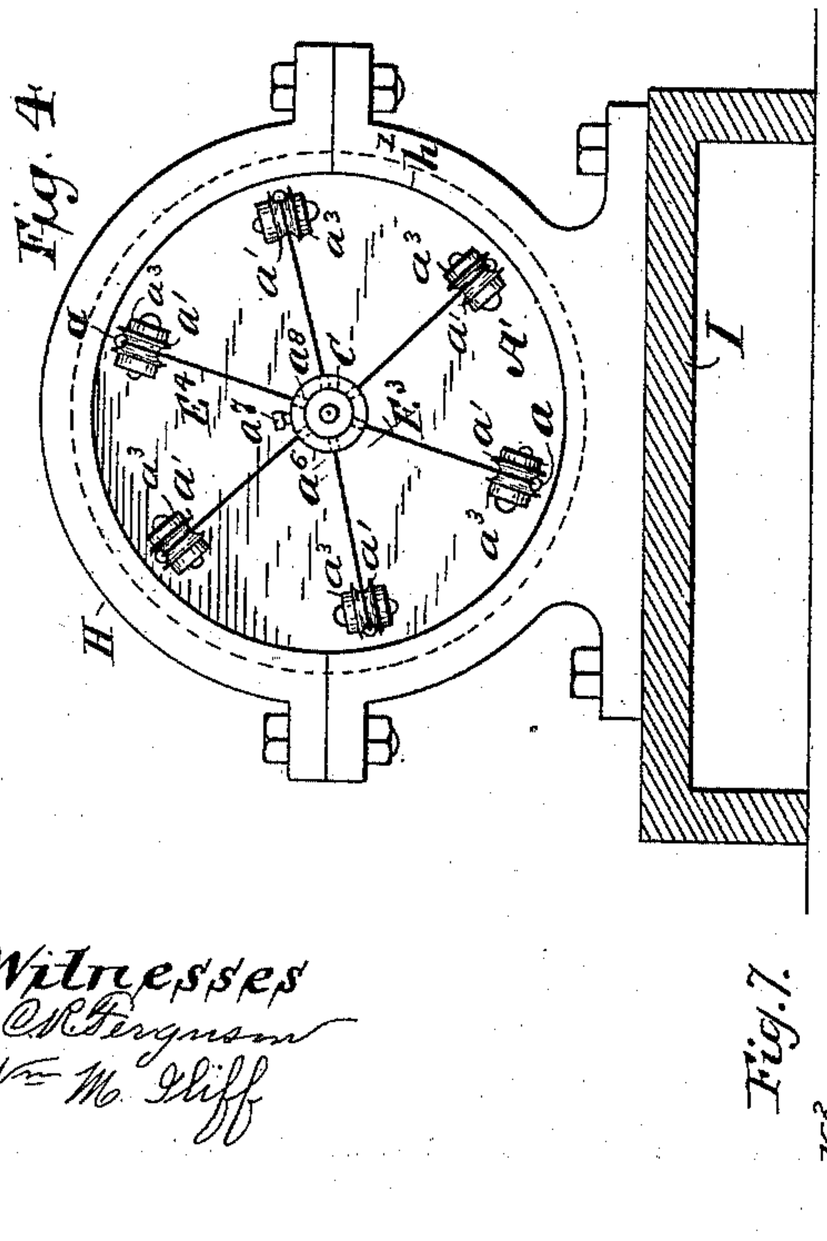


Fig. 6

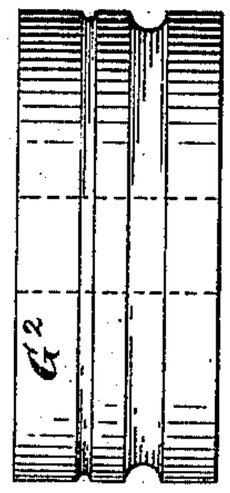


Fig. 5

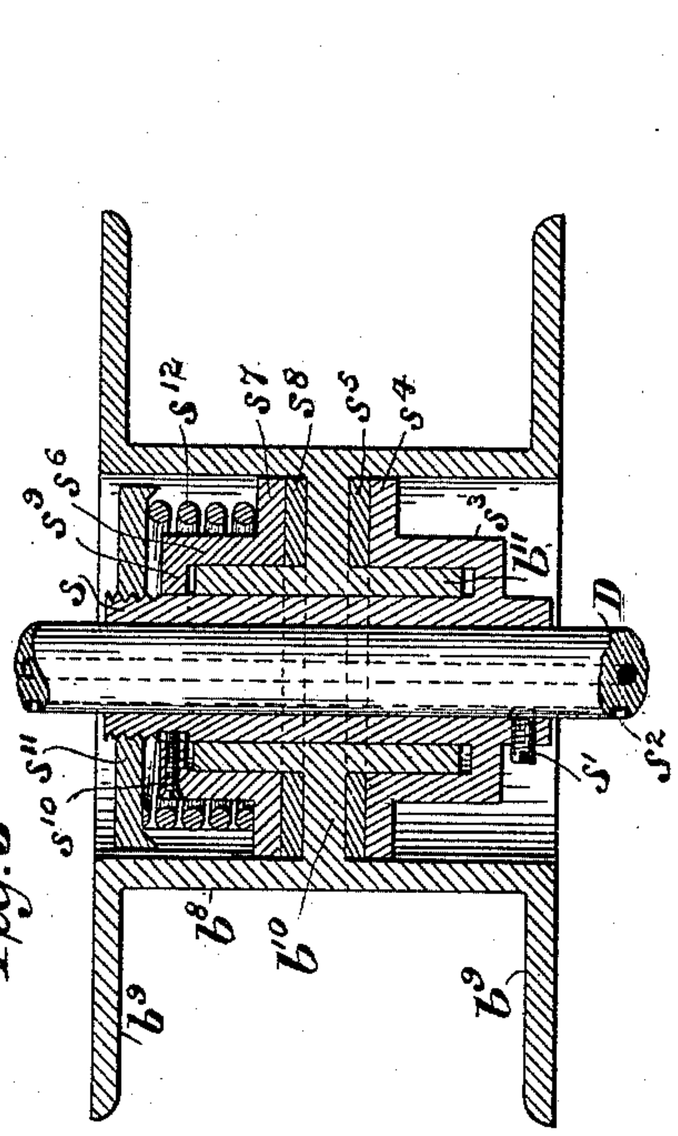
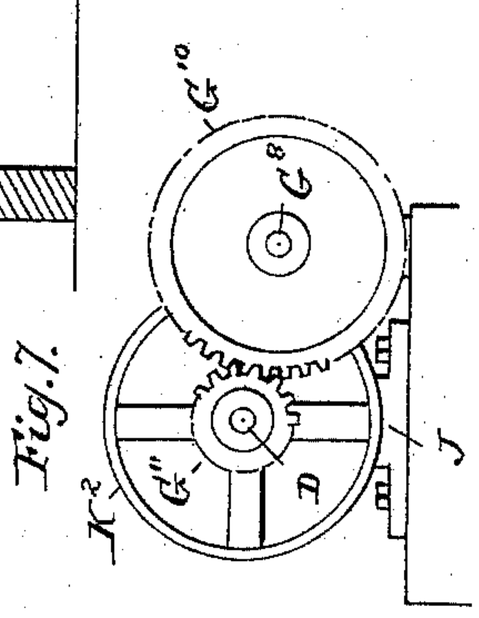


Fig. 7.



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UNITED STATES PATENT OFFICE.

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TWISTING OR WINDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 488,227, dated December 20, 1892.

Application filed October 31, 1889. Serial No. 328,796. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. H. SISUM, of Brooklyn, in Kings county, and the State of New York, have invented a certain new and useful Improvement in Twisting or Winding Machines, of which the following is a specification.

This improvement relates to the winding of wires, cords, or strands, together.

I will describe a machine embodying the improvement and then point out the novel features in claims.

In the accompanying drawings Figure 1 is a plan or top view of a machine embodying my improvement. Fig. 2 is a partly sectional side elevation of the machine. Fig. 3 is a transverse section taken at the plane of the dotted line *x x*, Fig. 2, looking in the direction indicated by the arrow which is located at one end of said line, but some of the parts which would be intersected by this plane are omitted. Fig. 4 is a transverse section taken at the plane of the dotted line *y*, *y*, Fig. 2, and looking in the direction indicated by the arrow which is delineated at one end of this line, but in this view some of the parts which would be intersected by said plane, are omitted. Fig. 5 is a central longitudinal section on an enlarged scale, of one of a series of spools or reels and the appurtenances thereof. Fig. 6 is an enlarged top view of one of a pair of take-away rollers. Fig. 7 is a rear end elevation showing a certain gear removed and one enlarged.

Similar letters of reference designate corresponding parts in all the figures.

A′ A^2 designate two rotary heads which are intended to rotate in unison. Between them are arranged a number of spools or reels B′ B^2 B^3 B^4 B^5 B^6, which are intended to rotate with the heads A′ A^2, and also to have such independent rotary motion as may be necessary for the proper delivery of the wires, or analogous material, E′ E^2 E^3 E^4 E^5 E^6, that may be wound upon them. The rotary heads A′ A^2, carry with them guides or guide pulleys b' b^2 b^3 b^4 b^5 b^6. The wire or other material which is wound upon the spools B′ B^2 B^3 B^4 B^5 B^6, passes off around the guide pulleys b' b^2 b^3 b^4 b^5 b^6, and passes out, as here shown, through holes *a*, with which the rotary head A′ is provided, thence around guides or guide pulleys a' and thence to the inside of a die C. Through the spools or reels B′ B^2 B^3 B^4 B^5 B^6, passes a tubular shaft D. Wire or similar material, E, passes, as here shown, from a spool or drum F, through the shaft D and thence through a bushing a^9 to the die C. The rotary movement of the heads A′ A^2 and spools or reels B′ B^2 B^3 B^4 B^5 B^6, causes the wires E′ E^2 E^3 E^4 E^5 E^6, to be laid, wound, or twisted, around the wire E, within the die C. The result is a cord or cable composed of the entire number of wires. This cord or cable is drawn forward by take-away rollers G′ G^2.

Having now given a general idea of the salient features of the machine, I will explain the details of the machine.

The rotary head A′, is supported in a standard H, which is erected upon a base piece or bed I. The standard H, is made in two separable sections secured together by screws or like means. It is internally circular to correspond with the exterior or periphery of the head A′; and it has side flanges h' h^2, which extend over the sides of the head A′, and thereby retain it in position. This standard is made of two separable sections to facilitate the insertion and removal of the head A′. The exterior contour of the standard is immaterial. It is shown as generally of circular form with laterally extending lugs at the lower portion for attachment to the base piece or bed I, and laterally extending lugs at the middle receiving the screws or analogous devices, which unite its sections. The guide pulleys a', are journaled in brackets a^3, which are attached to the forward face of the rotary head A′; hence these pulleys are revolved around the axis of the head A′, as the latter rotates. They are also free to rotate to facilitate the passage of the wire or analogous material, over them. The rotary head A^2 has a journal a^4, which is supported by a bracket J, erected upon the base piece or bed I. The guide pulleys b' b^2 b^3 b^4 b^5 b^6, as here shown, are supported upon spirally extending ribs a^5, which unite the rotary heads A′ A^2. As the rotary heads A′ A^2, are united it is obvious that any motion imparted to the one will be transmitted to the other. Upon the journal a^4 of the rotary head A^2, belt pulleys K′ K^2, are mounted. The pulley K′, is secured by means of a key, or otherwise, so as to be in-

capable of rotary movement independently of the journal a^4 of the head A^2. The pulley K^2 is, however, loose upon the journal a^4. Obviously by shifting the driving belt onto the pulley K', motion will be imparted to the rotary heads and their appurtenances and this motion may be terminated by shifting the belt from the pulley K' onto the pulley K^2.

The tubular shaft D, extends through the journal a^4 of the head A^2, across the space between the head A^2 and the head A', and enters a central hole or cavity in the head A'. The shaft may be secured in place by means of a wedge or key, *d*, so applied as not only to insure a rotary movement of the shaft D, with the heads, but also so as to preclude longitudinal movement of the shaft D, relatively to the heads. This shaft D, serves to support the spools or reels B' B^2 B^3 B^4 B^5 B^6, between the rotary heads A' A^2.

The rotary head A' has at its forward side a central hub-like tubular projection a^6. This at the outer end holds the die C, the latter being retained in position by any suitable contrivance, as for instance, by a set screw a^7. Just rearward of the die C, the hub or projection a^6, is provided with a number of longitudinal slots a^8, extending radially inward from its exterior to its interior. In rear of the slots a^8, I have shown a bushing a^9, as inserted in the projection a^6. It may be retained in place by a set screw or otherwise. It has a central hole or cavity which communicates with the central hole or cavity of the rotary head A' and consequently with the interior of the tubular shaft D.

The drum F, is mounted upon a non-rotary shaft F', supported by a standard F^2, erected upon the base piece or bed I. The wire or other material, E, passes from the drum F, around a guide pulley *f*, here shown as journaled in a standard L, erected upon the base piece or bed I, and passes from this guide pulley through the tubular shaft D, thence through the bushing a^9 and thence through the die C to the take-away or rollers G' G^2. The wires E' E^2 E^3 E^4 E^5 E^6, or analogous material, after passing around the guide pulleys *a'*, pass through the slots a^9 in the projection or hub a^6, of the rotary head A', and thence into the die C. The wire or material E, does not rotate. The slots a^8, in revolving around the wire or material E, cause the wire or material E' E^2 E^3 E^4 E^5 E^6, to be wound, twisted or laid around the wire or material E, forward of the rear end of the die C; so that there will be formed a cord or cable of wire.

The spools or reels B' B^2 B^3 B^4 B^5 B^6, and the spool, reel or drum F, are severally mounted upon their supporting shafts in such manner that they may move independently thereof. I will describe the details of this method of mounting them. A sleeve *s*, is secured to the supporting shaft, in the present instance by means of a set screw *s'*, passing through the sleeve and entering a longitudinal groove s^2, in the shaft. The set screw *s'* is not intended to impinge against the walls of the groove so as to clamp the sleeve to the shaft, because in the case of the shaft D, it is necessary at times to be able to withdraw the shaft for the purpose of taking off the spools or reels B' B^2 B^3 B^4 B^5 B^6. The set screw *s'*, is however, intended to cause the sleeve *s* to rotate with the supporting shaft. At one end the sleeve *s*, has a cylindrical shell s^3, terminating in a disk-like flange s^4. Each spool, reel or drum, has a cylindrical body b^8, upon which the wire or like material, is wound, two disk-like or plate-like flanges b^9 at the extremities of the body, a central disk-like or plate-like web b^{10}, and a cylindrical hub b^{11}. The cylindrical hub b^{11}, loosely fits the exterior of the corresponding sleeve *s*, and extends under or inward of the cylindrical shell s^3, which is an appurtenance of this sleeve. The disk-like or plate-like flange s^4, of the shell *s*, is faced with a frictional material such as leather, s^5; and the latter bears against the central web b^{10}, of the spool, reel or drum. Between the cylindrical body of the spool, reel or drum, and the sleeve *s*, a cylindrical shell s^6 is arranged. It fits upon the exterior of the cylindrical hub b^{11}, of the spool, reel or drum; and at one end has a disk-like or plate-like flange s^7, which is faced with frictional material such as leather, s^8, impinging against the central web b^{10}, of the spool, reel or drum. At the other end the shell s^6, has a flange s^9, that extends inwardly and bears against the sleeve *s*. The shell s^6, is precluded from turning independently of the sleeve *s*, by means of a set screw s^{10}, which extends through a radial hole in the flange s^9 and enters a longitudinally extending groove in the exterior of the sleeve *s*. The set screw s^{10} is intended to preclude any rotary movement of the shell s^6, relative to the sleeve *s*, but withal to allow of the movement of the shell s^6 lengthwise of the sleeve *s*. Outward of the shell s^6 the sleeve *s*, is shown as externally screw threaded and as having fitted to it a plate s^{11}. Obviously the plate may be adjusted lengthwise of the sleeve by rotating it along the screw thread of the sleeve. Between the plate s^{11} and the flange s^7, of the shell s^6, a helical spring s^{12} is located. This presses the flange s^7, toward the central web b^{10}, of the spool, reel or drum; and pulls against said central web, the flange s^4 of the shell s^3, which is formed integral with the sleeve *s*; and the pressure may be varied in intensity by adjusting the plate s^{11} lengthwise of the sleeve *s*. The combination of parts described constitutes a friction clutch intermediate of the spool or reel and the supporting shaft. Obviously as the sleeve *s*, is compelled to rotate with the supporting shaft and the flanges s^4 and s^7 are movable lengthwise of the supporting shaft under the influence of the spring s^{12}, and the spool, reel or drum is not caused to rotate with the supporting shaft except through the frictional contact of the facings of said flanges s^4 s^7, the spool, reel or drum, may rotate with the shaft or independently of it.

I will now describe the manner in which the take-up rollers are driven in this example of my invention. Their shafts are supported in standards G, erected upon the base piece or bed of the machine. The shaft of the upper roller G′, is journaled in boxes arranged in housings with which said standards are provided. Pins extend vertically from the tops of the boxes through the upper parts of the standards and have resting upon them lugs g^3, which are formed with or attached to a lever G^3, which is at one end fulcrumed by a pin g^4 to the standards G and at the other end attached to a spring G^4. The spring G^4 is attached to a cross-pin g^5, extending through a yoke or bracket g^6, which has fitted to it a screw g^7. The screw is free to rotate and has in the circumference of its head holes in which may be inserted a pin or bar, whereby the screw may be rotated. The screw engages with a tapped hole in the base piece or bed. Obviously by rotating it, the tension of the spring may be varied. On the shafts of the rollers G′ G^2, are affixed gear-wheels g' g^2, which intermesh. The shaft of the roller G^2 has affixed to it a gear wheel G^5, deriving motion from one or the other of two pinions G^6 G^7, which are secured to a shaft G^8, that is supported in standards G^9, erected on the base piece or bed I. The shaft G^8 has affixed to it a gear wheel G^{10}. This derives motion from a gear wheel G^{11}, affixed to the hub a^4 of the rotary head A^2. The gear wheel G^{11} may transmit motion to the gear wheel G^{10} by directly engaging with the latter, as shown in Fig. 7, or it may do this indirectly through an intermediate gear wheel G^{12}. When the gear wheel G^{10} is to directly engage with the gear wheel G^{11}, it will be of such a size as to reach the latter; but where it is to derive motion through an intermediate gear wheel, it will be smaller. I, therefore, in referring to the gear wheel G^{10} mean to include a wheel of any size in the same position as that occupied by the gear wheel marked G^{10} in the drawings. The intermediate gear wheel G^{12} is shown as mounted upon a shaft or stud secured to an arm G^{13} which is hung upon the journal a^4 of the rotary head A^2. The outer extremity of this arm has a transversely extending slot which receives a screw g^{13} which enters a tapped hole in the adjacent standard G^9. This screw, in connection with the said standard, serves to clamp the arm in different positions. This combination of gear wheels provides for driving the shaft G^8, and consequently the take-away rollers, at different speeds; for wheels G^{10} of a great variety of sizes may be used to receive motion from the wheel G^{12}, providing the arm G^{13} is properly shifted.

By employing a gear wheel G^{10} which will directly engage the gear wheel G^{11}, the direction of motion imparted to the shaft G^8, will be reversed. To compensate for this, I employ the two pinions G^6 G^7, so that one may be slipped into engagement with the gear-wheel G^5, when the shaft G^8, is rotated in one direction, and the opposite one may be slipped into engagement with the gear wheel G^5 and the first disengaged, when the shaft G^8 is rotated in the reverse direction. These pinions G^6 G^7 may be secured in operative engagement with the shaft G^8, by means of screws.

It will be readily understood that a machine constructed in accordance with my improvement, will always be uniformly balanced around its axis and main shaft because no matter how much or how little wire or like material may be at any time wound upon the different spools or reels, it will be distributed equally around the axis or main shaft and consequently one spool or reel will not preponderate with reference to another and so unbalance the machine. As the machine is perfectly balanced, it may be driven much more rapidly than otherwise would be possible. Moreover, a machine of the construction described, is very compact.

What I claim as my invention and desire to secure by Letters Patent is,

1. In a twisting or winding machine, the combination of a number of spools or reels, a tubular shaft extending axially through the said spools or reels, friction clutches between the spools or reels and said shaft the said friction clutches being wholly within the reels or spools, guides for receiving the wire or material from the spools or reels, means substantially such as described for rotating the guides and a die receiving the wire or material after it passes around the guides, substantially as specified.

2. In a twisting or winding machine, the combination of a number of spools or reels, a tubular shaft extending axially through the said spools or reels, guides for receiving the wire or material from the spools or reels, a rotary head receiving the wire or material from the guides and rotating said guides, a die receiving the wire or material after it passes around the guides, take away rollers, a driving shaft for said rollers, mechanism for rotating said shaft in opposite directions, and gears carried by the shaft movable into engagement at opposite sides with a gear on the shaft of one of said take away rollers, substantially as specified.

3. In a twisting or winding machine the combination with a spool or reel supporting shaft of a sleeve mounted on the shaft and having a cylindric shell, a spool or reel having a cylindric hub fitting loosely on the sleeve and extended within the cylindric shell, another cylindric shell arranged between the spool or reel and the sleeve and engaging a portion of the cylindric hub, an adjustable plate on the sleeve and a spring between said plate and last named shell, substantially as specified.

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