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WIRE COILING MACHINE WITH VIBRATING COILING DIE

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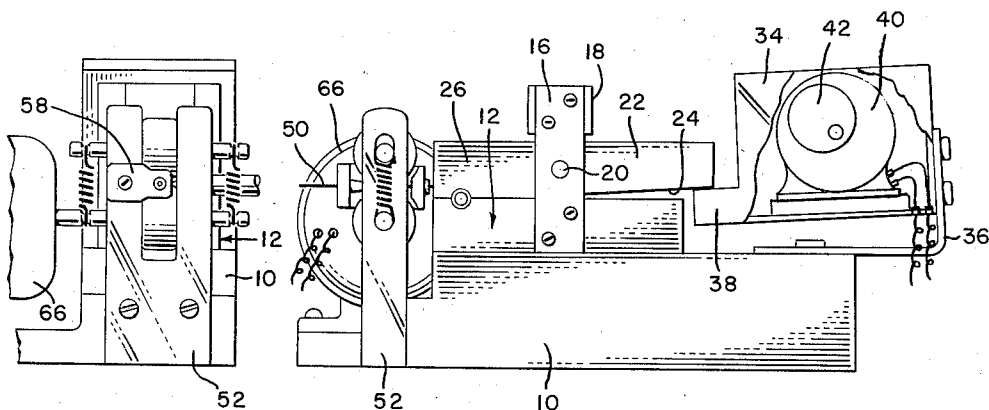


Fig. 2

Fig. 1

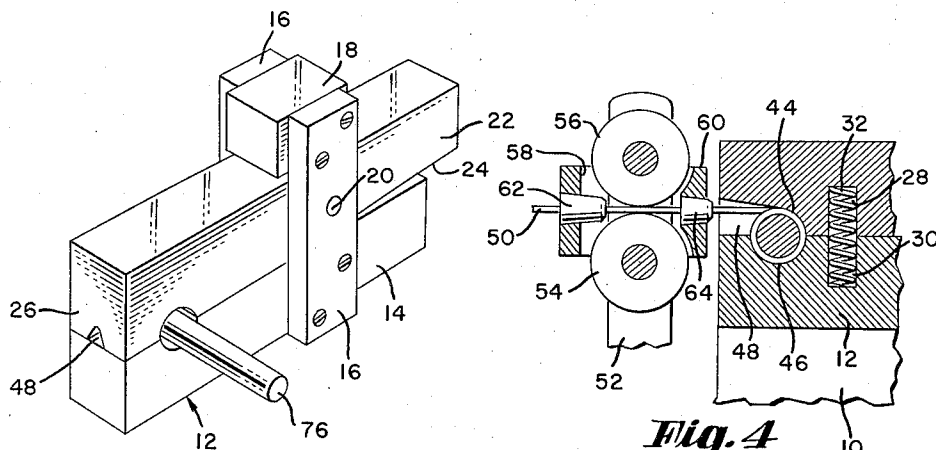


Fig. 3

Fig. 4

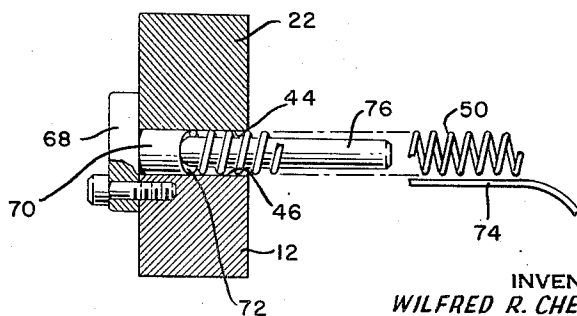


Fig. 5

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## WIRE COILING MACHINE WITH VIBRATING COILING DIE

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1 Claim. (Cl. 153—66)

This invention relates to the production of a long length of coil from straight wire stock of very small gauge.

In the past wire coils have been made in continuous lengths and without the use of a mandrel by forcing the wire tangentially into one end of a hollow cylinder whose interior wall may or may not be helically grooved whereby a coil of the diameter of the hollow of the cylinder is formed in the cylinder and forced out at the other and open end of the cylinder. Sometimes a short mandrel is provided axially of the cylinder to assist in the formation of the initial coils.

While such method and mechanism are effective when wire of considerable rigidity is utilized to enable pushing the wire ahead into and through the hollow cylinder, they are ineffective when it is attempted to form coils of fine wire since the wire would buckle, as can be readily understood.

It is an object of this invention to provide a method and means for coiling very fine wire and wire of very little rigidity.

Other objects will become apparent upon consideration of the following specification when taken in conjunction with the accompanying drawing in which:

Fig. 1 is a side elevation of mechanism employed to form a continuous coil of any desired length out of very fine wire.

Fig. 2 is a front elevation of the mechanism with a motor casing partially broken away.

Fig. 3 is a perspective view of wire coiling blocks utilized in the mechanism.

Fig. 4 is a section through part of wire feeding mechanism to illustrate how the wire is fed in between the coil forming blocks, and

Fig. 5 is a section through the wire receiving end of the wire coiling blocks.

Referring to the drawings in greater detail, at 10 there is disclosed a base of the machine. Surmounting the same and affixed thereto in any convenient fashion is a fixed coil forming block 12, approximately square in cross section. Fastened to side walls 14 of the block 12 is a pair of standards 16 supporting a spacing and abutment member or stop 18 at the upper end of the standards. Pivotaly supported by the standards as by a pivot pin 20 is a second coil forming block 22 also generally square in cross section, but extending rearwardly beyond the lower block. The block 22 is bevelled on its lower face to the rear of the pivot, as indicated at 24, to enable its forward part or nose 26 to be separated from the upper surface of the lower block. Although motor means may be affixed to the upper block to oscillate the same in any known fashion the following mechanism has been found to be more effective to obtain coiled wire. The forward ends of the opposing faces of the blocks 12 and 22 are provided with opposed recesses 28 and 30 within which is seated a spring 32 under compression. The compression spring

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urges the upper block toward the stop 18 but such motion is normally resisted by a vibratory casing 34 secured to an L-shaped spring bar 36 in turn fixed to the base 10, said casing having a toe 38 engaging the face 24 of the overhanging end of the upper block 22. Within the casing is a conventional vibratory element which when set in motion will cause the toe to vibrate arcuately allowing the spring 32 to spread the forward ends of the blocks on downward movement of the toe 38 which then forces the forward ends together again on its upward movement. A conventional vibrating means may be used, as an electric motor 40 with an eccentrically mounted weight 42 on its armature shaft.

The forward ends of the blocks are provided with mating semi-cylindrical recesses 44 and 46 arranged parallel to the pivot 20 and leading from the nose of the upper block 22 to the circumference of the recess 44 is a substantially V-shaped orifice or throat 48 diverging toward the noses of the blocks.

The wire 50 to be coiled is fed into the semi-cylindrical hollows of the blocks via this orifice. Although the wire could be fed in by hand, it is preferred to feed the same in by motor mechanism. To assist in feeding the wire in through the orifice there is mounted on the forward end of base 10 a forked bearing 52 supporting a pair of driving rollers 54, 56 resiliently held to each other in conventional fashion. Mounted on one of the forks of the bearing are guide supports 58 and 60 carrying wire guides or perforated thimbles 62 and 64. A suitable motor 66 is provided to rotate the driving rolls in conventional fashion. To limit the direction of motion of the coil as it is formed, and to determine the pitch of the coil, one of the blocks, as block 12, has removably affixed thereto a head 68 with a stud 70 of the diameter of the hollow within the blocks, the end of the stud being provided with a surface forming part of a helix, as indicated at 72, to determine the pitch of the coil as it is being formed. Should a coil with different pitch be desired, the head with its stud may be readily removed and replaced by one whose stud has a different slant on its end. A receiver 74 may be provided to support the coil as it is being fed out of the machine. A guide rod 76, fixed to the stud, may also be provided to assist in formation and guidance of the coil, although its presence is not a necessity.

It is intended to feed into the machine tungsten wire of exceedingly small diameter, as for example .006 inch, and to form coils with an outside radius as small as .076 inch. Because of the vibratory action of the upper block, which subjects successive lengths of the wire to a bending force as it is fed into the hollow area, this very fine wire may be easily fed into the space within the blocks without wire buckling at the nose of the block 22 and the vibratory motion of the blocks will not only assist in the formation of the coils but also in advance of the formed coils.

Although the invention has been described as being useful with wire, it should be obvious that any strand material having some degree of stiffness may be similarly processed.

Having thus described the invention, what is claimed as new is:

Means for forming a coil out of wire comprising a fixed block having a semi-cylindrical recess on its upper surface at one end of the block, pivot means at an intermediate portion of the length of the block, a second block longer than said first block, coterminous with the said one end of the first block, and overhanging the other end of the fixed block mounted on said pivot means, said second block having a semi-cylindrical recess complementary to the recess in the fixed block, walls

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defining an orifice tangential to the recess in the second block, a casing housing a vibrator resiliently mounted on the fixed block, a projection on said casing engaging beneath the overhanging end of the second block to transmit vibrations from the vibrator to the second block, 5 and means at the recessed ends of the blocks tending to resiliently urge apart the recessed ends.

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