June 26, 1945. W. F. SPAHR 2,379,046

DRUM SWAGER

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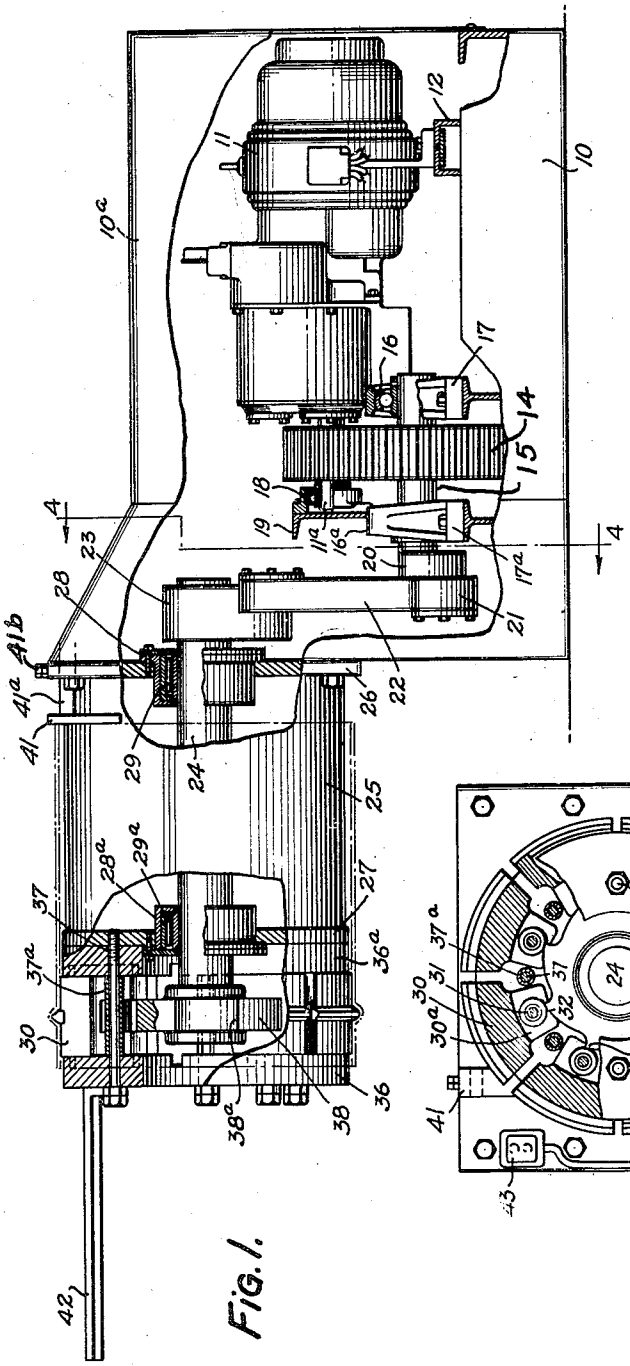


FIG. 1.

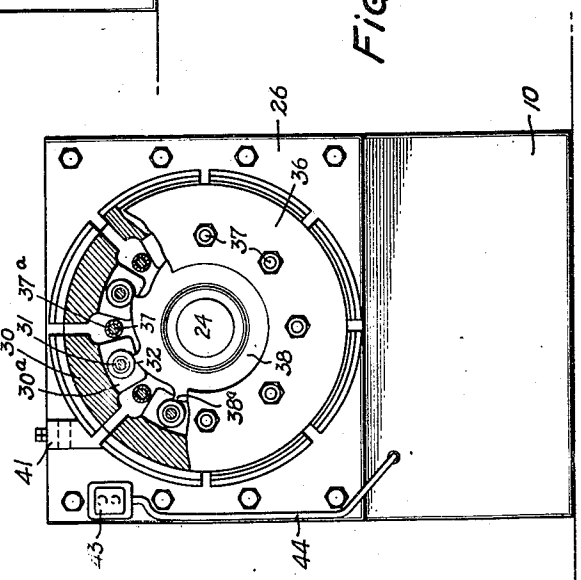


FIG. 3.

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DRUM SWAGER

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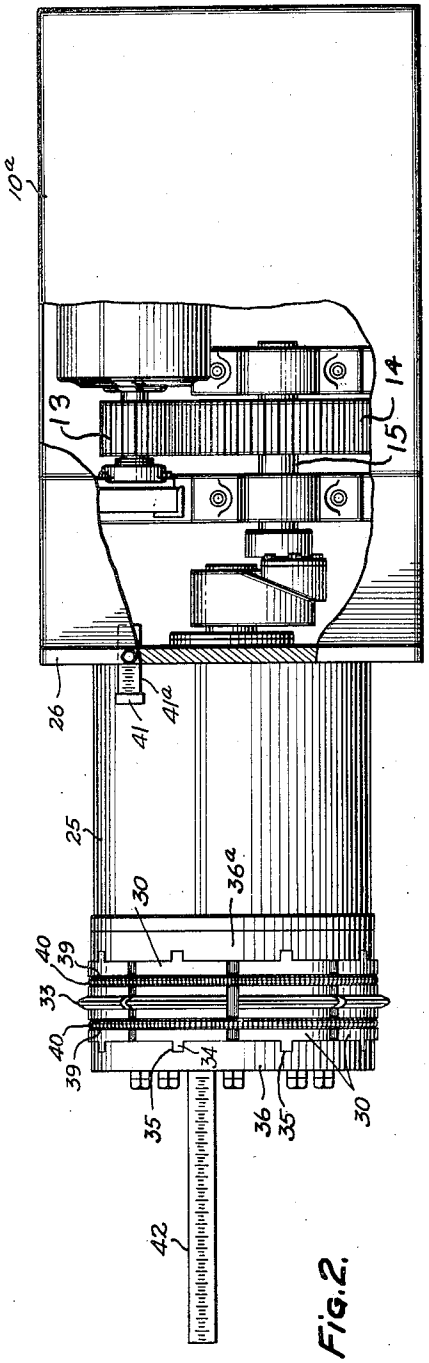


Fig. 2.

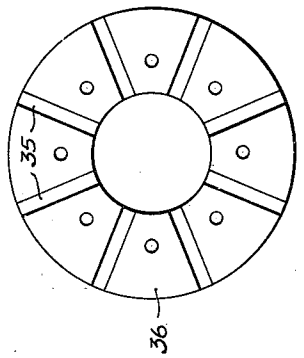


Fig. 5.

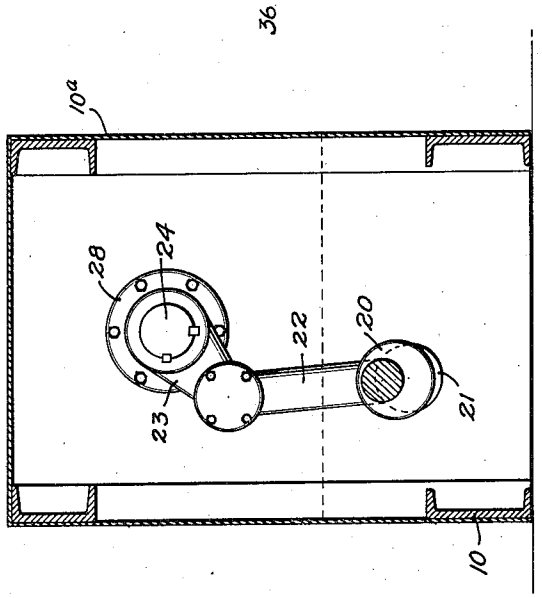


Fig. 4.

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DRUM SWAGER

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Application January 2, 1943, Serial No. 471,197

4 Claims. (Cl. 153—73)

This invention relates to expanding machines for forming beads or annular enlargements on drums or barrels and like cylindrical objects, and an object of the same is to provide a machine of this type which is of rugged yet simple construction and capable of carrying out the expanding operation accurately and expeditiously with a minimum of manual labor.

Another and more specific object of the invention is to provide a drum or barrel expanding machine wherein the barrel body may be telescoped over a cylindrical expanding head and a bead automatically located and formed at the extremity of the drum, whereupon the drum may be partially removed from the head and a second or succeeding bead located and formed, thereby requiring only one set of expanders for any desired number of beads while at the same time effecting the beading operation with a minimum of manipulation or manual labor.

A further object is to generally improve expanding machines for cylindrical bodies.

The foregoing and other objects and advantages will become apparent in view of the following description taken in conjunction with the drawings, wherein:

Figure 1 is a view in broken sectional side elevation of a machine in accordance with the invention;

Fig. 2, a broken top plan view of Fig. 1;

Fig. 3, an end elevation of the machine with parts broken away and in section;

Fig. 4, a section taken substantially on the line 4—4, Fig. 1;

Fig. 5, a detail view in face elevation of one of the guide plates for the expander shoe assembly.

Referring to the drawings in detail, the machine is provided with a base frame 10 having mounted thereon a housing 10*a* in which a drive motor 11 is disposed, said motor being rigidly mounted on a pedesal bracket 12. The armature shaft 11*a* of the motor has mounted thereon a drive pinion 13 in mesh with a main drive gear 14 secured on a crank shaft 15, said shaft being rotatably mounted in bearings 16 and 16*a* supported on pillar blocks or brackets 17 and 17*a*. The outer end of the armature shaft 11*a* is preferably steadied and reinforced by a bearing unit 18 mounted on a bracket 19.

A crank 20 is secured on the outer end of the crank shaft 15 and is pivotally connected or journaled as at 21 to the lower end of a link or crank arm 22, the upper end of said arm being pivotally connected to a crank 23 secured on the one end of a cam shaft 24.

The cam shaft 24 projects through a cylindrical head 25 having mounting plates 26 and 27 at opposite ends thereof in which bearing housings 28 and 28*a* are mounted and carry bearings 29 and 29*a* for the cam shaft 24.

An expander assembly is removably mounted on the outer end of the head 25 and comprises a plurality of radially movable segmental shoes 30 of similar construction, each of which is formed with a recessed or undercut base portion terminating in a boss 30*a* having mounted therein a bearing 31 carrying a cam follower pin or roller 32. Each of the shoes 30 is also formed with a peripheral die segment 33, which forms the bead on the drum or other cylindrical object, and laterally projecting guide lugs 34 adapted to engage in a series of radial guideways 35 formed in the adjacent faces of a pair of oppositely disposed front and rear guide plates 36 and 36*a*, note Fig. 5.

The guide plates 36 and 36*a* are secured to the end plate 27 of the cylindrical head 5 by means of through bolts 37 which project through sleeves or bosses 37*a* disposed between recessed side portions of the segments 30, the said sleeves 37*a* maintaining the guide plates in definite spaced relation so as to permit a free radial movement of the shoes 30.

To expand the shoes or die segments radially outwardly, a circumferentially stepped cam 38 is secured on the outer end of the cam shaft 24 and is provided with a series of cam portions 38*a* adapted to engage the cam rollers 32 mounted on bearing pins 31. To retract the cam shoes or segments, the latter are formed with registering circumferential grooves 39 having mounted therein contracting springs 40.

The drive of motor 11 causes rotation of shaft 15 in one direction, and this rotary motion is changed to oscillatory motion when the drive is applied to cam shaft 24 through crank 20.

It will be seen that when the cam shaft 24 is rotated in a counterclockwise direction as viewed in Fig. 3, the cam members 38*a* engage the cam rollers 32 and cause the shoes 30 to move radially outwardly between the guide plates 36 and 36*a*; and when the cam members 38*a* attain a fully expanded position, the drive on the cam shaft is reversed and the springs 40 move the said shoes inwardly to their retracted position. Thus the working stroke of the expanding elements is of a positive nature while the retracting stroke is impositive.

To spot or definitely locate the beads on the cylindrical barrel body, a rear stop gauge 41 is mounted on a calibrated slide 41a in turn adjustably mounted in the rear head plate 26 and secured in adjusted position by screw 41b and to locate the opposite bead, or that on the other extremity of the barrel, or any number of intermediate beads, a front gauge 42 is mounted on the front guide plate 36 and projects outwardly therefrom, said gauge being in the form of an elongated rod-like member having calibrations thereon for accurately determining the position of the beads.

The motor may be conveniently controlled from a push button station or bracket 43 having suitable conducting cables 44. connected thereto and leading to the switch mechanism of the motor. The working stroke of the crank 20 and expander cam 38 is such as to finish before the cam portions pass out of contact with the cam rollers, retraction of the shoes being attained by springs 40 when the cam shaft 24 is reversed.

In operation, assuming the motor has been started, an attendant inserts a drum or barrel body over head 25, the gauge 41 having been adjusted to definitely locate the bead at the one extremity of the barrel. The machine may be driven continuously, the attendant timing the operation so as to slide the cylindrical drum body onto the head 25 when the shoes are retracted; and when the one end or edge of the barrel body contacts the gauge 41, the shoes 30 move radially outwardly and the swaging operation ensues. When the shoes move into retracted position, the operator moves the barrel body outwardly until it reaches a predetermined point with respect to the gauge 42, whereupon the barrel body remains at rest until the swaging operation takes place on the opposite end of the barrel; after which the barrel is removed and another inserted to repeat the operation. Obviously any number of beads may be formed on the drum.

It will thus be seen that the swaging operation may be carried on in an expeditious manner with only one set of expanding shoes and coacting parts. This not only materially simplifies construction of the machine, resulting in lower initial cost as well as lower cost of upkeep and maintenance, but it also permits a free swaging operation without danger of mutilating a bead already formed. With a machine of this type, barrel bodies may be swaged in substantially the same time as where double or multiple swagers are used, without necessitating complicated parts necessary in multiple swagers.

The machine is of unusually rugged construction and will operate over long periods of time with a minimum of attention.

It will be understood that certain minor changes in construction and design may be adopted without departing from the spirit or scope of the invention as defined by the appended claims.

What is claimed is:

1. A drum swager comprising a base frame having a housing secured thereon, a drive motor disposed in said housing, a cylindrical head secured to one extremity of said frame and provided with front and rear end plates, a cam shaft and bearings therefor mounted in said end plates, a crank secured on the one end of said shaft, means operatively connecting the motor with said crank for oscillating said shaft, an expanding assembly including an expander cam mounted on the opposite end of said cam shaft and formed with a plurality of circumferential cam portions and a plurality of expander shoes having laterally projecting guide bosses, guide plates connected in spaced relation and formed with radial guide grooves mounting said guide bosses, die segments formed on the peripheries of said shoes and conjointly adapted to form a bead on the drum cylinder to be swaged, said shoes having cam rollers mounted in the base portions thereof adapted to engage said cam portions on said expander cam when the cam shaft is rotated in a direction to cause radial outward movement of the shoes, means connecting said guide plates to said front end plate, a rear gauge connected to said rear end plate for locating a bead at one extremity of the drum cylinder, and an elongated gauge connected to the front extremity of said head for locating a succeeding bead or beads after formation of said first bead, the drum cylinder to be swaged being removed axially outwardly from said head after each bead is formed.

2. A drum swager comprising a base frame, a drive motor mounted on said frame, a cylindrical head secured to one extremity of said frame over which a drum to be swaged is placed, a cam shaft projecting through and oscillatably mounted in said head, a crank secured on one end of said shaft, means operatively connecting the motor with said crank for oscillating said shaft, an expanding cam mounted on the opposite end of said cam shaft, a plurality of expander shoes having laterally projecting guide bosses and circumferential die segments, guide plates connected in spaced relation on opposite side of said shoes and formed with radial guide grooves mounting said bosses, means connecting said guide plates to the outer end of said head, cam rollers mounted in the base portions of the shoes and adapted to engage said expander cam when the cam shaft is rotated in a direction to cause radial outward movement of the shoes, a rear gauge having a stop member adjustably mounted adjacent the rear extremity of said head and adapted to be contacted by the edge of a drum cylinder and determine the location of the first bead to be formed on the drum, and a rear gauge mounted adjacent the opposite extremity of said head for locating a succeeding bead or beads after formation of the first bead, the drum cylinder to be swaged being removed axially outwardly from said head after each bead is formed.

3. A drum swager comprising a substantially horizontally-disposed hollow cylinder constituting a head adapted to have a drum body to be swaged placed thereover, a cam shaft projecting through and oscillatably journaled in said head, a crank secured to one extremity of said cam shaft and a swaging cam secured to the opposite end of said shaft, a pair of guide plates connected in spaced relation to one end of said drum on opposite sides of said cam, a plurality of radially movable swaging shoes mounted between said plates, said shoes and plates having interengaging guide means for guiding said shoes, the peripheral portions of said shoes being formed with die segments which act conjointly to form a bead on the drum, means for oscillating said cam shaft, rotation of the cam shaft in one direction causing said cam to move said shoes to expanding position, means resiliently urging said shoes to retracted position when rotation of the said cam shaft is reversed, a gauge for definitely

locating the first bead to be formed on the drum, the latter being removed axially outwardly of said head to form succeeding or additional beads, and means for definitely locating said additional beads.

4. A drum swager comprising a housing, a mounting plate carried by said housing, driving means within the housing including a rotary shaft, a cam shaft extending through said mounting plate, a crank fixed to each said shaft and said driving means, a crank arm connecting said cranks whereby rotation of said driving means will impart oscillatory motion to said cam shaft, a cam member fixed on said cam shaft exteriorly of said housing, and die segments grouped around said shaft and radially movable from said shaft by direct engagement of said cam member.

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