June 16, 1959 J. G. McKAY 2,890,654

INKING DEVICE

Filed May 23, 1957

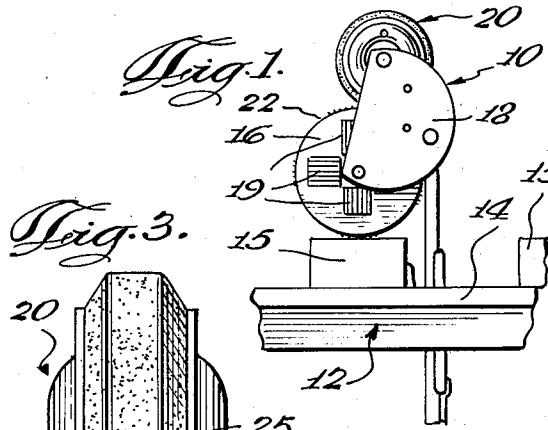

Fig. 1.

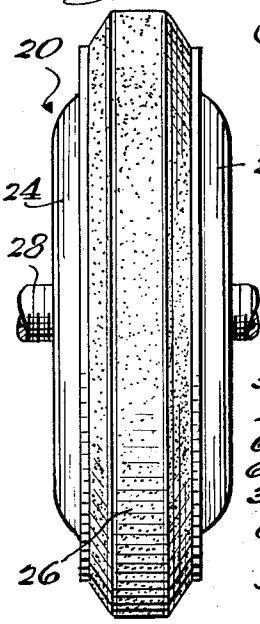

Fig. 3.

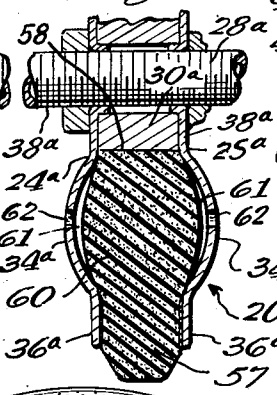

Fig. 5.

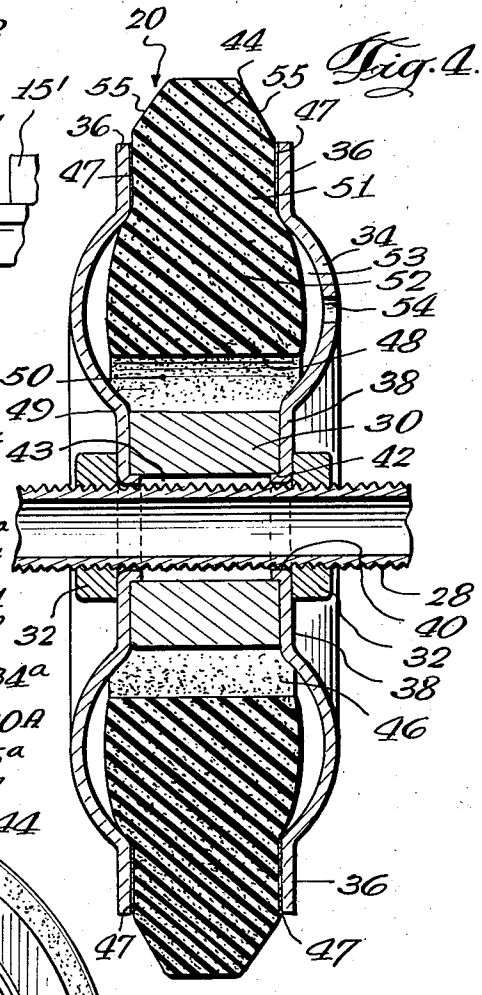

Fig. 4.

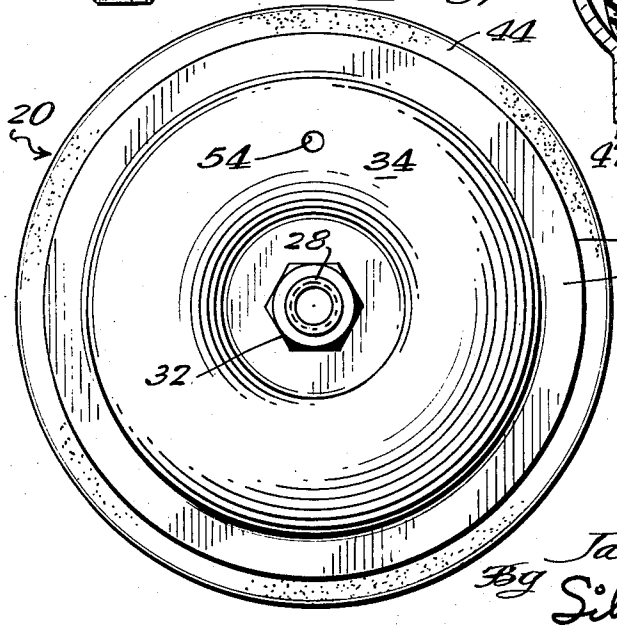

Fig. 2.

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INKING DEVICE

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13 Claims. (Cl. 101—367)

This invention relates generally to inking devices and more particularly, relates to novel improvements in a rotary inking device which enable greater ink capacity, more accurate control of rate of ink flow and more substantial support for the inking member proper than has heretofore been realized in such rotary inking devices.

In my U.S. Patent No. 2,562,627, issued July 31, 1951 for an Adjustable Inking Device there is described a rotary inking device of the general type with which this invention is concerned. These inking devices have great utility, for instance, in automatic code dating equipment operative in conjunction with a conveyor system for transporting packages past the equipment in a continuous line to have selected indicia applied thereto during such transit. Such inking devices are installed in operative position adjacent the printing wheel to transfer ink to the printing members continuously as the printing device rotates. Also, inking devices of this general construction have universal application to rotary printing equipment designed for other uses as well, such as, equipment described in my Letters Patent No. 2,735,678, issued February 21, 1956 for a Folded Carton Feeding and Printing Device; Patent No. 2,701,519, issued February 8, 1955 for a Printing Device Having Automatic Sychronizing Mechanism; Patent No. 2,613,598, issued October 14, 1952 for Code Printing Attachment for Tape Dispensing Machines, as well as other not specifically mentioned. Such rotary inking devices may be driven by suitable power means coupled thereto or may rotate idly through frictional engagement with the rotating printing wheel of the equipment.

This invention achieves singular improvements in the inking device described and illustrated in said Patent No. 2,562,627 for an Adjustable Inking Device. As will be understood from said patent, such an inking device generally includes a pair of sandwiching cups or side plates between which is supported a disc of cellular, porous material, such as foam rubber, in which the ink is stored. Ink transfer occurs at the peripheral surface of the foam rubber disc upon physical engagement with the numberers or type of the printing wheel and for this purpose, the inking device is mounted for rotary movement on an axis spaced from the axis of rotation of the printing wheel. There is provided structure for controlling the rate of flow of ink to the peripheral surface of the disc which compresses the disc inwardly of the peripheral surface thereof, said structure comprising the sandwiching cups or plates and means for adjusting the distance therebetween.

It is a principal object of the invention to provide a rotary inking device of the character described having novel improvements embodied therein which enable the basic principles of the said Patent No. 2,562,627 to be employed to realize singular advantages heretofore not achieved with devices of this type.

An important object of the invention is to provide a rotary inking wheel of the character described in which the inking disc of absorbent, cellular material has novel

conduit means for cirulating ink introduced to the inking wheel to more efficiently and rapidly saturate or load the inking disc with an ink supply.

Another important object of the invention is to provide a rotary inking device of the character described in which the inking device is rigidly supported between a pair of sandwiching members arranged to exert sustained compression forces against the foam rubber disc for controlling the rate of flow of ink to said surface, and the rubber disc has an expanded reservoir portion disposed between said sandwiching members for increasing the capacity of the disc.

Another object of the invention is to provide a rotary inking device of the character described in which the side plates each have an annular concave medial portion facing inwardly one toward the other to provide annular bulges to accommodate the expanded reservoir portion of the disc. An ancillary object in this connection is the provision of such annular concave formations in the side plates to contribute great structural strength therefor whereby the side plates may be stamped from very thin gauge sheet metal while still providing adequate support for the rubber disc.

Another object of the invention is to provide an inking device as described in which the bulge portions of said side plates have integral annular flanges or gripping fingers bearing against the foam rubber disc radially inward of the periphery of the disc and the disc is rigidly affixed to said flanges or fingers by means of a suitable adhesive.

In the inking device described in said Patent No. 2,562,-627, adjustment in the distance between the sandwiching members or side plates was permitted by reason of the bushings 41 which had the inner ends thereof spaced apart to provide the clearance 49. Taking up on the cup-shaped nuts resulted in movement of the plates inwardly one toward the other to increase the compression on the foam rubber disc and loosening of said nuts resulted in the reverse situation. By reason of the selective compression-action of the side plates, desirable control of the rate of flow of ink to the peripheral edge of the disc was achieved. Such selective control of the rate of ink flow may be achieved also by means of a spacing member between the side plates of predetermined length calculated to establish the rate of flow desired for the ink in any given device. Said spacer may be removably installed so that spacers of different predetermined lengths may be used to vary the rate of ink flow in the device, or where the disc is secured by adhesive to the side plates, the rate of ink flow is established at the time the inking device is assembled by reason of the length of spacer employed. Accordingly, it is another object of the invention to provide an inking device as described having a spacer member installed between the side plates, and the side plates have integral, inwardly extending flanges for supporting said spacer between said side plates so that the rate of ink flow permitted for the device is controlled by means of the length of spacer employed.

Other objects of the invention comprise providing a rotary inking device of the character described which is characterized by its highly economical and simple structure, which is strong and durable and easily and rapidly assembled.

The foregoing and other objects of the invention will become apparent as the description thereof evolves. To enable the skilled artisan to understand and practice the invention as required by the patent statutes, a preferred embodiment and modification thereof have been described in detail in the specification and illustrated in the accompanying drawing. It is contemplated that minor variations in the size, arrangement, proportion and construction of the several parts described and illustrated

may occur to a skilled artisan without departing from the scope or sacrificing any of the advantages of the invention.

In the drawings, in which the same reference numerals are employed to identify the same or equivalent parts throughout the several figures thereof:

Fig. 1 is a fragmentary elevational view of a conveyor system having automatic code dating apparatus installed therewith, the rotary inking device embodying the invention being associated with said equipment to illustrate one manner of employing said device.

Fig. 2 is a side elevational view of the preferred embodiment of the inking device embodying the invention.

Fig. 3 is an elevational edge-on view of the said device looking toward the peripheral surface of the inking disc.

Fig. 4 is a vertical sectional view taken transversely through the inking device, on an enlarged scale.

Fig. 5 is a fragmentary sectional view taken transversely through a modified form of the invention.

Referring to the drawing, illustrated in Fig. 1 is a representative code dating apparatus designated generally by the reference character **10** which has been installed in conjunction with a conveyor table **12**. The movable reach or table top **14** of the conveyor transports the individual packages or containers, in a continuously moving line past the apparatus **10** to have imprinted thereon selected indicia or code data, such a container **15** being shown passing beneath said apparatus to receive an imprint. For this purpose, the apparatus **10** includes a printing wheel **16** rotatably mounted between a pair of support plates, one of which is shown at **18**. The printing wheel **16** is rotated to apply the imprint upon engagement therewith of the moving package **15**. It will be noted that a portion **15'** of a package following behind the package **15** indicates that the imprinting process is continuous. The printing wheel **16** carries a plurality of printing numberers **19** or other printing means such as rubber or metal type members to engage the packages. Spaced above the printing wheel **16** is the inking device embodying the invention which has been designated generally by the reference character **20**.

It should be understood that the apparatus **10** is illustrated to show environment in which the inking device **20** is suitable for operation and is not intended to restrict the application of the principles of the invention merely to such apparatus. The representative apparatus illustrated, however, is sufficient to instruct in the relationship between the printing wheel **16** and said inking device, it being noted that the inking device is supported between plates **18** for rotation on an axis parallel with and spaced from the axis of rotation of said wheel, and the periphery of the inking device is arranged to contact the protruding type **22** of the numberers so as to transfer ink to said type **22** as the printing wheel rotates.

Referring to Figs. 2, 3 and 4, inking device **20** includes a pair of circular side plates or discs **24** and **25** having a rubber inking disc **26** sandwiched therebetween. The side plates are supported on an elongated externally threaded sleeve **28** in fixed spaced relationship by means of wooden spacer **30** supported by the said plates concentric with and spaced from the sleeve and the nuts **32** threaded on said sleeve into engagement with external surfaces of said plates.

Each side plate has an annular concave bulge **34** in a medial portion thereof and flat, annular portions **36** and **38** integral with and extending from the bulge on opposite sides thereof in a common plane. The plates are disposed on the sleeve **28** with bulges **34** opening one toward the other. Each plate has a circular opening **40** in said portion **38** through which the sleeve **28** is extended in the completed assembly of the inking device. The circular edge of each hole **40** is inwardly turned normal to portion **38** to provide an annular flange or lip **42**. In the assembled device **20**, the spacer **30** is supported at its ends engaged over said facing lips **42** of the plates and accordingly, spaced from the sleeve passed therethrough by the width of a lip **42**, as indicated at **43**.

The disc **26** of highly absorbent, compressible material, such as foam rubber, is supported between said side plates under pressure, with a peripheral portion **44** of the disc protruding beyond the peripheral edges of the side plates. Said disc **26** has a transverse passageway **46** therethrough concentric with the sleeve and spacer albeit, substantially larger in diameter than the outside diameter of the wooden spacer **30**. Thus, assembled, the inner surfaces of annular portions **36** of said plates are pressed against circumferential facing areas of the disc **26** spaced radially inward of the peripheral portion **44**. The portions **36** of said plates thereby function as compression fingers or flanges, and these circumferential areas of the disc are rigidly secured thereto by means of a tenacious adhesive **47**, such as a casein glue or resin.

It will be noted from Fig. 4, that the increased diameter of the passageway **46** through the disc locates the inner circumference **48** of the disc radially spaced outwardly from the annular bend **49** connecting each bulge with a portion **38** of said side plates. As a result, the inner circumference of the disc likewise is separated from the spacer **30** as indicated by clearance space **50** so that said disc is supported between the plates only by the compressed portion **51** thereof engaged between the compression fingers **36**. Thus, the disc **26** has a portion thereof **52** depending from said engaged portion **51** intermediate the bulges **34** which upon compression of the disc portion **51** is capable of expanding considerably into the clearance spaces **53** provided by said bulges. This expansible portion **52** of the disc comprises a reservoir for the ink supplied to the disc and thereby increases the capacity of said disc.

Ink may be introduced to the disc at the peripheral surface thereof by kneading same into the reservoir **52**. However, I also provide an inking opening in at least one of the side plates, such as opening **54** in the wall of the bulge of plate **25**, to permit ink to be introduced directly to one circumferential surface of the reservoir. Ink thus introduced will flow from the space **53** into the clearance space **50** between the inner circumference of the disc and the spacer **30** to the opposite circumferential surface of the reservoir portion **52**. This assures rapid and thorough loading of the reservoir **52** with ink to take advantage of the increased ink capacity provided thereby. The clearance space **50** thereby functions as a conduit for ink introduced through said inking hole **54** by which such ink is led into contact with the major part of the surfaces of portion **52** of the disc.

Not only do the bulges **34** permit considerable expansion of reservoir portion **52** when the disc is under compression, but also contribute great strength to the side plates. Consequently, the bulges permit the side plates to be formed from very thin gauge sheet metal stamped to completed shape. This is very economical and avoids previous use of plastic plates which were frangible and had a tendency to crack easily. With the discs secured by adhesive to the compression fingers **36**, adequate support for the disc may be realized even with such thin gauge sheet material for the side plates.

The protruding portion **44** of the disc has been provided with tapered side surfaces **55**. The taper preferably may be ground with a suitable grinding wheel after assembly of the inking device.

Referring to Fig. 5, there is illustrated a fragmentary portion of a modified form of the invention which is designated generally **20A**. The construction of the side plates **24***a* and **25***a*, the elongate sleeve **28***a* and the spacer **30***a* is substantially identical to the counterparts thereof in embodiment **20** of the invention. The modification of the inking device **20***a* resides in the rubber disc **57** thereof and the manner in which same is installed

between the side plates. Said disc **57** has a central transverse passageway **58** therethrough substantially equal to the diameter of the spacer **30***a* so that in the assembled condition of the device **20***a*, the inner circumference of the disc **57** engages upon the spacer **30***a*. With the disc **57** under compression, an expanded reservoir portion **60** is realized which is enabled to enter the bulges **34***a* and is spaced from the inner surfaces of the walls of said bulges as indicated at **61**. Ink may be introduced to the disc by kneading the ink thereinto from the periphery thereof or through an opening **62** which may be provided in one or both of the side plates **24***a* and **25***a*.

Where only one opening **62** is provided in the device **20***a*, I have determined that ink is absorbed rapidly throughout the reservoir **60** even though the ink is introduced adjacent only one circumferential surface of the said reservoir **60**. Ink flows quite readily throughout the uncompressed rubber due to the capillary action between cells. In foam rubber all cells are interconnected.

The control of rate of ink flow to the periphery of the disc is achieved through the portions of the disc compressed between the compression fingers of the side plates of the device. The amount of compression varies with the distance between the side plates which, of course, is determined by the length of the spacer. It will be understood from the previous patents issued to me, that a supporting shaft is passed through the hollow elongate sleeve of the inking device with the protruding ends of the shaft supported in bearing openings in the plates **18** seen in Fig. 1. The rate of ink flow is established at the time of manufacture of the inking device. Where the disc is not adhesively secured to the side plates, replacement of the sleeve would be possible to adjust the device for a different rate of ink flow.

It is believed the invention has been described in adequate detail to enable the skilled artisan to understand and practice the same. The principles of the invention have been set forth in the claims in terms of structural features described and illustrated and hence, it is intended the claims be construed in their broadest scope commensurate with the improvements over the prior art contributed by the invention.

I claim:

1. A rotary inking device of the character described for transferring ink to a printing device, said inking device comprising, a disc of highly absorbent compressible rubber material, a pair of side plates retained in spaced apart relation having the disc rigidly supported therebetween with the peripheral surface of the disc protruding beyond the peripheries of the plates, said plates each having an annular bulge in a medial portion thereof opening toward the other plate, said disc being rigidly affixed to and compressed by inner surface areas of said plates between the peripheries and bulges thereof and having an expansible reservoir portion entering said bulges, said disc having transverse conduit means in proximity to said bulges for leading ink introduced to the inking device from one circumferential surface of the disc to the other, a sleeve supporting said plates at their centers, a spacer of predetermined length between said plates over the sleeve, said plates having inwardly facing flanges supporting the spacer spaced from the sleeve with the spacer abutting the plates, the length of said spacer being predetermined to provide a desired rate of flow of ink from the reservoir to the peripheral surface of the disc.

2. An inking device as described in claim 1 in which said conduit means comprises a passageway in said disc between said reservoir and the spacer.

3. An inking device as described in claim 1 in which said disc has a central passageway therethrough the diameter of which is greater than the cross-sectional dimension of the spacer, so as to provide a transverse clearance space between the spacer and the reservoir comprising said conduit means.

4. An inking device as described in claim 1 in which said disc has a radially extending annular portion terminating inwardly of the inner ends of said bulges and next adjacent said spacer and comprising a relatively narrow section of the disc between said reservoir and spacer providing said conduit means.

5. An inking device as described in claim 3 in which at least one of said side plates has a hole therein opening to the bulge thereof for introducing ink to the inking device, said clearance space extending entirely through the disc with the termini thereof spaced from the side plates to provide ingress and egress to the clearance space for said ink from opposite circumferential surfaces of the disc.

6. An inking device as described in claim 4 in which at least one of said plates has a hole therein communicating with the interior of the bulge thereof permitting ink to be supplied therethrough to the reservoir.

7. In automatic printing equipment having a printing wheel rotatable to imprint indicia on an article moving past the wheel; a rotary inking device for transferring ink to said printing wheel comprising, a pair of side plates formed of relatively thin gauge sheet metal, a sleeve having said plates supported in spaced relation thereon, a spacing member having a bore therethrough mounted between said plates with the sleeve extending through the bore, a highly absorbent, rubber disc having a central transverse passageway therethrough, said disc being sandwiched between said plates with the sleeve and spacing member extending through said passageway, said plates each having a medial annular concave bulge therein opening toward the second plate and a flat annular gripping flange integral with the bulge adjacent the peripheral edge of the plate, said disc having circumferential areas adhesively secured to and compressed by said flanges and an expanded portion thereof spaced from adjacent surfaces of the bulges.

8. An inking device as described in claim 7 in which said disc has a transverse clearance space therethrough between said expanded portion and spacing member.

9. An inking device as described in claim 8 in which said clearance space opens at each end thereof to a said bulge.

10. An inking device as described in claim 8 in which said plates each have a circular lip integral therewith between the plates and said spacing member is supported on said lips spaced from the sleeve.

11. An inking device as described in claim 9 in which at least one of said plates has a hole therein communicating with the bulge for supplying ink therethrough to the expanded portion.

12. An inking device as described in claim 7 in which said disc has transverse conduit means between said expanded portion and the spacing member for leading ink introduced to the device from one circumferential surface of the disc to the opposite such surface.

13. A rotary inking device for transferring ink to a printing device in which said inking device comprises: a pair of side plates, a sleeve supporting the plates at their centers and spacer means for maintaining said plates in a predetermined spaced relation on the sleeve, a highly absorbent rubber disc sandwiched between said side plates with peripheral surfaces thereof extending radially outward of the peripheries of the side plates, said plates each having an annular medial bulge therein opening toward the other plate and an annular inner surface connecting with the upper end of the bulge, said disc having annular circumferential portions thereof cohered to and compressed by said annular inner surfaces radially inward of said peripheries, said disc having an expansible reservoir formation integral therewith between the inner and outer ends of said bulges and received in the bulges

with the inner surfaces of the bulges spaced from the reservoir formation, said disc having transverse conduit means between the inner ends of said bulges and the spacer means communicative with the spaces between said formations and inner surfaces of the bulges for leading ink introduced to the inking device from one circumferential surface of the disc to the other.

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