April 21, 1964 G. H. LAUER 3,129,659

EMBOSSING APPARATUS

Filed Feb. 15, 1963

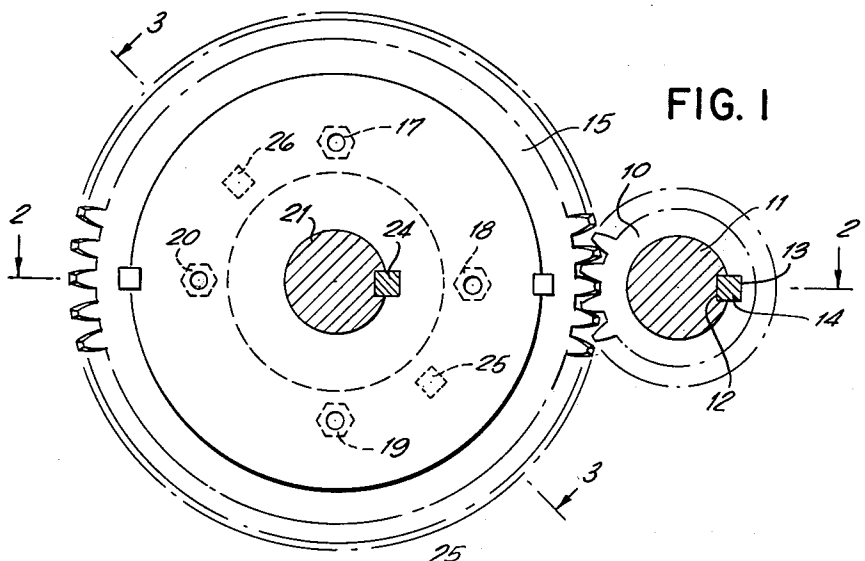


FIG. 1

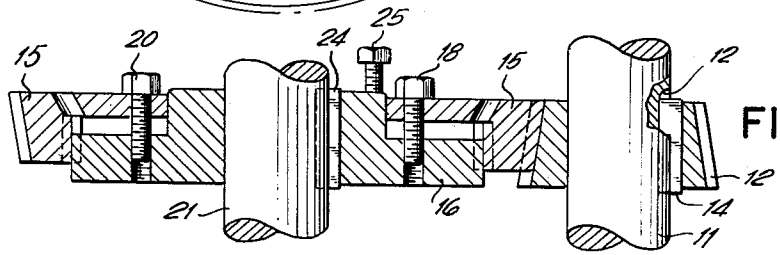


FIG. 2

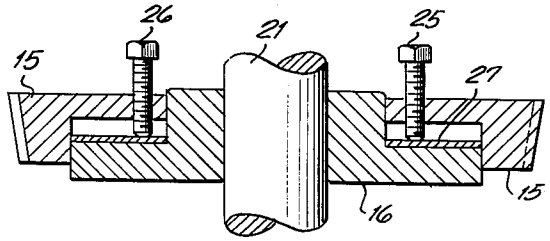


FIG. 3

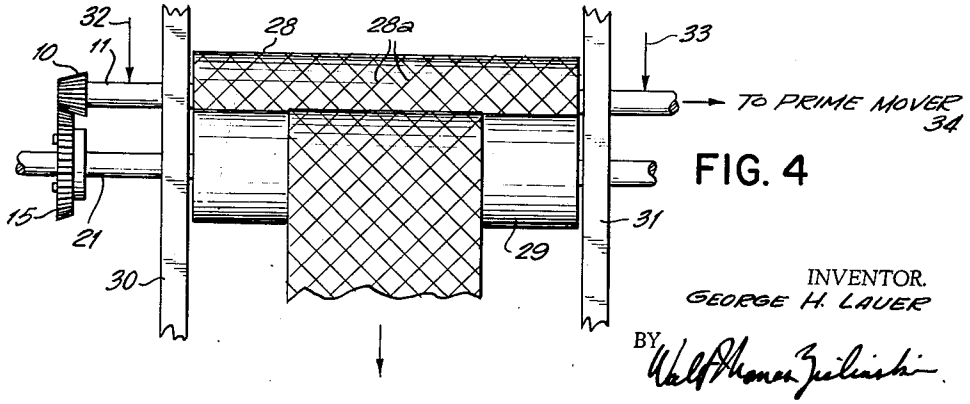


FIG. 4

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EMBOSSING APPARATUS

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This invention relates to embossing apparatus. More, particularly, it relates to embossing rolls and backing rolls used in the embossing of paper webs and sheets and a new and improved means for keeping such rolls in registration.

Equipment for embossing paper and the like commonly consists of a smaller, engraved steel roll and a larger paper, felt, cotton-surfaced roll. These are parallelly disposed to form a nip for the paper to pass through and be embossed by the steel roll when it is rotated about its axle by standard drive means.

The steel or embossing roll drives the fabric-surfaced or backing roll by virtue of the friction between them and friction is secured by applying extreme pressures to the embossing roll and making the nip between it and the backing roll very tight. Clearly, the tighter the nip, the greater the imparting of the engraved pattern on the embossing roll upon the paper web or sheets passing through such nip.

However, no matter how tight the nip, there is a hazard of slippage which will mar or ruin the desired patterning on the paper unless steps are taken to keep the embossing and backing rolls in registration. Indeed, for any degree of slippage, the tighter the nip, the greater the probability of a flawed embossing.

It has been suggested to mount gears on the respective shafts of the embossing and backing rolls and to engage such gears to secure the requisite registration. But, because of the relative softness of the backing roll and the continuing pressure which is applied to the embossing roll, the backing roll ultimately wears down and is reduced in its size to a point where the engaged gears mounted on the embossing roll shaft and the backing roll shaft root. This, in turn, leads to uneven gear tooth wear and uneven embossing from one side of the material being embossed to the other.

In accordance with the present invention, the proper utilization of registration gears in embossing equipment is furthered by means, broadly, of three heretofore unsuggested structural modifications with respect to such gears. The gears are bevelled oppositely, one of the gears is adapted to be moved adjustably along the shaft on which it is mounted, and the other of the gears is given a wider face to insure continued engagement between the gears notwithstanding the movement within a limited range of the one along its shaft in response to the reduction in size, i.e., outside diameter, of the backing roll. It has been found that such modifications are so effective as to encourage their use for, for instance, driven pressure rolls where either the pressure or the material thickness varies.

For a better understanding of the present invention, reference should be had to the attached drawings wherein

FIGURE 1 shows a plan view of a pair of registration gears in accordance with the present invention;

FIGURE 2 shows a sectional view of the gears of FIGURE 1, taken along lines 2—2;

FIGURE 3 shows a sectional view of one of the gears of FIGURE 1, taken along line 3—3; and,

FIGURE 4 shows a schematic view of the gears of FIGURE 1 in combination with paper embossing equipment.

FIGURES 1 and 2 show a bevelled ring gear **10** mounted on shaft **11** by means of keyway **12** on the shaft, keyway **13** in the gear, and key **14**. They also show bevelled ring gear **15** fastened to hub **16** by means of bolts **17**, **18**, **19**, and **20** and hub **16** fastened to shaft **21** by means of keyway **22** on the shaft, keyway **13** in the hub, and key **24**.

FIGURES 1 and 3 show the use of bolts **25** and **26** alone or with spacer or shim **27** to aid in adjusting the positioning of gear **15** with respect to hub **16** and, therefore, longitudinally along shaft **21**.

FIGURE 4 shows an embossing apparatus wherein gears **10** and **15** are employed. It includes a steel roll **28** having thereon engraving **28***a* mounted on shaft **11** and a softer backing roll **29** mounted on shaft **21**. Support members **30** and **31** and means journalling the shafts therein hold the shafts parallel to one another. Pressure means, indicated by arrows **32** and **33** hold roll **28** tightly against roll **29** to give an intimate contact between them which affords, when shaft **11** is rotated by conventional drive means **34**, the frictional motive force to rotate roll **29**. A web of paper **35** which has been embossed with pattern **28***a* on roll **28** is shown emanating from the nip between rolls **28** and **29**.

What is claimed is:

1. In an apparatus for embossing paper webs and sheets, in combination with a rotatable engraved embossing roll having a centrally disposed shaft and a rotatable backing roll having a centrally disposed shaft and having a relatively softer surface than the embossing roll, means to dispose the embossing roll and the backing roll parallelly, means to hold the embossing roll in intimate contact with the backing roll, means to rotate the embossing roll, roll registration securing means comprising, a first bevelled gear disposed on one shaft means to adjust the disposition of the first bevelled gear along the one shaft in order to compensate for a reduction in diameter of the backing roll, and a second bevelled gear fixedly disposed on the other shaft and in engagement with the first bevelled gear wherein the first bevelled gear and the second bevelled gear are oppositely bevelled.

2. The combination of claim 1 wherein the first bevelled gear has a narrower face than the second bevelled gear.

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