July 3, 1962 R. R. TARBUCK 3,042,397

SHEET FEEDING MECHANISM

Filed Jan. 21, 1959

Fig. 1

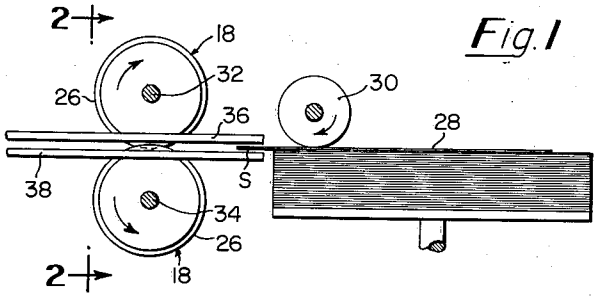


Fig. 7

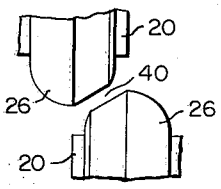


Fig. 2

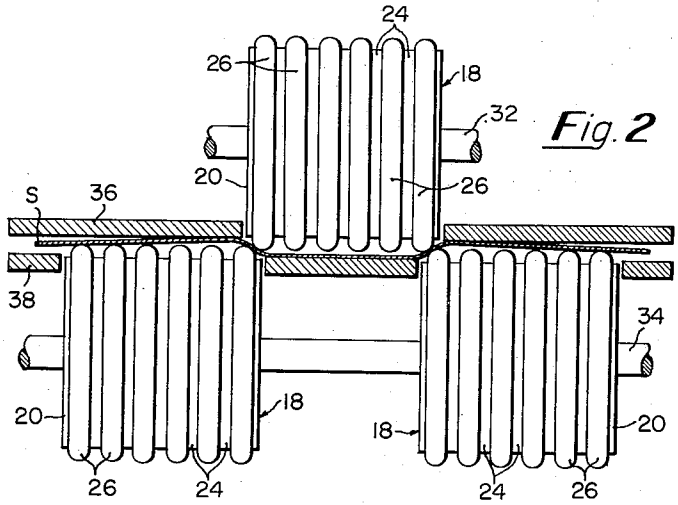
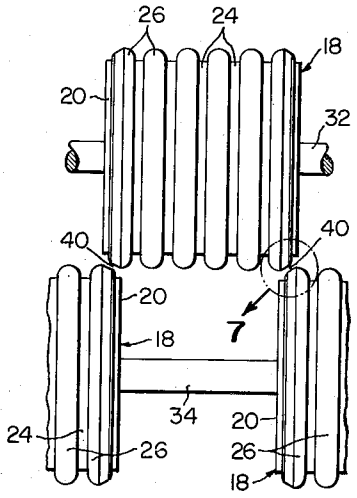


Fig. 5



Fig. 6



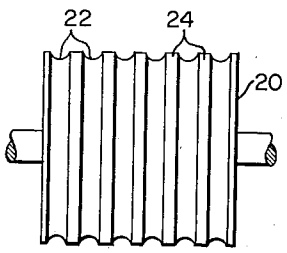


Fig. 3

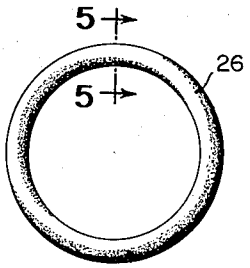


Fig. 4

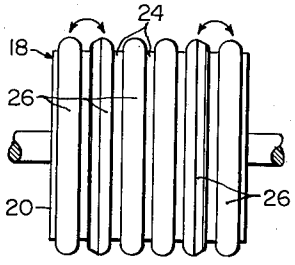


Fig. 8

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3,042,397
SHEET FEEDING MECHANISM

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8 Claims. (Cl. 271—51)

This invention relates generally to sheet feeding machines and more particularly to rollers for feeding sheets of material through the machines. While the invention is capable of a variety of uses, it is found to be particularly advantageous in the sheet feeding art where it is desired to corrugate the sheet material as it is being fed through the sheet feeding machine. The corrugation imparts to the sheet material added stiffness which is highly desirable, particularly when handling thin sheets of material, such as paper bank checks, since the added stiffness improves the feeding qualities of the sheets. The waveform of the corrugated sheet, however, causes excessive corner wear on conventional sheet feeding rollers which are generally constructed with substantially sharp corners or end edge portions.

The prior art feed rollers are usually constructed of a hub and either a peripheral friction facing material or tire generally of rectangular cross-section cemented or otherwise bonded to the hub. Consequently, when such rollers are subjected to corner wear, as mentioned above, their original machine setting and feeding efficiency is destroyed requiring that they frequently be removed from the machine for reconditioning or possible replacement.

An object of the invention is to provide a sheet feeding roller which will be less subject to wear.

Another object of the invention is to provide a sheet feeding mechanism in which the sheet feeding rollers can readily be reconditioned without removing them from the sheet feeding machine.

These and other objectives will become more apparent from the following detailed description of a specific embodiment of the invention when read in conjunction with the accompanying drawings in which:

FIG. 1 is a side elevation of one form of sheet feeding apparatus utilizing a plurality of rollers constructed in accordance with the present invention;

FIG. 2 is an enlarged view of the roller apparatus when taken in the direction of arrows 2—2 of FIG. 1;

FIG. 3 shows a roller hub;

FIG. 4 shows one of the roller tires;

FIG. 5 is a sectional view of the tire shown in FIG. 4 taken along line 5—5;

FIG. 6 illustrates corner wear on certain of the tires necessitating reconditioning of the rollers;

FIG. 7 is an enlarged view of the encircled portion 7 of FIG. 6; and

FIG. 8 shows a reconditioned roller.

Considered in its broad aspects, the invention contemplates a sheet feeding mechanism wherein the sheet feeding rollers comprise a hub and a plurality of elastic tires of a friction material mounted on the hub.

In the drawings, the rollers **18** each comprise a hub **20** (FIG. 3) formed with circumferential recesses or grooves **22** and ridges **24**. A plurality of tires **26**, preferably of circular or O-ring construction, are mounted in the grooves **22**. The grooves **22** are preferably characterized by having a friction surface to prevent slipping of the tires **26** about the hub **20**.

As seen in FIGS. 1 and 2, a plurality of rollers **18**, in this case three are used in the present illustration to corrugate and feed individual sheets S forwardly as they are separated from a stack of sheets **28** by a feed roll **30**. Each of the rollers **18** is preferably power-driven, the upper roller **18** being mounted on a drive shaft **32** and

the two lower rollers **18** being mounted on a drive shaft **34**. As shown, the upper roller **18** is disposed somewhat in the space between the two lower rollers **18** so that their peripheries intersect or overlap. Accordingly, as sheets are fed from the stack **28** they pass between fixed guide members **36** and **38** and into the nip of the corrugating rollers **18** to be fed forwardly to their destination.

The wavy or corrugated configuration of the sheets as they pass through the rollers **18** will in time cause wear on the end tires **26**, as illustrated in FIGS. 6 and 7, so that the critical spacing between adjacent end tires of the upper and lower rollers **18** will eventually be enlarged as at **40**, thus reducing or destroying the feeding efficiency of the rollers **18**. However, with the preferred circular cross-section tires **26**, wear is minimized and distributed over a greater period of time so that there is here provided a reliable, long-life sheet feeding roller.

In order to recondition the rollers **18**, the worn end tires **26** and a corresponding number of neighboring tires are stretched and interchanged into the respective grooves **22**, as indicated by the arrows in FIG. 8, so that new end tires will now provide the original roller spacing. It will also be noted that eventually the worn tires may be shifted to the opposite ends of the rollers and thereby provide for full utilization of the surface of the tires.

It will now be seen that the invention provides a sheet feeding mechanism characterized by a feeding roller which is less subject to wear and which is capable of being reconditioned without removal from the machine and in the least possible time.

While there has been disclosed a specific embodiment of the invention it is to be understood that this is the preferred form, and that the invention may be constructed in a variety of forms without departing from the spirit and scope thereof. Accordingly, it is to be understood that the invention is not to be limited by the specific device disclosed but only by the subjoined claims.

What is claimed is:

1. A sheet feeding mechanism comprising, first and second shafts, a pair of sheet feeding rollers mounted on the first shaft in spaced relation, and a sheet feeding roller mounted on the second shaft interposed between and in sheet gripping relation with the pair of rollers on the first shaft for feeding sheets between the rollers, each of said rollers comprising a hub and a plurality of elastic tires mounted on said hub.

2. A sheet feeding mechanism comprising, first and second shafts, a pair of sheet feeding rollers mounted on the first shaft in spaced relation, and a sheet feeding roller mounted on the second shaft interposed between and in sheet gripping relation with the pair of rollers on the first shaft for feeding sheets between the rollers, each of said rollers comprising a hub formed with ridge portions on its periphery and a plurality of elastic tires mounted on said hub and located thereon by said ridge portions.

3. A sheet feeding mechanism comprising, first and second shafts, a pair of sheet feeding rollers mounted on the first shaft in spaced relation, and a sheet feeding roller mounted on the second shaft interposed between and in sheet gripping relation with the pair of rollers on the first shaft for feeding sheets between the rollers, each of said rollers comprising a hub and a plurality of elastic tires mounted on said hub, and wherein the sheet feeding portion of said tires is of curved cross-section.

4. A sheet feeding mechanism comprising, first and second shafts, a plurality of sheet feeding rollers mounted on the first shaft in spaced relation, and at least one sheet feeding roller mounted on the second shaft and interposed between and in sheet gripping relation with a pair of rollers on the first shaft for feeding sheets between the rollers, each of said rollers comprising a hub formed with ridge portions on its periphery and a plurality of elastic

manually manipulative tires mounted on said hub and located thereon by said ridge portions, and wherein the sheet feeding portion of said tires is of curved cross-section.

5. A sheet feeding mechanism comprising, first and second shafts, a plurality of rollers mounted on the first shaft in spaced relation, and at least one roller mounted on the second shaft and interposed between and in sheet gripping relation with a pair of rollers on the first shaft for feeding sheets between the rollers, each of said rollers comprising a hub formed with circumferential grooves and a plurality of tires of circular cross-section mounted in said grooves, said tires being sufficiently elastic for manual manipulation thereof for interchanging one of said tires with another tire.

6. In an assemblage of sheet feeding rollers coupled in an offset or corrugated relationship to effect a corrugation of a sheet as it is fed therebetween, a sheet feeding roller comprising in combination, a hub and a plurality of tires each mounted on said hub in spaced-apart removably fixed relation, the sheet feeding portion of said tires being of circular cross section and the tires being sufficiently elastic to allow for manual stretching thereof for interchanging one of said tires with another tire without removing the tires from the ends of said hub.

7. In an assemblage of sheet feeding rollers coupled in an offset or corrugated relationship to effect a corrugation of a sheet as it is fed therebetween, a sheet feeding roller comprising in combination, a hub formed with ridge portions on its periphery, and a plurality of tires mounted on said hub and each located thereon by adjacent ones of said ridge portions, the sheet feeding portions of said tires being of circular cross section and the tires being sufficiently elastic to allow for manual stretching thereof for interchanging one of said tires with another tire without removing the tires from the ends of said hub.

8. In an assemblage of sheet feeding rollers coupled in an offset or corrugated relationship to effect a corrugation of a sheet as it is fed therebetween, a sheet feeding roller comprising in combination, a hub formed with circumferential grooves, and a plurality of tires of circular cross section each mounted in one of said grooves in spaced relation to an adjacent tire, said tires being sufficiently elastic to allow for manual stretching thereof for interchanging one of said tires with another tire without removing the tires from the ends of said hub.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,042,397 July 3, 1962

Robert R. Tarbuck

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 1, line 64, after "grooves 22." insert -- The tires 26 are of such elasticity as to provide for easy manipulation of the tires, as by stretching, to facilitate flexing one tire over an adjacent tire for mounting or interchanging the tires into the grooves 22. --.

Signed and sealed this 23rd day of October 1962.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

DAVID L. LADD
Commissioner of Patents