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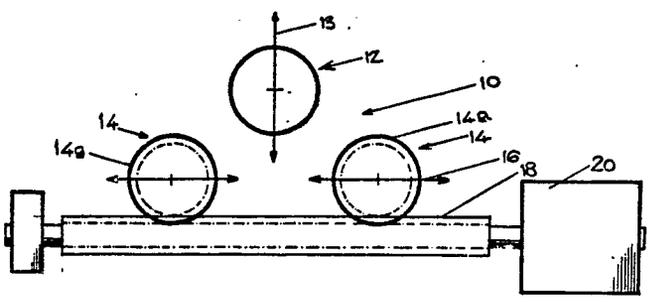
(71) Applicant: **Raw, Harold Gordon, 2 Haworth Road, Mkondeni Natal (ZA)**
Applicant: **ZAKO ENGINEERING (PROPRIETARY) LIMITED, 344 Greyling Street, Pietermaritzburg Natal (ZA)**

(72) Inventor: **Raw, Harold Gordon, 2 Haworth Road, Mkondeni Natal (ZA)**

(74) Representative: **Howden, Christopher Andrew et al, FORRESTER & BOEHMERT Widenmayerstrasse 4/I, D-8000 München 22 (DE)**

## (54) Drive mechanism for a rolling machine.

(57) A rolling machine is provided with worm driven rolls (14) which are positionally adjustable with respect to the remaining roll (12), the worm wheels (14a) being mounted on the driven rolls (14) and the worm (18) being driven by means of an external power source. Synchronisation of the rolls is automatic and positional adjustment is simplified. A machine which allows horizontal and vertical adjustment is described.




EP 0 055 102 A2

0055102

This invention relates to rolling machines and in particular to a drive mechanism for a machine for rolling metal plate into cylindrical form.

Conventional rolling machines comprise three rolls located, in section, on the apices of an imaginary triangle. The upper roll is free to rotate, while one or both of the lower rolls are driven.

Machines are known in which the distances between the centres of the lower rolls can be varied, but the need for the synchronisation of the rolls means that the drive mechanism for the roll in such machines is elaborate. This problem has been solved by driving only one of the rolls and having the remaining lower roll movable, or by supplying each of the lower roll with an integral motor. Austrian Patent No. 321 680 to VOEST, describes the use of swing arms carrying a drive shaft with a gear which meshes with a gear on the ends of the roll shafts . Adjustment is vertical only and synchronisation is automatic but a motor integral with the drive shaft is still required to allow adjustment. US Patent No. 2 215 111 to Tucker goes further and uses blocks which slide horizontally to move the rolls in an arc, the radius of which corresponds to the radius of the driving gear thereby allowing adjustment along both the vertical and the horizontal axes.

It is an object of this invention to provide a simplified

solution to this problem by the provision of a worm drive. Such drive mechanisms are known and used in profiling machines where, however, only one driven and one dead roll, or two opposed driven rolls are involved.

German Patent No. 1 259 824 to Hirz and the patent of addition thereto, German Patent No. 1 266 268 describe a worm drive for such a profiling machine.

According to the invention a rolling machine is provided with at least one pair of driven rolls which are positionally adjustable with respect to the remaining roll, a drive mechanism comprising a worm wheel mounted on each of the driven roll and a worm driven by means of an external power source, the worm being mounted to remain in mesh with the worm wheels irrespective of the position of the worm wheels within the range of movement of the rolls.

The worm wheel is preferably maintained in mesh with the worm by the mounting of the worm with the axis of rotation thereof parallel to the adjustment travel of the part of the roll, preferably an end thereof, on which the worm wheel is mounted.

In one form of the invention the machine comprises three rolls, two driven rolls located on a plane and one dead roll located thereabove the lower roll being driven by means of a single worm mounted with the axis of rotation

thereof parallel to the plane in which the rolls are mounted, and the rolls being movable along the mounting plane for the positional adjustment thereof with respect to the upper roll.

In a further form of the invention the two lower rolls are adjustable along inclined planes and each lower roll is provided with a worm mounted with the axis of rotation thereof parallel to the plane of adjustment of the roll.

The invention is further described with reference to the accompanying drawings in which:

Figure 1 is a diagrammatic end-on elevation of a rolling machine according to the invention;

and

Figure 2 is a diagrammatic end-on elevation of an alternative machine according to the invention.

The rolling machine 10 shown in Figure 1 comprises a dead, or freely rotating upper roll 12 which is movable in a vertical direction (indicated by the arrow 13), and two worm driven lower rolls 14 which are movable in a horizontal plane (indicated by the arrows 16). As the drawing is an end-on elevation, only the ends of the rolls and the worm wheels 14a associated with the lower roll, can be seen. The worm wheels 14a are meshed with a worm 18 mounted with the axis of rotation thereof parallel to the plane of movement 16 of the lower roll 14. The worm is driven by a motor 20, which could be any kind of a motor.

It will be clear from the drawing that the roll 14 can be moved, within the range of the worm 18, along the plane 16 so that the position of the lower roll 14 with respect to the upper roll 12 can be changed. The upper roll 12 can, of course, be moved up and down to produce the required bending moment. The motor 20 is reversible so that the lower rolls 14, both moving in the same direction on the worm 18, can be reversed.

The machine 100 shown in Figure 2 differs from the machine 10 only in the fact that the adjustment travel of the lower rolls 102 is not horizontal but inclined upwardly towards the upper roll 103. The lower rolls 102 are movable towards or away from the upper roll 103 on inclined planes (indicated by the arrows 104). The worm wheels 105 associated with the rolls 102 are each provided with a separate motor 106 driving an inclined worm 108, each worm 108 meshing with a worm wheel 105.

It is evident that, particularly in machines such as the machine 100 in Figure 2 where each lower roll 102 is provided with a separate drive unit 106, that the substitution of a worm drive for a hydraulic motor or the like, will provide a great reduction in the cost of the machine.

CLAIMS:

1.

A rolling machine is provided with at least one pair of driven rolls which are positionally adjustable with respect to the remaining rolls and a drive mechanism comprising a worm wheel mounted on each of the driven rolls and a worm driven by means of an external power source, the worms being mounted to remain in mesh with the worm wheels irrespective of the position of the worm wheels within the range of movement of the rolls and the two driven rolls being located on a plane, characterised in that the driven rolls are driven by means of a single worm mounted with the axis of rotation thereof parallel to the plane in which the rolls are mounted, and the rolls being movable along the plane for the positional adjustment thereof with respect to the upper roll.

2.

A rolling machine according to claim 1 characterised by the provision of three rolls, two driven rolls located on a plane and one dead roll located thereabove the lower rolls being driven by means of a single worm mounted with the axis of rotation thereof parallel to the plane in which the

rolls are mounted, and the rolls being movable along the plane for the positional adjustment thereof with respect to the upper roll.

3.

A rolling machine is provided with at least one pair of driven rolls which are positionally adjustable with respect to the remaining rolls, and a drive mechanism comprising a worm wheel mounted on each of the driven rolls and a worm driven by means of an external power source, the worms being mounted to remain in mesh with the worm wheels irrespective of the position of the worm wheels within the range of movement of the rolls characterised in that the two driven rolls are adjustable along inclined planes and each driven roll is provided with a worm mounted with the axis of rotation thereof parallel to the plane of adjustment of the roll.

0055102

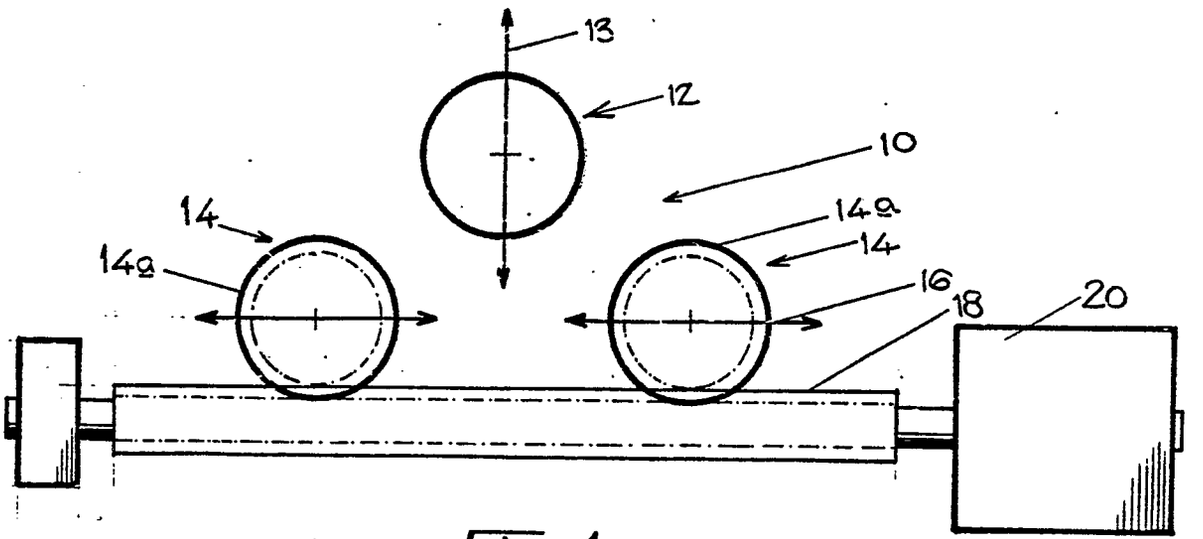



Fig 1

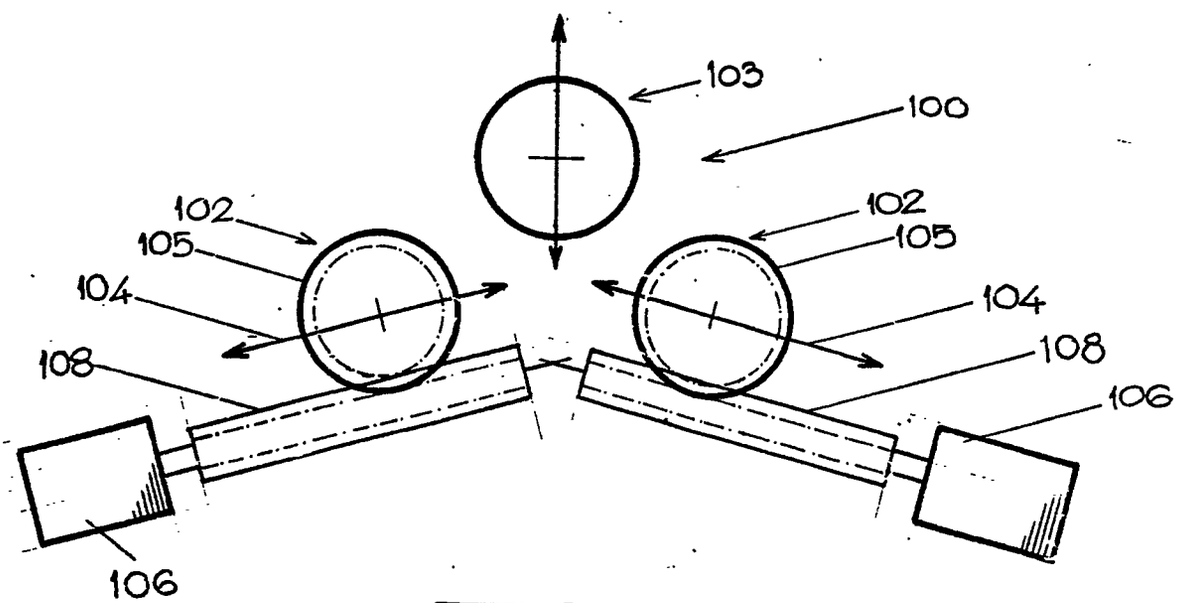



Fig 2