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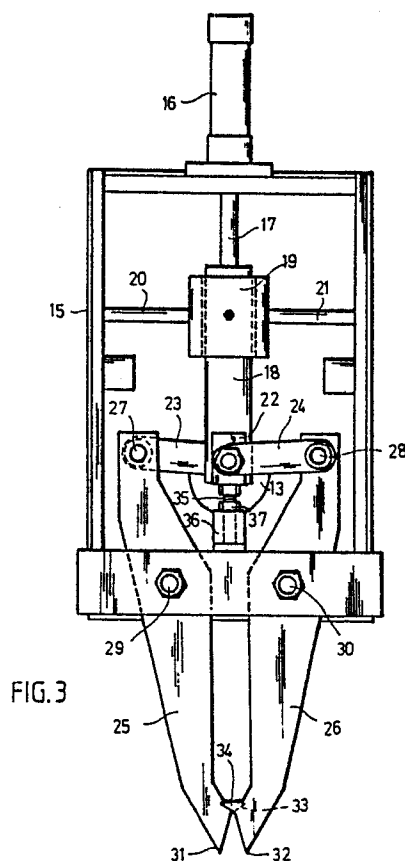
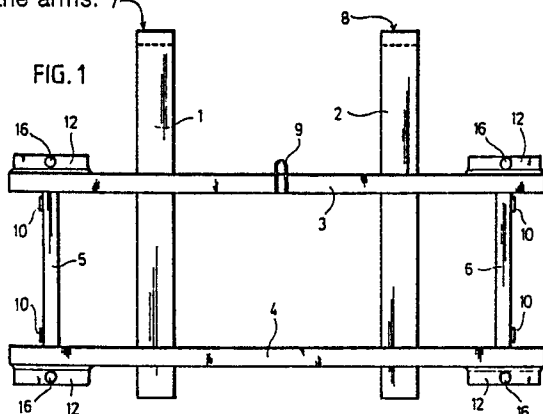
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Device for handling reinforcing mesh.

The device comprises a frame incorporating spaced parallel box section members (1, 2) to receive the arms of a fork lift. The members are joined by transverse members (3, 4,) the outer ends of which are joined by side members (5, 6) provided with attachment points (10) for lifting chains. The ends of cross members (3, 4) carry depending gripper assemblies (12) which are independently pivotable about parallel horizontal axes for insertion into a stack of horizontal mesh sheets. Each gripper assembly comprises a pair of pointed coacting gripper arms (25, 26) having opposed teeth (33, 34). The arms are hydraulically operated from a cylinder (16) via an operating rod (18) and links (23, 24). An adjustable stop (37) determines the closed position of the arms. 7



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DEVICE FOR HANDLING REINFORCING MESH

Sheets of steel mesh for concrete reinforcement are often stored horizontally in stacks. They are notoriously difficult to handle, and the aim of this invention is to provide a device which makes this task much easier.

The present invention provides a device for handling sheets of steel mesh, comprising a frame provided with means for attachment to lifting apparatus, and a plurality of horizontally spaced downwardly directed gripper assemblies depending from the frame for gripping the mesh at spaced positions. When gripped by the device one or more sheets of mesh can be lifted from a stack and carried to a new location.

The invention is exemplified in the following description which is to be read in conjunction with the accompanying drawings in which +

Figure 1 is a plan view of a device in accordance with the invention,

Figure 2 is a front elevation of the mounting plate for one of the gripper assemblies used in the device, and

Figure 3 is a front elevation of a gripper assembly.

Referring to Fig. 1, the device comprises a pair of parallel spaced box-section beams 1, 2 joined to transverse cross beams 3, 4. The ends of cross beams 3, 4 extend beyond the main beams 1, 2 and are joined by side members 5, 6 extending parallel to the beams 1, 2. The ends 7, 8 of beams 1, 2 are open to receive the lifting forks of a fork lift truck. A loop 9 is welded to cross beam 3 mid-way between the main beams 1, 2 for attachment to a safety chain by which the device can be anchored to the fork lift. Four attachment points 10 are also provided on the side members 5, 6 adjacent to the cross beams 3, 4 for the attachment of lifting chains by which the device can be suspended from a crane or overhead gantry for example.

Four mounting plates 11 (Fig.s 1 and 2 = are welded in a vertical position to the outer faces of the cross beams 3, 4, one at each end of the respective beam, for mounting a respective gripper assembly 12. Each plate has a central outwardly projecting stub shaft 13 (Fig. 2 = and contains four tangential slots 14 symmetrically disposed about the shaft 13. The gripper assemblies 12 are all substantially identical in structure and one of these will now be described with reference to Fig. 3.

Each gripper assembly comprises a housing 15 having a hydraulic cylinder 16 mounted in an upright position on its top wall. A piston (not shown = within the cylinder is connected by rod 17 to an axially aligned round bar 18 within the housing. This bar is axially slidable within a guide bush

19 which is attached by stay rods 20, 21 to the inner walls of the housing. The lower end of bar 18 has opposed flats 22 against which two links 23, 24 are pivotally held by a pin 25 passing through the bar 18. The outer ends of links 23, 24 are in turn pivoted to the upper ends of a pair of coacting gripper arms 25, 26 by pins 27, 28. The gripper arms are flat and of elongate form. They extend downwardly through the lower end of the housing, each arm being pivoted at 29, 30 part way along its length adjacent to the point at which it passes through the housing. Below the pivots 29, 30 the arms taper downwardly to terminate in downwardly directed points 31, 32. The arms carry a pair of co-operable inwardly directed teeth 33, 34 which are a little above the points 31, 32 and, when the arms are fully closed as shown, the teeth overlap each other.

The lower end of bar 18 carries an axially aligned threaded stud 35 which is guided within a bush 36 attached to the lower wall of the housing. The stud carries a nut 37 which can be adjusted along the stud to determine the closed position of the gripper arms by contact with the upper end of bush 36.

The rear wall of the housing 15 contains a round aperture (not labelled = to receive the stub shaft 13, and bolts (not shown = are inserted through the tangential slots 14 into the housing, thereby allowing the gripper assembly a limited degree of independent angular movement about the stub shaft in the plane of movement of the gripper arms.

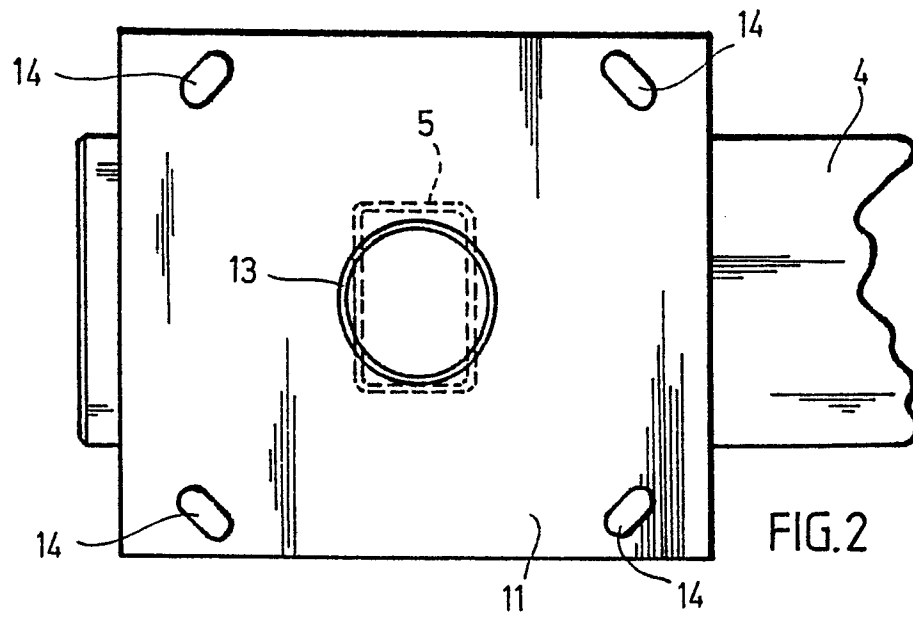
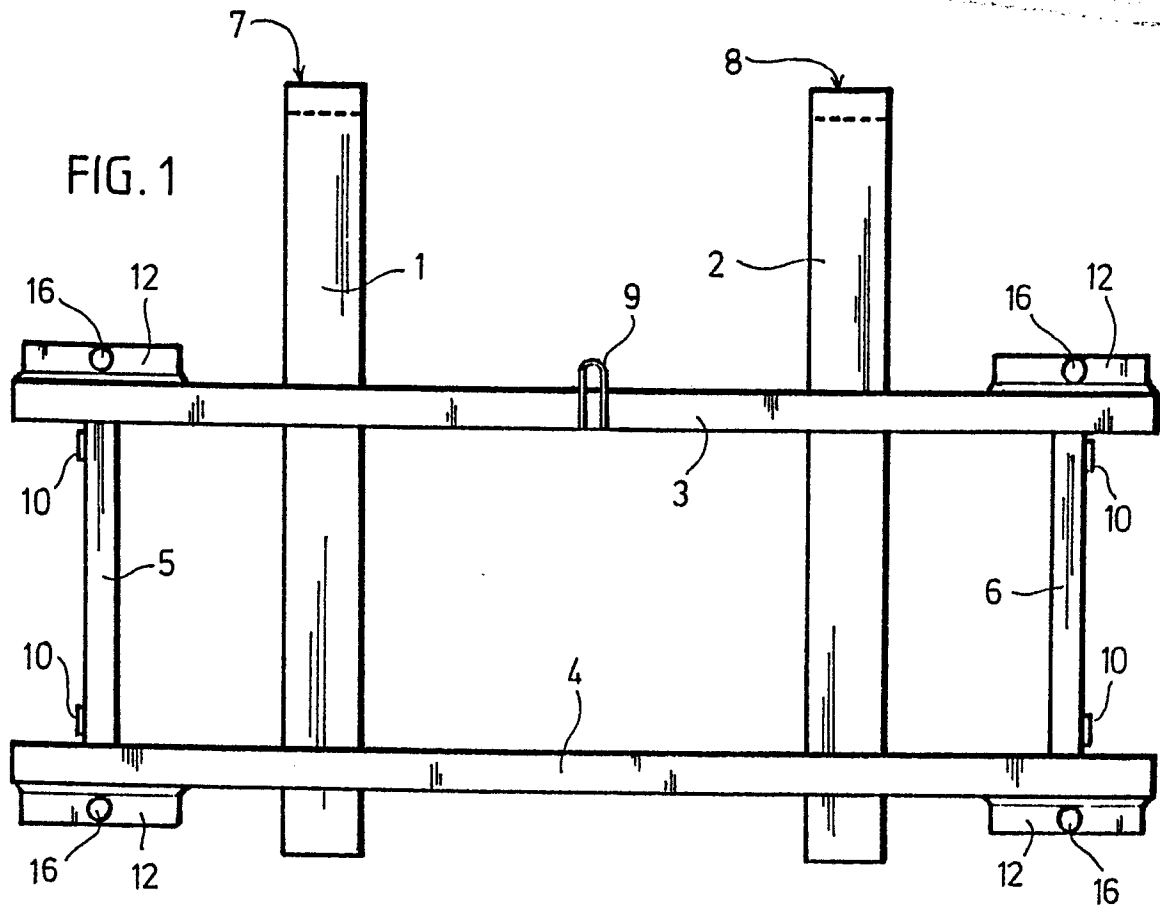
In use the device is lowered over a stack of steel mesh with the pistons withdrawn into the cylinders 16 so that bar 18 is raised and the lower ends of the arms 25, 26 are spaced apart. The lower ends of the arms penetrate the sheets of mesh and the points 31, 32 ensure that the assembly is angularly deflected about the stub shaft 13 should the arms contact a strand of the mesh. When the arms have penetrated several layers of mesh the cylinders are actuated to move the bar 18 down and thus move the teeth 33, 34 together beneath the strands. The hydraulic circuit that operates the cylinders 16 includes a hydraulic accumulator so that the pressure applied to the arms is sustained after they move together. This is important to ensure that should the teeth 33, 34 close onto a strand of the mesh they do not release it during the subsequent lifting or carrying operation.

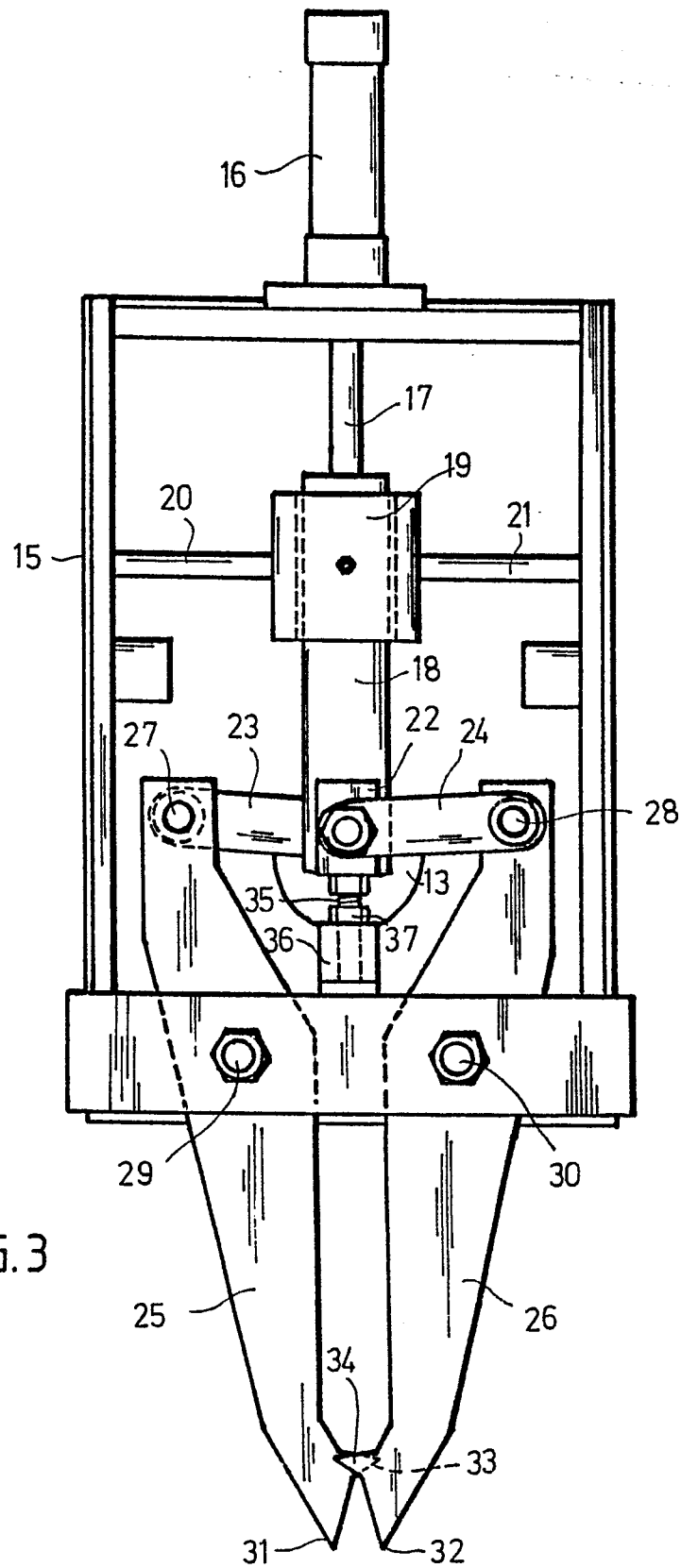
Claims

1. A device for handling sheets of steel mesh, characterised by a frame (1 - 4) provided with means (7, 8; 10) for engagement by lifting apparatus, and a plurality of horizontally spaced downwardly directed gripper assemblies (12) depending from the frame for gripping the mesh at spaced positions. 5
2. A device according to Claim 1, in which the gripper assemblies (12) each comprise a pair of coaxing downwardly directed gripper arms (25, 26). 10
3. A device according to Claim 2, in which the lower ends of the arms (31, 32) are tooth-like. 15
4. A device according to Claim 2 or 3, in which the arms have inwardly directed teeth (33, 34) adjacent to their lower ends.
5. A device according to Claim 2, 3 or 4, in which the gripper assemblies include hydraulic actuating means (16) for moving the gripper arms together. 20
6. A device according to Claim 5, in which the said hydraulic actuating means (16) is arranged to axially move an operating bar (18) which is coupled by links (23, 24) to the upper ends of the gripper arms (25, 26), which are pivoted (29, 30) part way along their length on substantially parallel pivot axes. 25
7. A device according to Claim 6, in which the operating bar (18) carries stop means (35, 37) which is cooperable with a fixed abutment (36) to determine the closed position of the arms. 30
8. A device according to any preceding claim, in which the gripper assemblies (12) are mounted for independent movement in a horizontal direction. 35
9. A device according to any preceding Claim, in which the frame comprises a pair of spaced substantially parallel box section beams (1, 2) having open ends (7, 8) to receive the lifting forks of a fork lift truck. 40
10. A device according to any preceding claim, in which the frame is provided with two pairs of horizontally spaced attachment points (10) for lifting chains. 45

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 4)
X	CH-A- 566 262 (E. WIRZ) * whole document * ---	1-3,5,6 ,8	B 66 C 1/62 B 66 C 1/28
A	DE-A-1 556 338 (BETONSTAHL) * page 3, lines 5-9; figures 1-3 * ---	3,6	
A	DE-U-7 103 738 (HOLSTEIN & KAPPERT) * page 3, lines 13,14; figure 1 * ---	4	
A	GB-A-2 048 212 (ZAHNRADFABRIK FRIEDRICHSHAFEN) * page 2, lines 105-115; figure 1 * ---	7	
A	US-A-3 930 585 (LYNCH) * column 2, line 65 - column 3, line 14; figures 1-4 * ---	9	
A	FR-A-1 305 361 (SOCIETE AUXILIAIRE DE MANUTENTION MODERNE) * page 1, right-hand column, lines 5-11; figure * -----	10	
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			B 66 C 1/00
The present search report has been drawn up for all claims			
Place of search BERLIN		Date of completion of the search 05-07-1988	Examiner SIMON J J P
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document	