

CONTENTS

PAGE

PREFACE	V
-------------------	---

CHAPTER I

PROVISION	1
---------------------	---

Passenger lifts—Specification—Lifting ropes—Clearances for car and counterweight—Sheaves and pulleys—Car—Gates—Guides—Gearing—Safety devices—Wiring—Machine room—Counterweight—Control—Speed—Size and capacity of car—Type of control—Cost—Bank of lifts—Maximum running speed of cars—Rates of acceleration and retardation—Average number of stops made per journey—Average distance between stops—Time required for passengers to enter and leave the car—Goods lifts—Service lifts—Typical installations

CHAPTER II

ACCOMMODATION	14
-------------------------	----

Well—Pit depth—Car clearances—Machine room—Space requirements—Noise

CHAPTER III

TYPES OF DRIVES	29
---------------------------	----

Traction drive—Sheaves—Single-wrap drive—Double-wrap drive—Coefficient of friction—Diverting pulleys—Drum drive

CHAPTER IV

ROPING SYSTEMS AND ROPES	39
------------------------------------	----

Methods of roping—Machine overhead—Machine below—Traction drives—Drum drives—Compensating ropes—Ropes—Material—Size—Lays—Factor of safety—Round strand ropes—Other lift ropes—Ropes of special strand construction—Preformed ropes—Rope fastenings—Spliced ends—Bulldog clips—Sockets—Rope equalizing gear

CHAPTER V

MOTORS	59
------------------	----

Lift motors: general—Size—Direct current motors—Motors for car speeds up to about 120 ft. per min.—Motors for car speeds between about 120 ft. per min. and 300 ft. per min.—Motors for car speeds above 300 ft. per min.—Alternating current motors—Polyphase supply—Motors for car speeds up to about 120 ft. per min.—Motors for car speeds between about 120 ft. per min. and 300 ft. per min.—Squirrel-cage induction motors—Slip-ring induction motors

—Slip-ring variable voltage control—Tandem motors—A.c. commutator motors—Motors for car speeds above 300 ft. per min.—Single-phase supply—Motors for car speeds up to about 120 ft. per min.—Repulsion-induction motors—Capacitor motors—Motors for car speeds between 120 ft. per min. and 300 ft. per min.—Motors for car speeds above 300 ft. per min.

CHAPTER VI

VARIABLE VOLTAGE EQUIPMENT	88
--------------------------------------	----

Advantages—Speed regulation—Exciter—Booster

CHAPTER VII

BRAKES	95
------------------	----

Types of brakes—A.c. versus d.c. brakes—Oil-immersed brake—Gearless motor brake—Torque motor brakes

CHAPTER VIII

GEARING	104
-------------------	-----

Worm gearing: over- and under-types—Materials—Irreversibility—Efficiency—Thrust races—Tandem gearing—Spur gearing

CHAPTER IX

CARS, COUNTERWEIGHTS, AND GUIDES	112
--	-----

Passenger cars—Car floor area—Goods cars—Car travelling cable—Counterweights—Guides—Material—Sizes—Fixing and jointing—Guide lubrication

CHAPTER X

GATES, DOORS, AND LOCKS	132
-----------------------------------	-----

Gates—Doors—Collapsible steel shutter door—Balanced rise-and-fall doors—Single-hinged door—Double-hinged door—Single-leaf slide—Two-leaf, two-speed slide—Two-leaf, centre opening slide—Two-leaf slide and stationary—Two-leaf slide and swing—Three-leaf, two-speed slide and stationary—Three-leaf, two-speed slide and swing—Four-leaf slide, two-speed centre opening—Methods of operation—Manually operated—Self-closing—Automatic operation—Semi-automatic operation—Power operation—Locks—Car gate or door locks—Car gate delayed contact—Landing gate or door locks—Lock requirements—Wiring of locks

CHAPTER XI

INDICATORS	159
----------------------	-----

Car indicators—Indicator wiring diagram—Landing indicators—Directional indicators—Position indicators

CONTENTS

ix

CHAPTER XII

PAGE

SAFETY FEATURES	168
---------------------------	-----

Car and counterweight safety gear—Instantaneous type—Gradual wedge clamp safety gear—Governor rope carriers—Governors—Flexible guide clamp safety gear—Safety gear stopping distances—Car and counterweight clearances—Terminal limit switches—Ultimate or final limit switches—Buffers—Spring buffers—Oil buffers—Spring return oil buffer—Gravity return oil buffer—Guarding—Car emergency handle—Gates—Gate or door locks—Landing gate or door clearance—Car apron—Car emergency exit—Emergency stop push

CHAPTER XIII

FLOOR LEVELLING SYSTEMS	196
-----------------------------------	-----

Direction switches—Floor selectors—Corrective levelling systems—The “Micro-Drive”—The “Leveltric” system—“Trulevel” geared machine—Inductor and inducer systems

CHAPTER XIV

CAR CONTROL SYSTEMS	218
-------------------------------	-----

Simple car switch control—Pre-register control—Departmental store control—Signal control—Automatic control—Semi-automatic control—Automatic collective control—Dual control—Automatic dispatching of cars

CHAPTER XV

CONTROLLERS	230
-----------------------	-----

General—Low voltage controller—Control features—Car switch controllers—Elementary car switch controller—Four-floor car switch controller with two-speed d.c. motor—Four-floor car switch controller with “Trulevel” machine—Four-floor car switch controller with gearless motor and variable voltage control—Automatic controllers—Elementary automatic controller—Semi-automatic single-speed controller—Fully automatic single-speed with prelocks and inductors—Fully automatic two-speed controller with a.c. commutator motor—Fully automatic two-speed controller with tandem motor

CHAPTER XVI

MAINTENANCE AND TESTING	274
-----------------------------------	-----

Inspections made in machine room—Inspections made from landings—Inspections made from inside car—Inspections made from top of car—Inspections made from pit—Acceptance tests—Dead load tests—Energy consumption—Full load levelling—Irreversibility—Safety gear tests—Governor tripping speed—Contract speed—Car emergency handle—Car size—Lift balance—Leveling empty—Car and counter-weight clearances—Car and landing gates—Controller—Acceleration and retardation—Normal terminal stopping switches—Final terminal stopping switches—Oil buffers—Ropes

CONTENTS

CHAPTER XVII

LIFT ACCIDENTS	PAGE 295
BIBLIOGRAPHY	306

APPENDIX I

FACTORIES ACT, 1937: SECTIONS RELATING TO LIFTS, THE HOISTS EXEMPTION ORDER, 1938	308
--	-----

APPENDIX II

BRITISH STANDARD SIZES OF WIRE ROPES OF ROUND STRAND AND SPECIAL STRAND CONSTRUCTIONS.	314
---	-----

APPENDIX III

BREAKING LOADS OF ROUND STRAND ROPES	315
--	-----

APPENDIX IV

BREAKING LOADS OF SPECIAL STRAND ROPES	319
--	-----

APPENDIX V

INTERFERENCE WITH WIRELESS RECEPTION DUE TO ELECTRIC LIFTS	323
---	-----

APPENDIX VI

NOTES ON WEAR OF WIRE ROPES	326
INDEX	331

INSETS

FIG. 55. PERFORMANCE CURVES OF B.T.H. TYPE CH LIFT MOTOR	<i>facing page</i> 79
FIG. 200. WIRING DIAGRAM FOR CONTROLLER FOR "TRULEVEL" MACHINE	<i>facing page</i> 243